

#WWDC19

Taking iPad Apps for Mac to the Next Level

Jamie Montgomerie, UIKit

Glen Low, UIKit

Nils Beck, AppKit

Chris D'Angelo, Xcode

Taking your app further

Application lifecycle

Distributing your application

Making Your UIKit App a Better Mac App

Better iPad apps
are better Mac apps

Support Varying Screen Sizes



Implement Great Keyboard Support

Use `UIKeyCommand`

Adopt standard responder actions

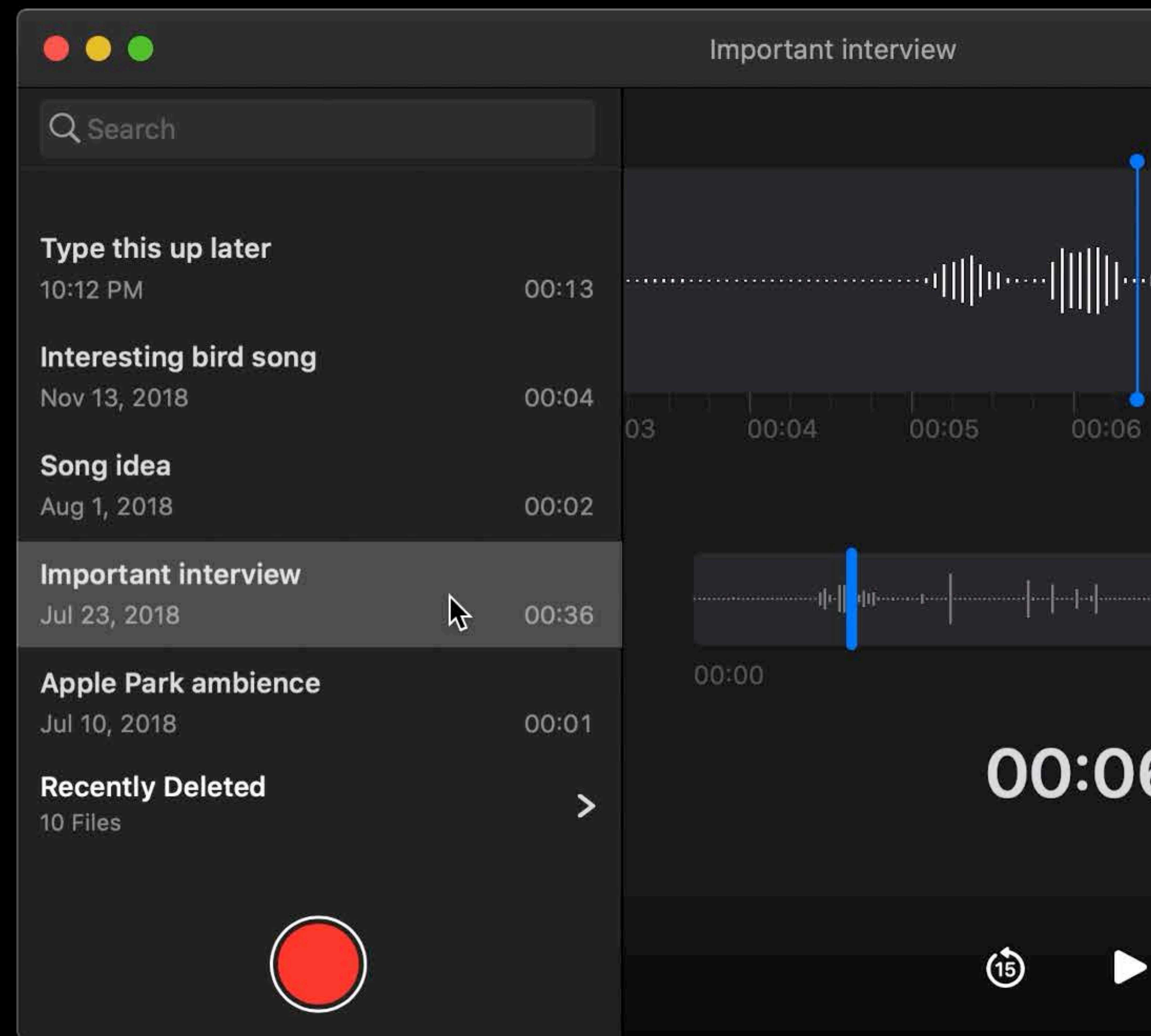
Look after your responder chain



Make Great Use of Drag and Drop

Use the UIKit Drag and Drop APIs

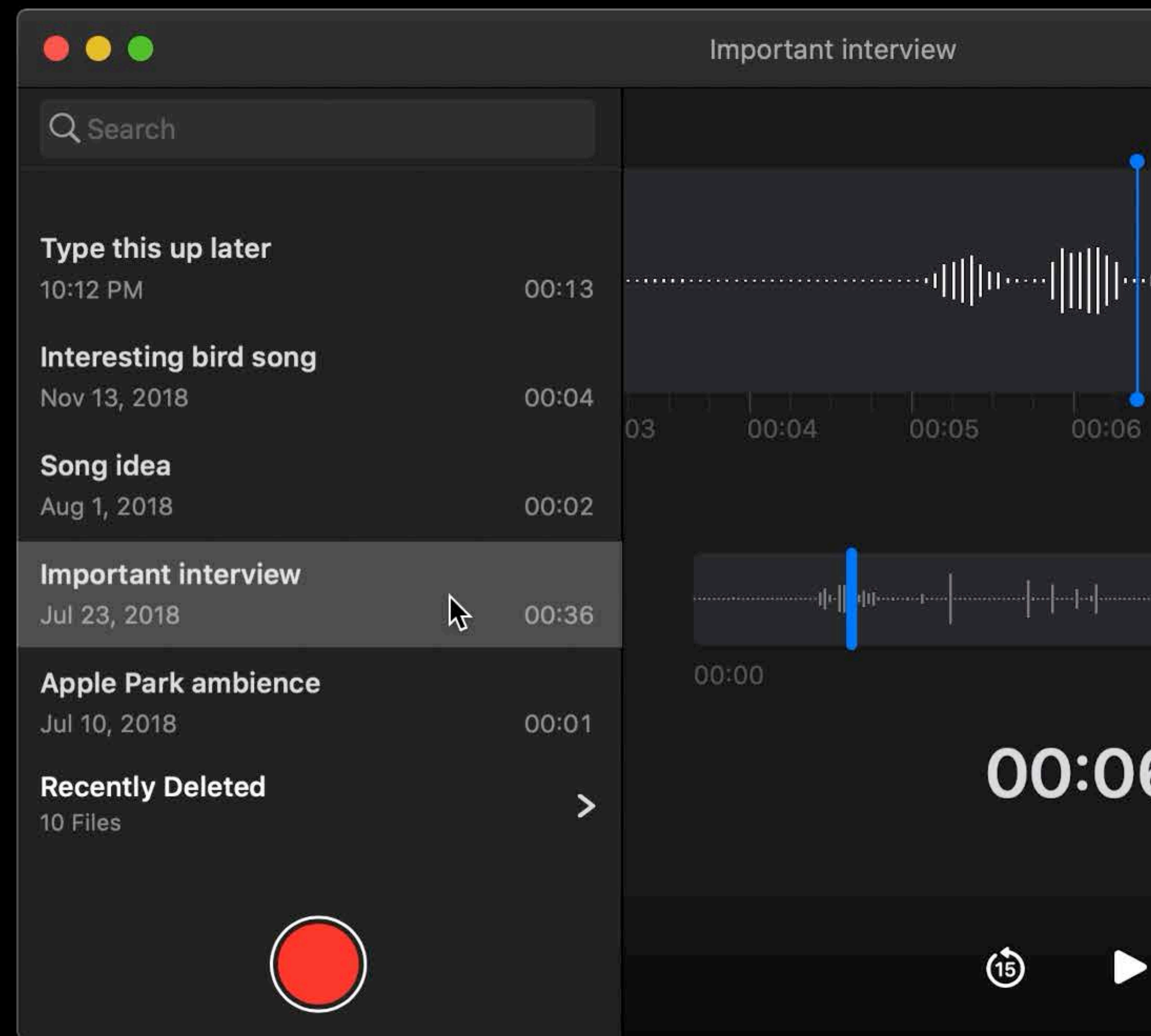
- UIDragInteraction
- UIDropInteraction



Make Great Use of Drag and Drop

Use the UIKit Drag and Drop APIs

- UIDragInteraction
- UIDropInteraction



Use the Latest APIs

`WKWebView`, not `UIWebView`

Metal, not OpenGL ES, etc.

Most deprecated iOS APIs
are unavailable on Mac



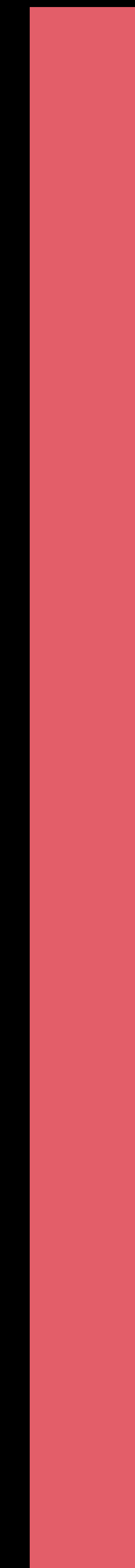
Support New iOS 13 features

Multi Window

Dark Mode

Symbol Images

Etc.

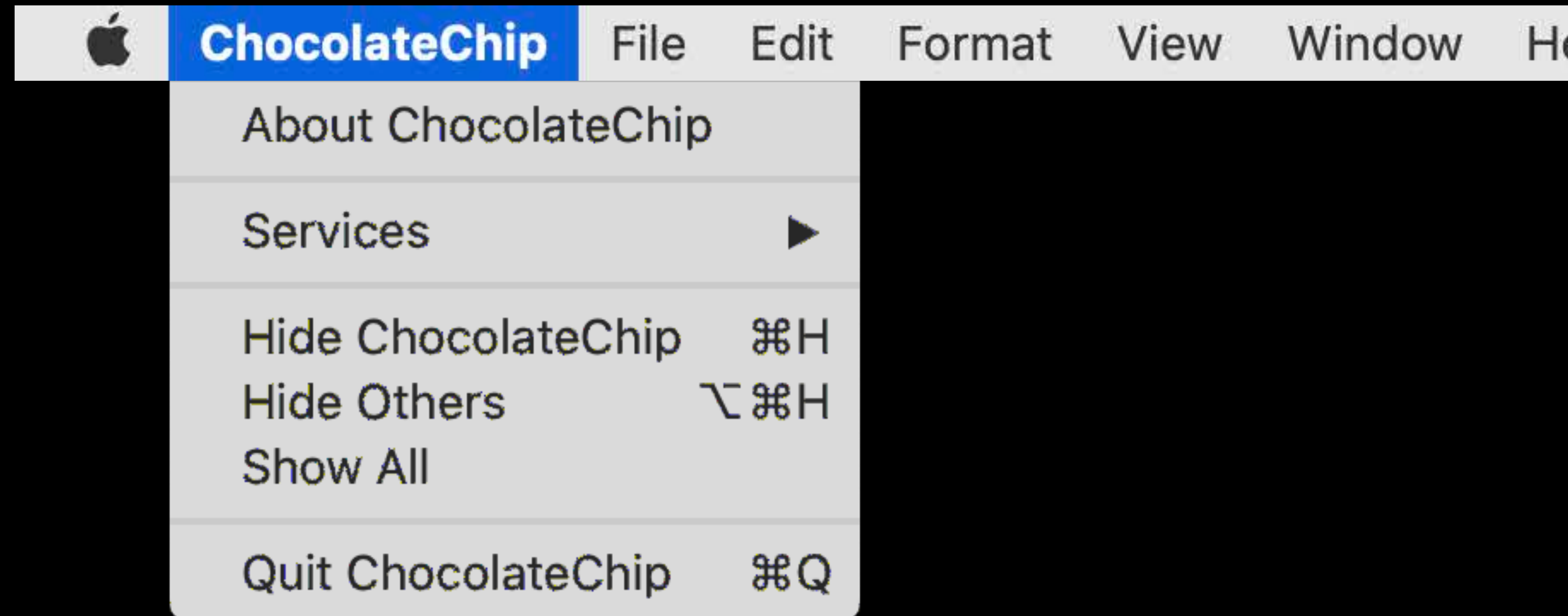


Better Mac apps contain
refinements for Mac

The Menu Bar

New UIKit APIs

- `UIKeyCommand`
- `UICommand`
- `UIMenu`
- `UIMenuBuilder`

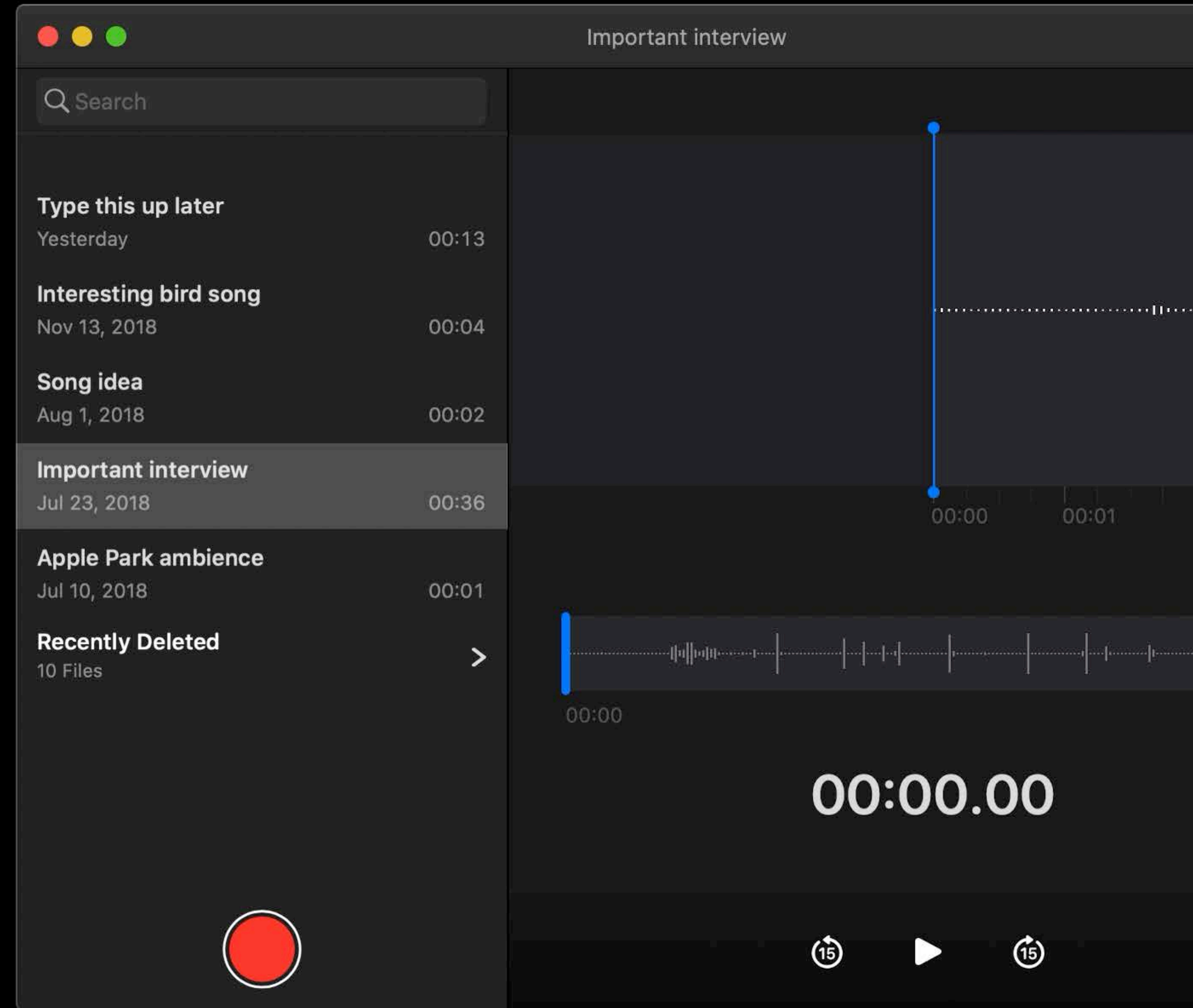


Context Menus

New UIKit APIs

- `UIContextMenuInteraction`
- `UIAction`
- `UICommand`

Expressed as context menu on Mac

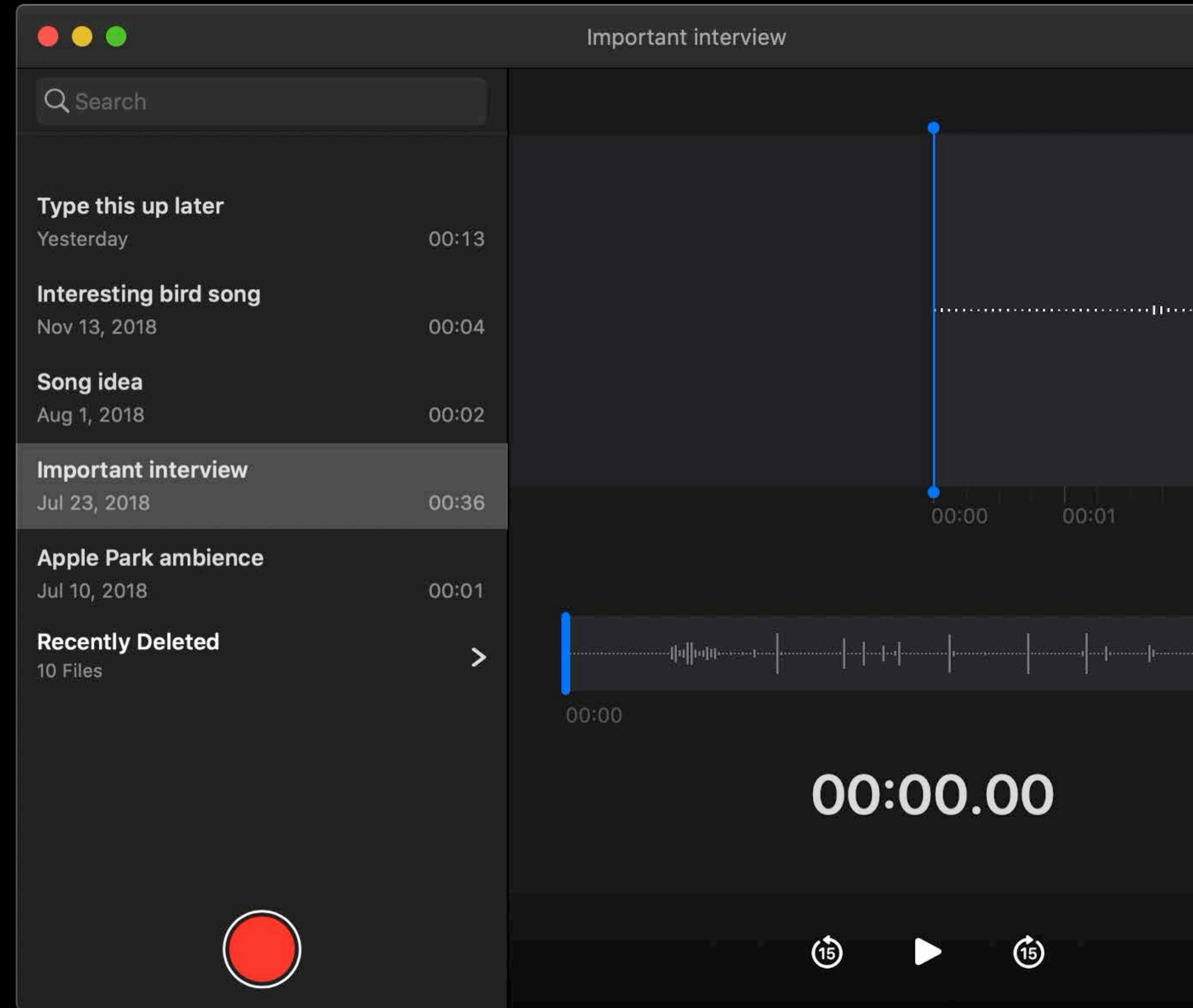


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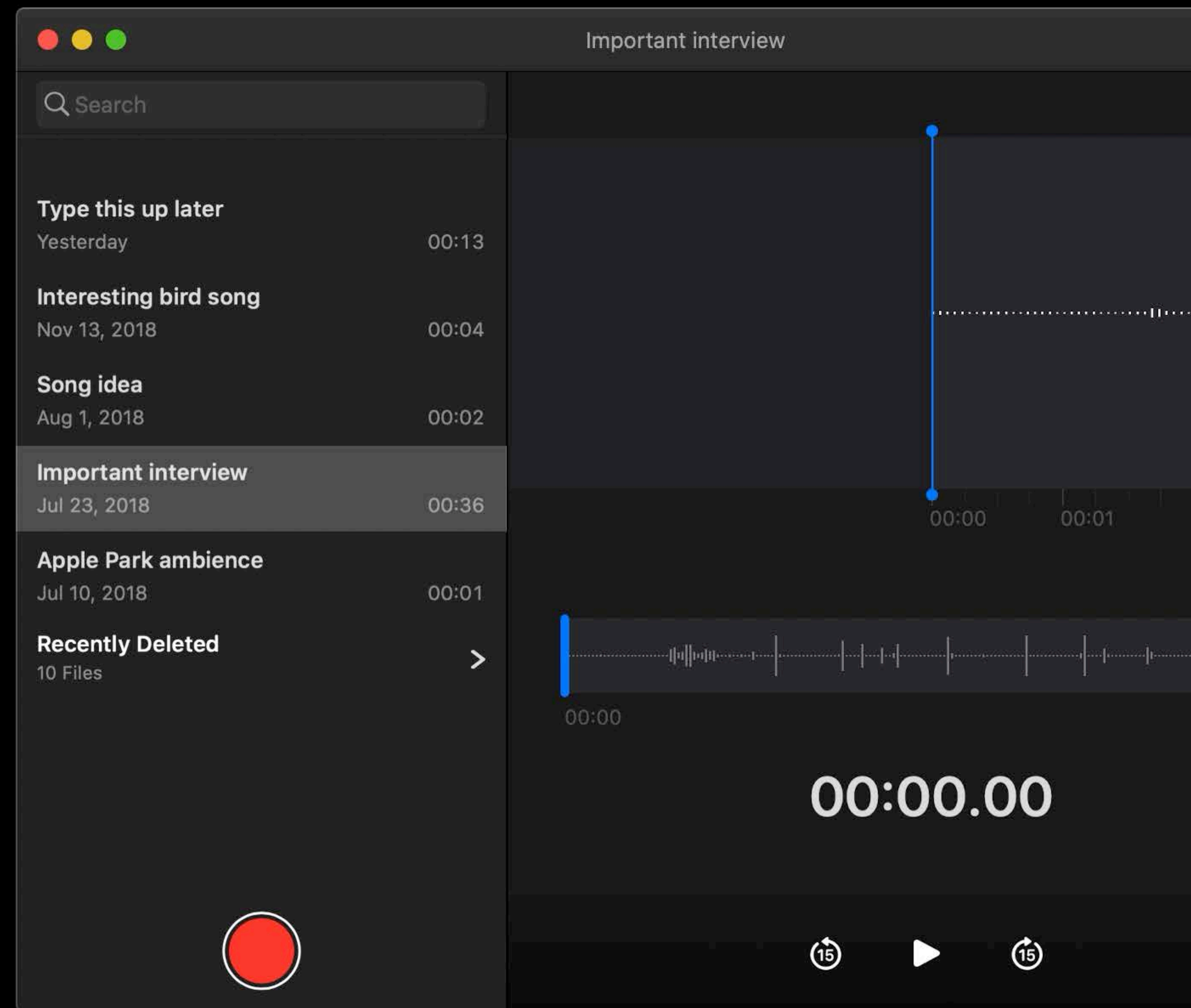


Context Menus

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Sidebars

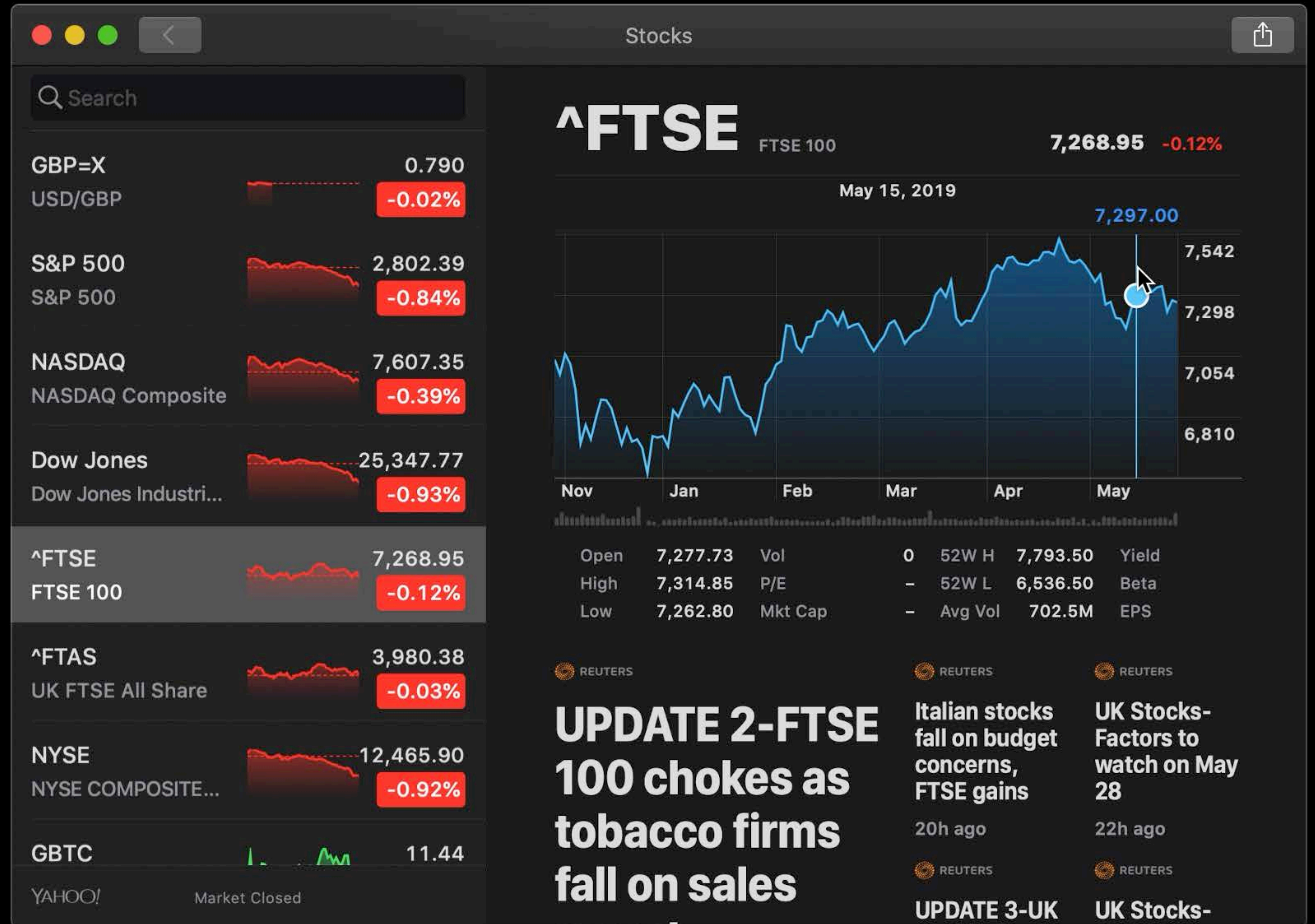
Mostly Old UIKit APIs

- UISplitViewController Properties
 - minimumPrimaryColumnWidth
 - maximumPrimaryColumnWidth
 - primaryBackgroundStyle
- UITableView Changes Style
 - UITableViewStyleGrouped
 - UITableViewStyleInsetGrouped

Hover

New UIKit API

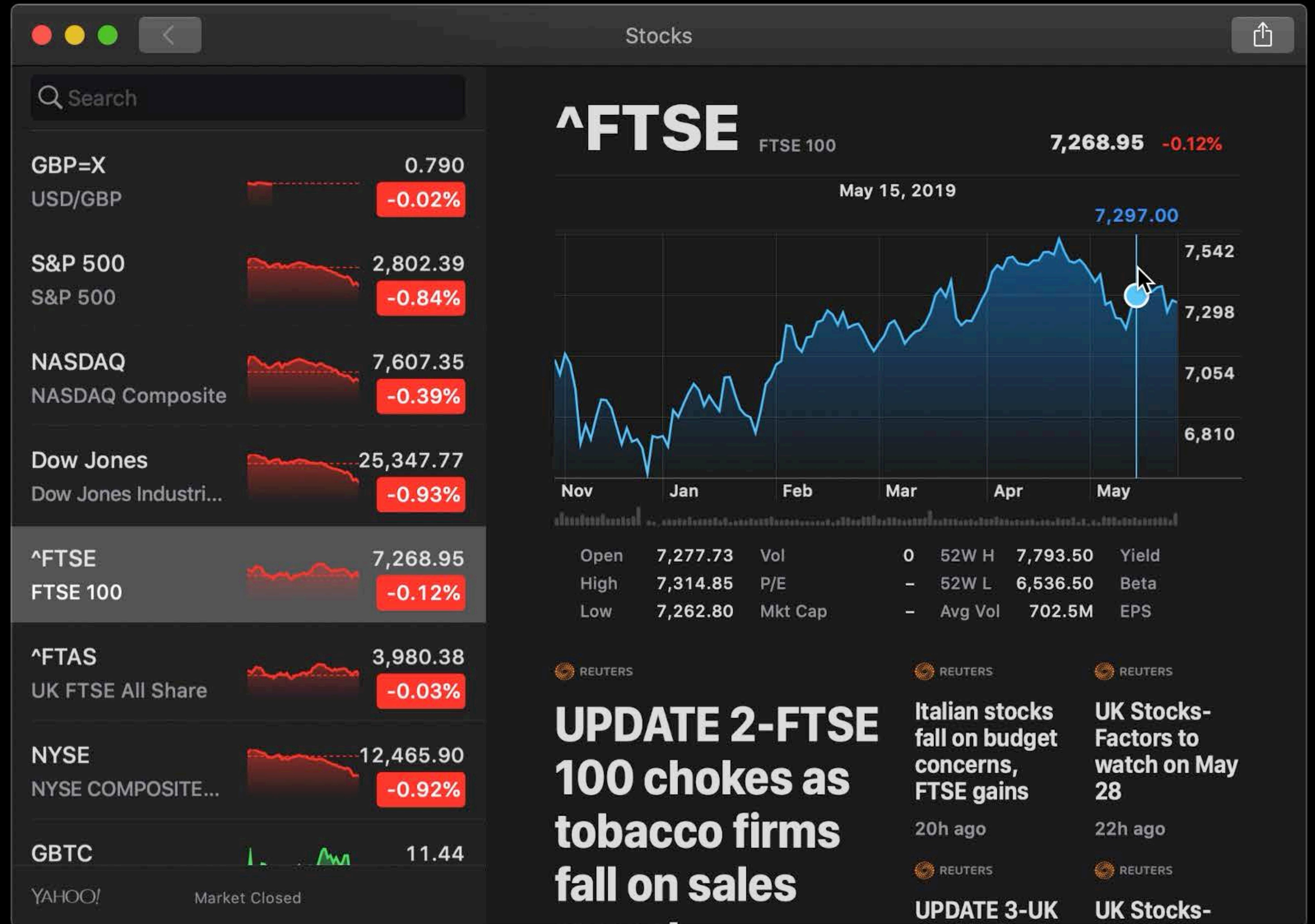
- `UIHoverGestureRecognizer`
- Works just like other gesture recognizers.



Hover

New UIKit API

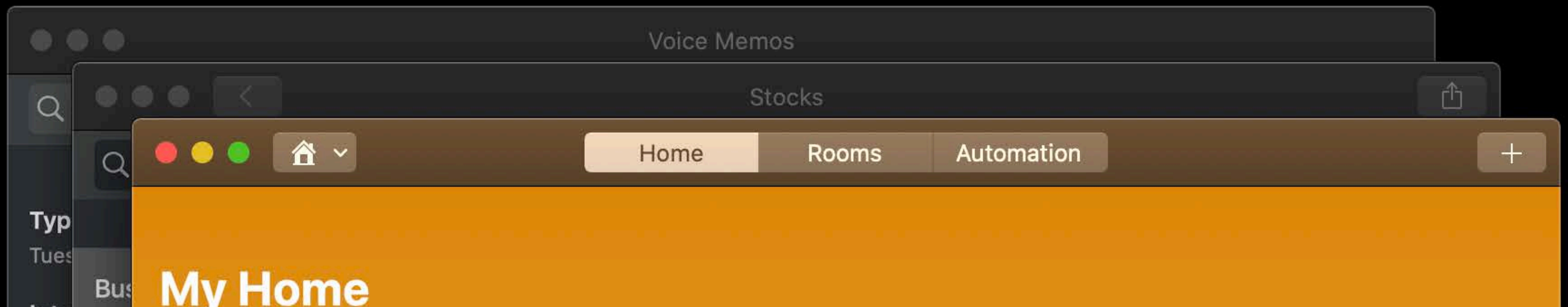
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Mac Toolbars

Dip your toes into AppKit API!

- `NSToolbar`
- `UIWindowScene.titlebar.toolbar`



Touch Bar

Continue diving into AppKit

- `UIResponder.touchbar`
 - `NSTouchBar`
- `UIViewController.childViewControllerForTouchBar`
- `UIViewController.setNeedsTouchBarUpdate`



Other Mac Features

Take control of window sizing

Implement support for printing

Author a Help Book

Customize Assets and Strings

Mac App Icon

Mac App Icon



Demo

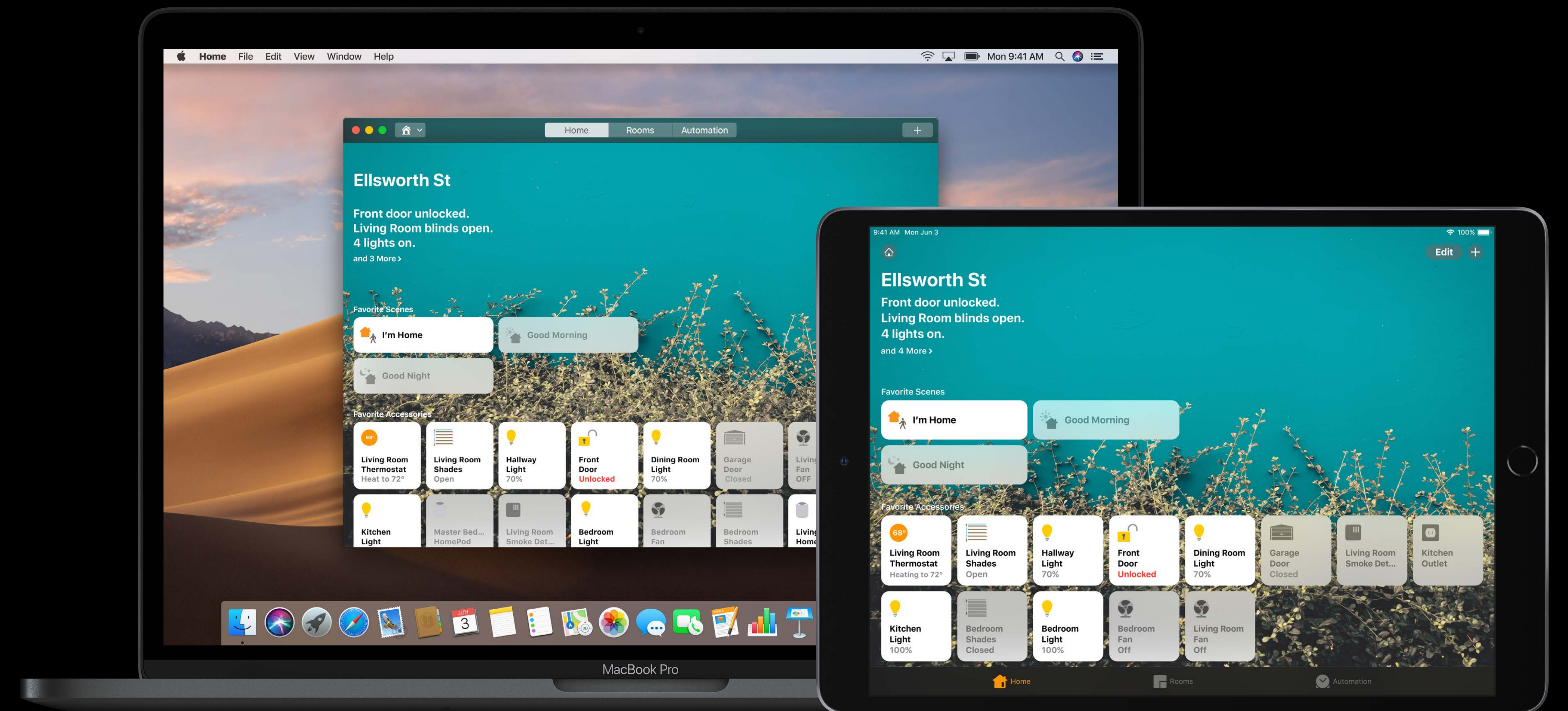
Design Considerations

Navigation

Use a sidebar

Reconsider use of tab bars

Make use of the Mac toolbar



Layout

Be flexible in layout

Use the space in the big window

Reflow, redesign, or reword

Typography

Baseline font sizes are not the same

- Mac: 13 points
- iPad: 17 points

UIKit apps are scaled to 77% on Mac

Typography

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The Menu Bar

What should go in the menu bar?

Think about your app's complete functionality

Input

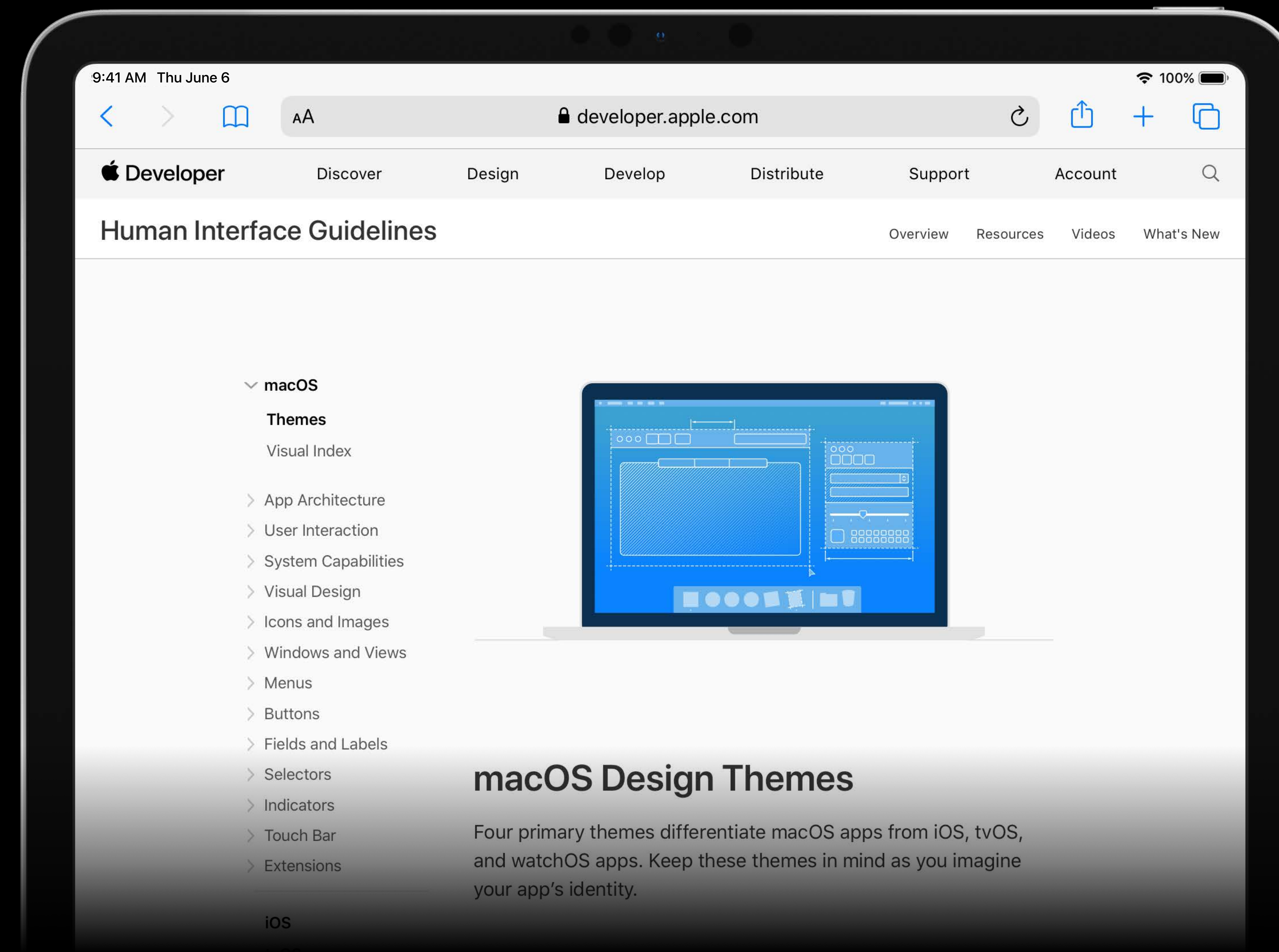
iPad is optimized for multitouch

Macs always have keyboards

Macs always have trackpads or mice

Consider accessibility too

More Design Resources



Application Lifecycle

Nils Beck, AppKit

iOS App Lifecycle

≠

macOS App Lifecycle

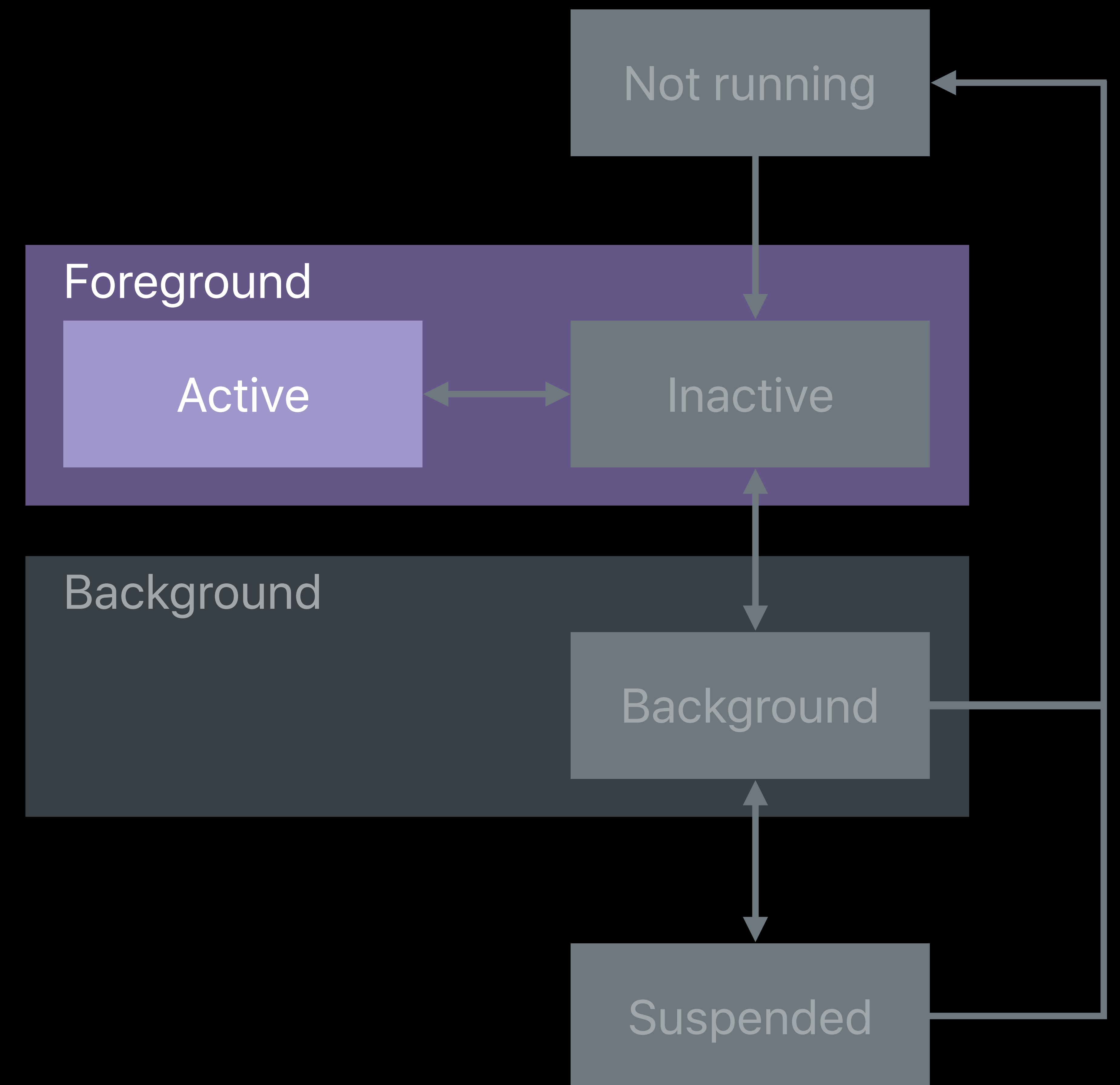
App Lifecycle States

iOS Review



Foreground + Active

- Normal interaction



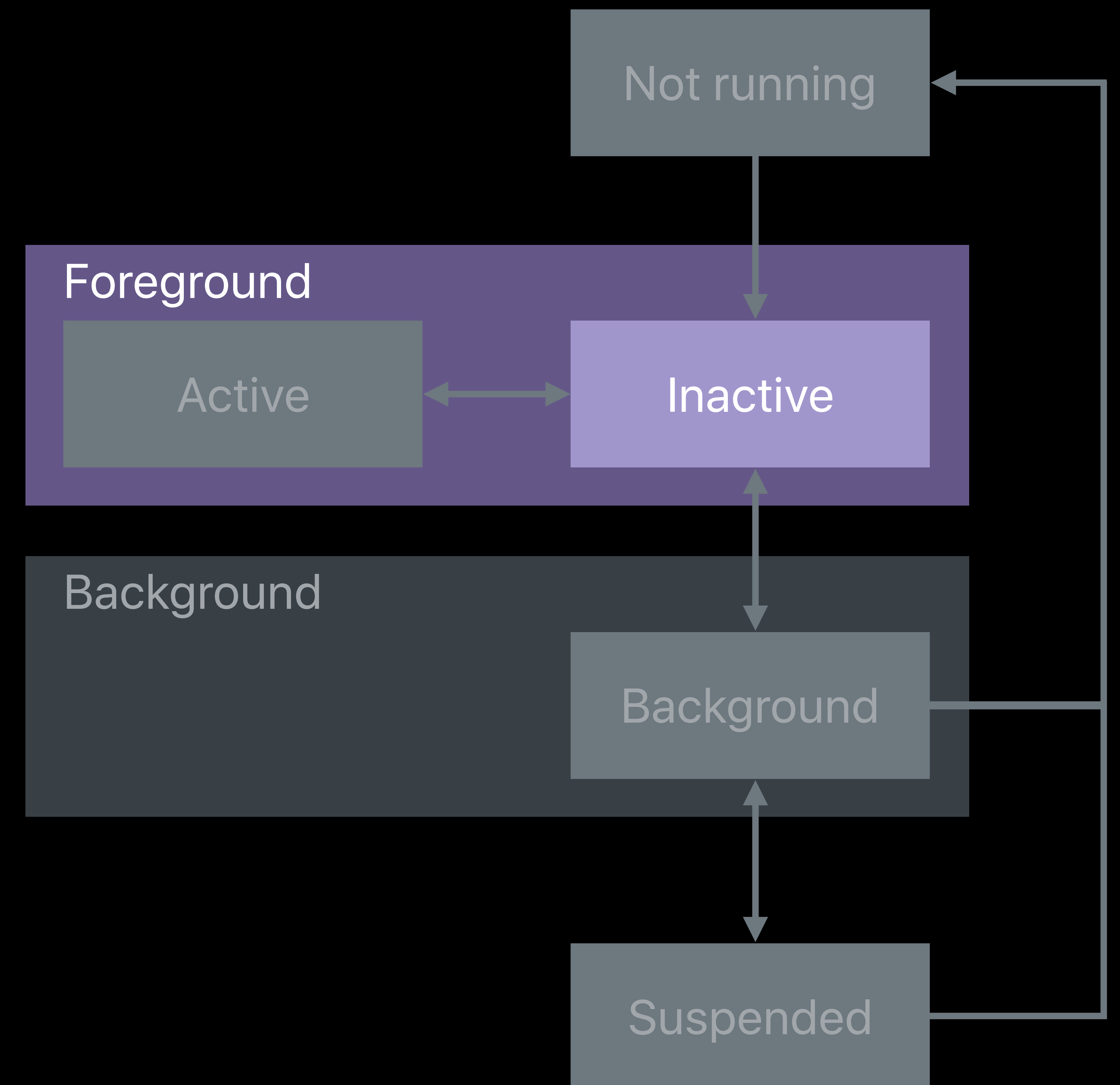
App Lifecycle States

iOS Review



Foreground + Inactive

- Not receiving events
- Temporary interruption



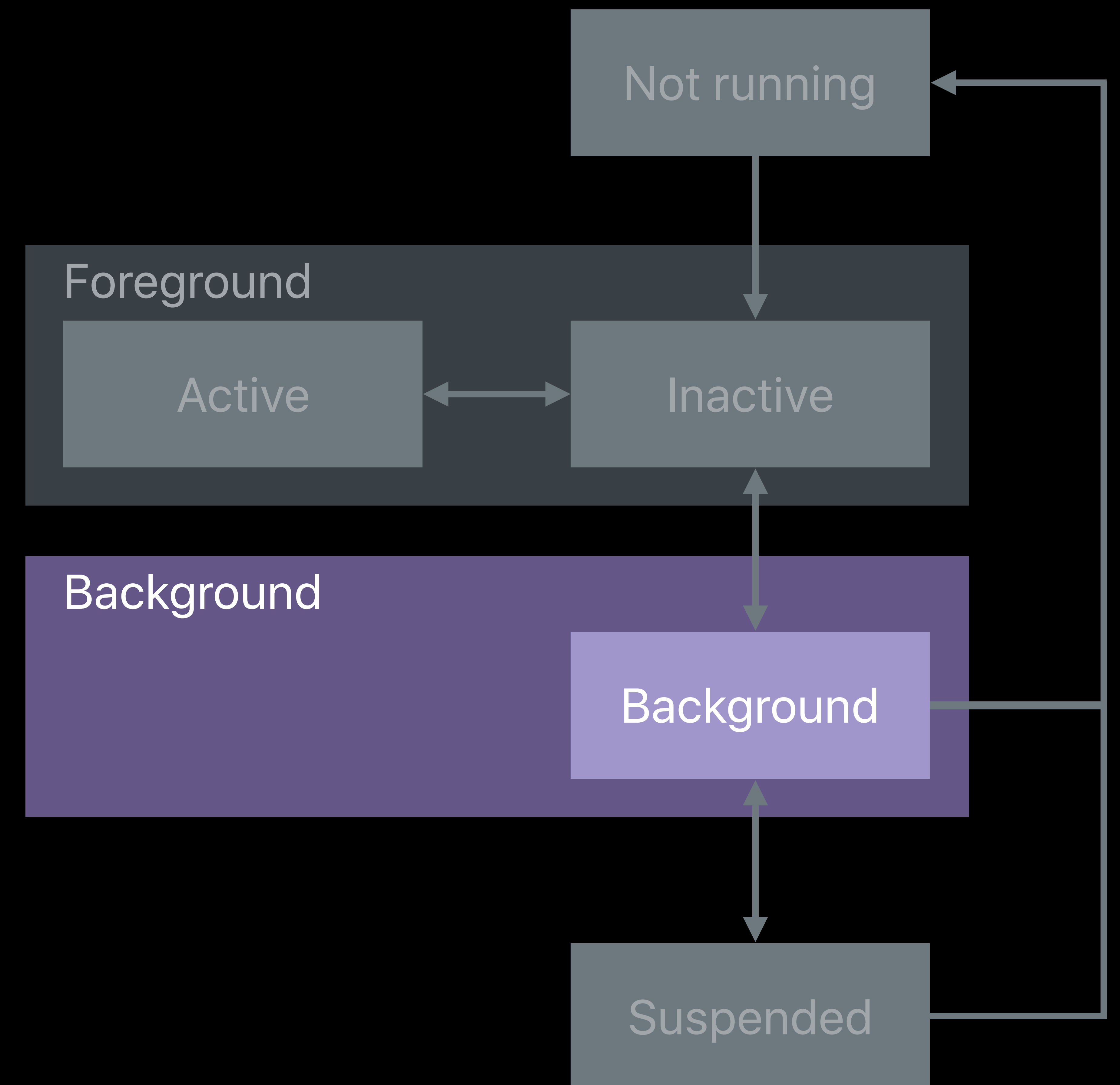
App Lifecycle States

iOS Review



Background

- About to be suspended
- Background tasks allowed



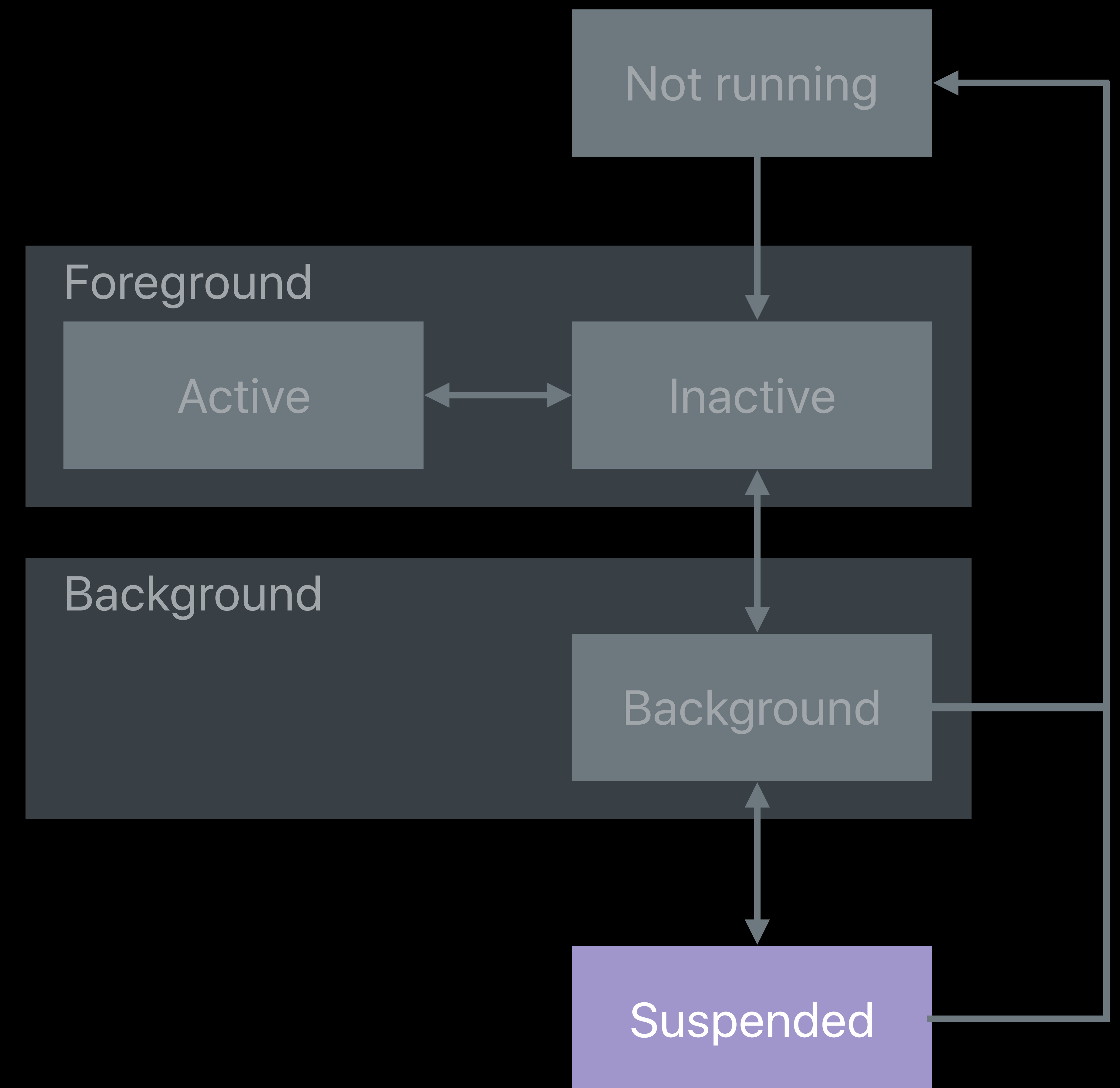
App Lifecycle States

iOS Review



Suspended

- No code is executed
- May be killed without warning



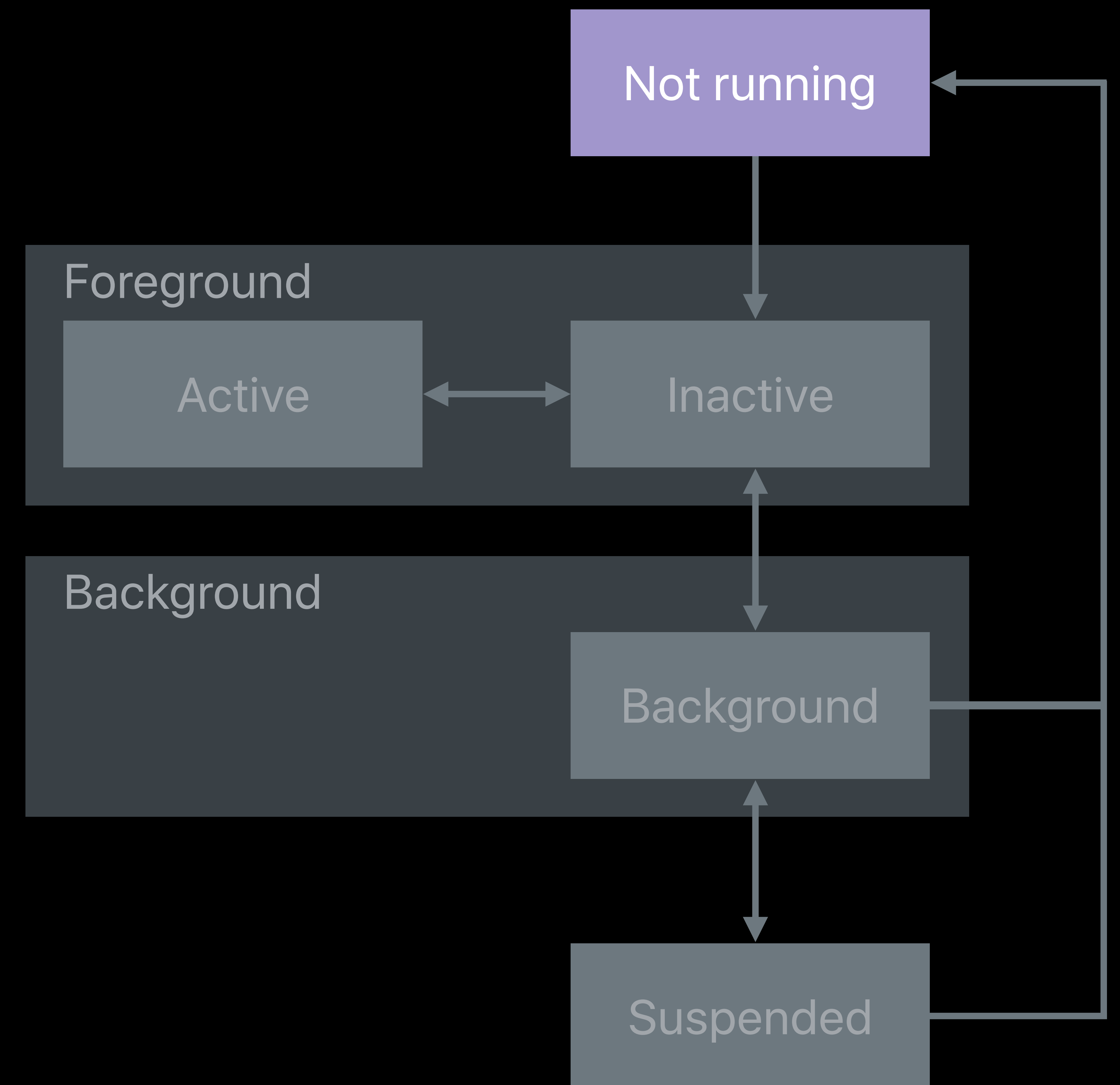
App Lifecycle States

iOS Review



Not running

- Not in memory

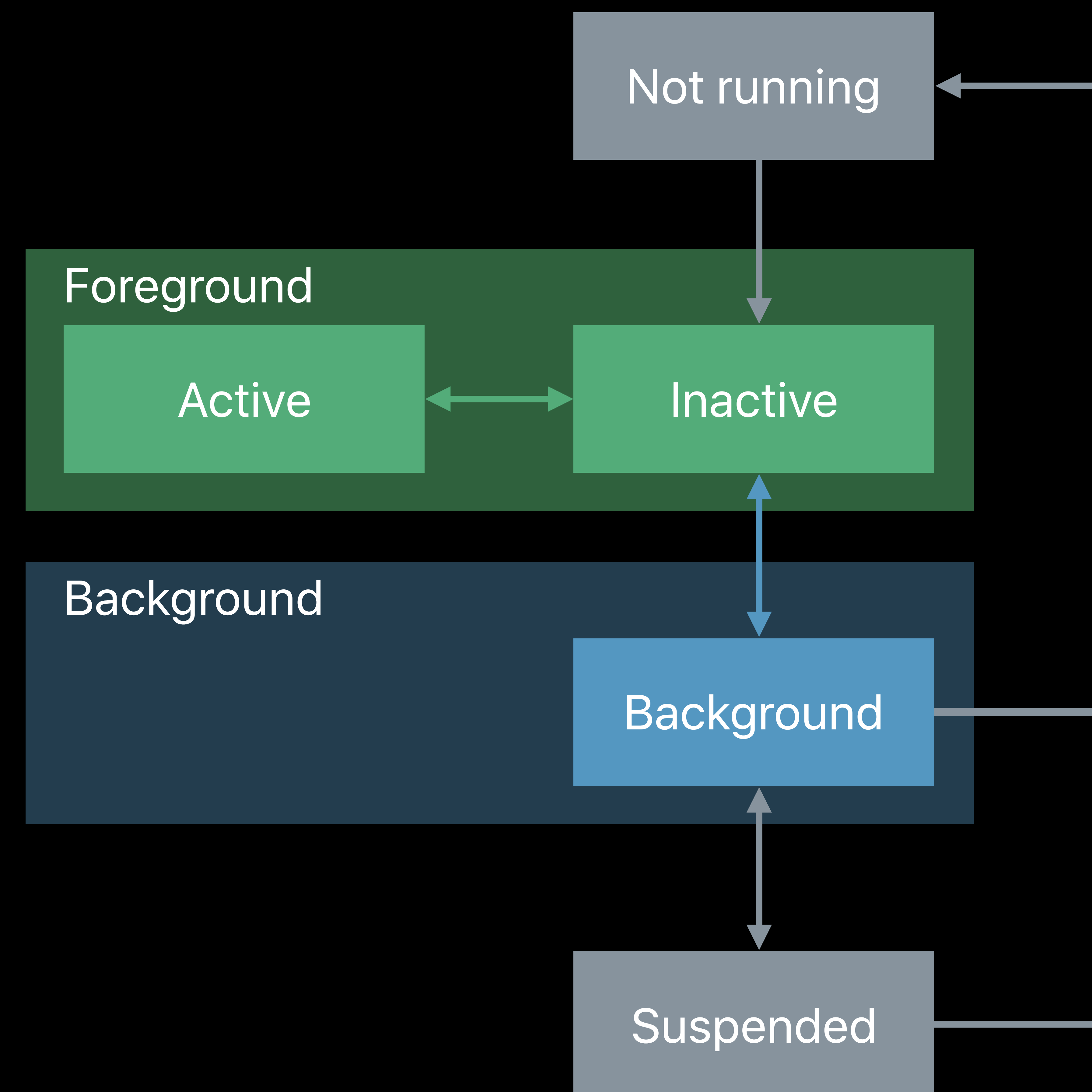


App Lifecycle States

State Changes



```
// UIApplication Lifecycle Notifications  
.didFinishLaunchingNotification  
  
.didBecomeActiveNotification  
.willResignActiveNotification  
  
.willEnterForegroundNotification  
.didEnterBackgroundNotification  
  
.willTerminateNotification
```

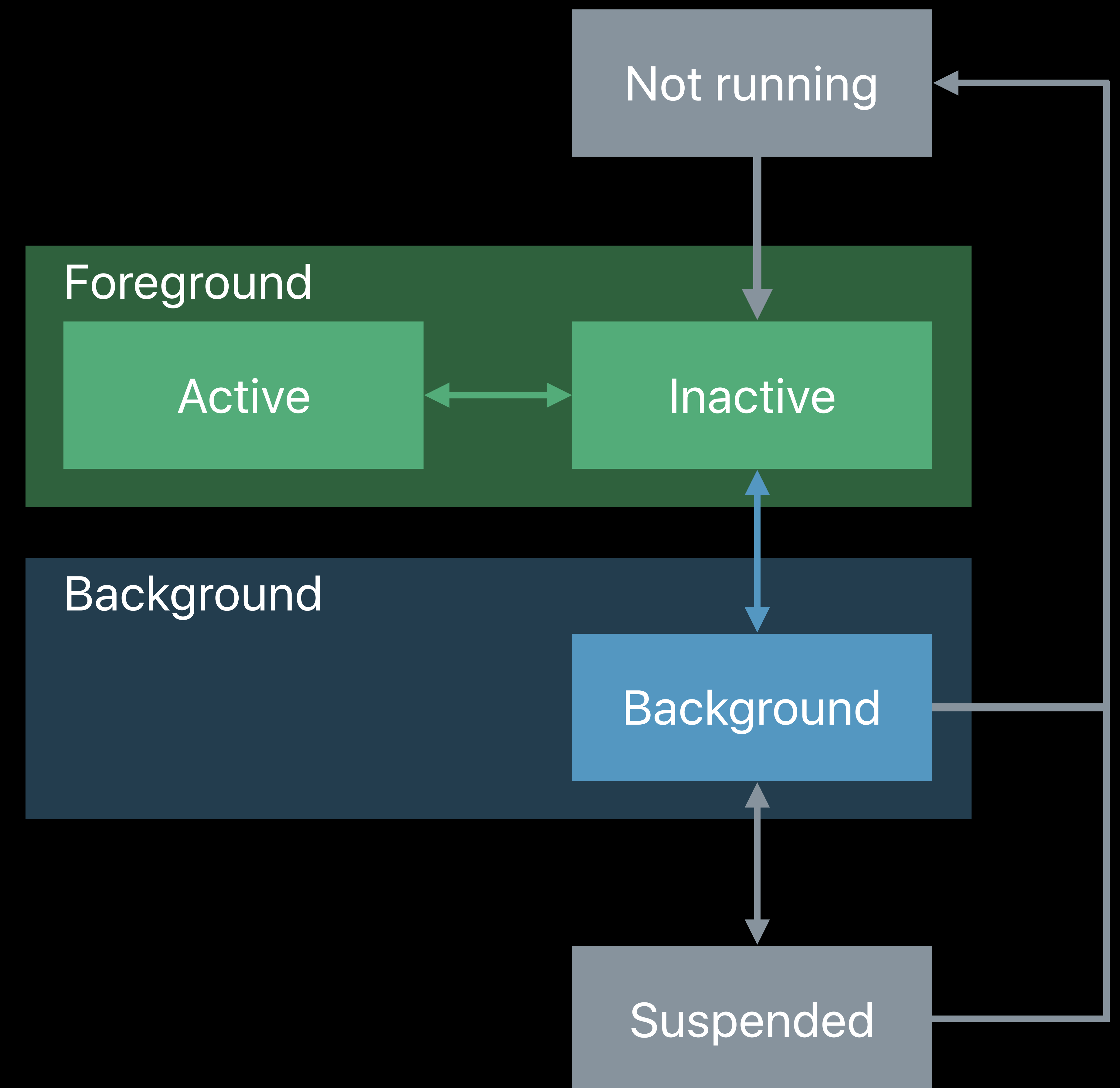


App Lifecycle States

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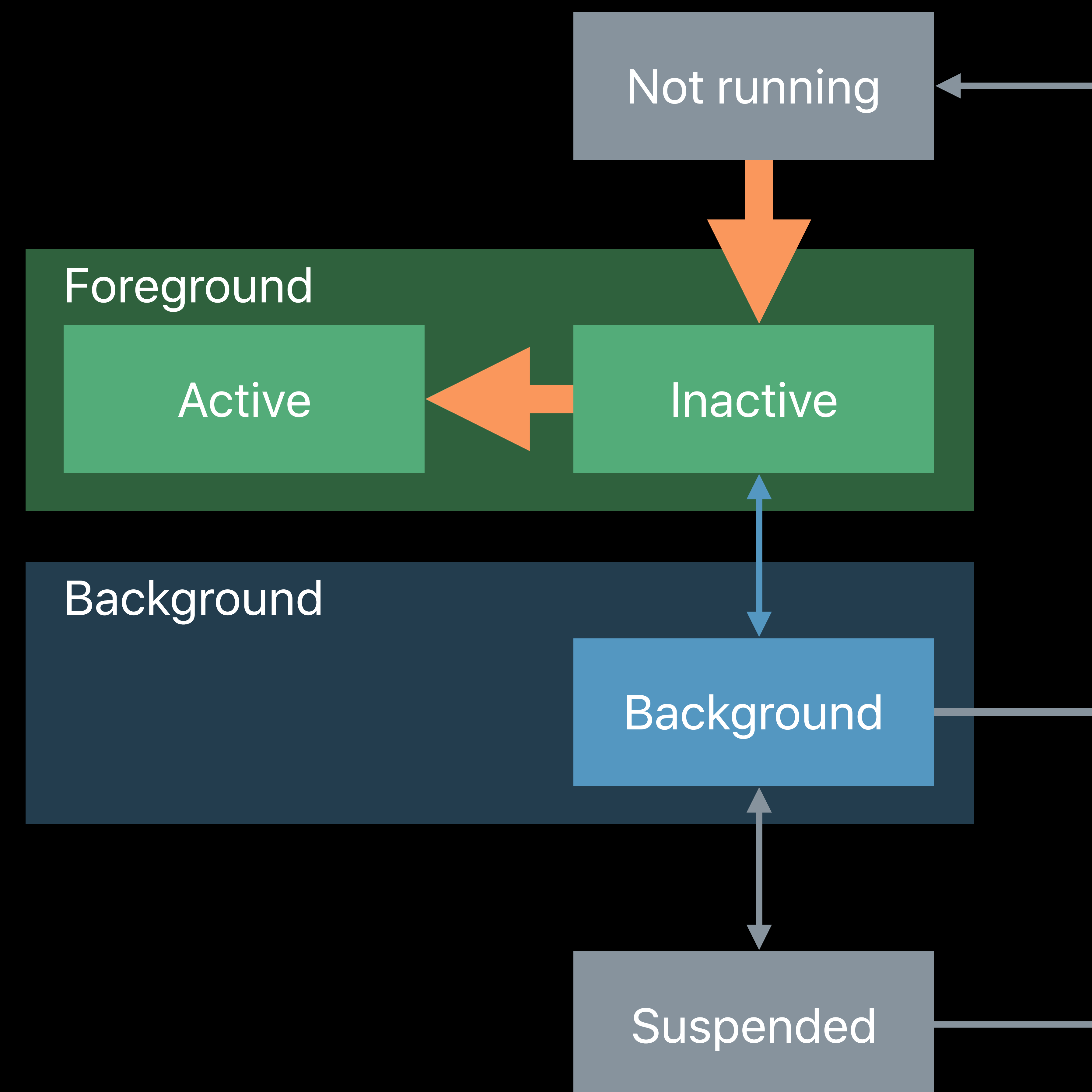


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App Lifecycle States

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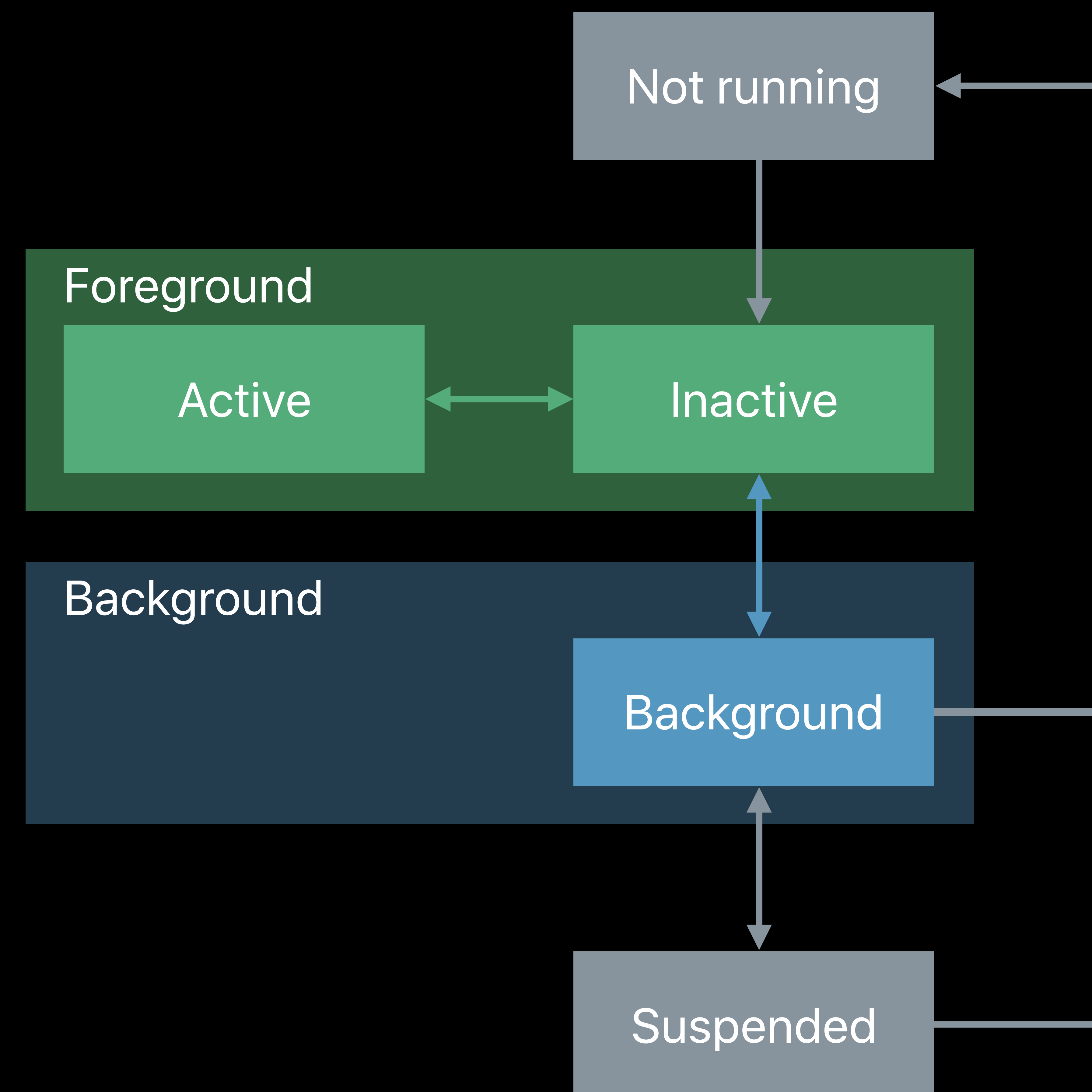


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App Lifecycle States

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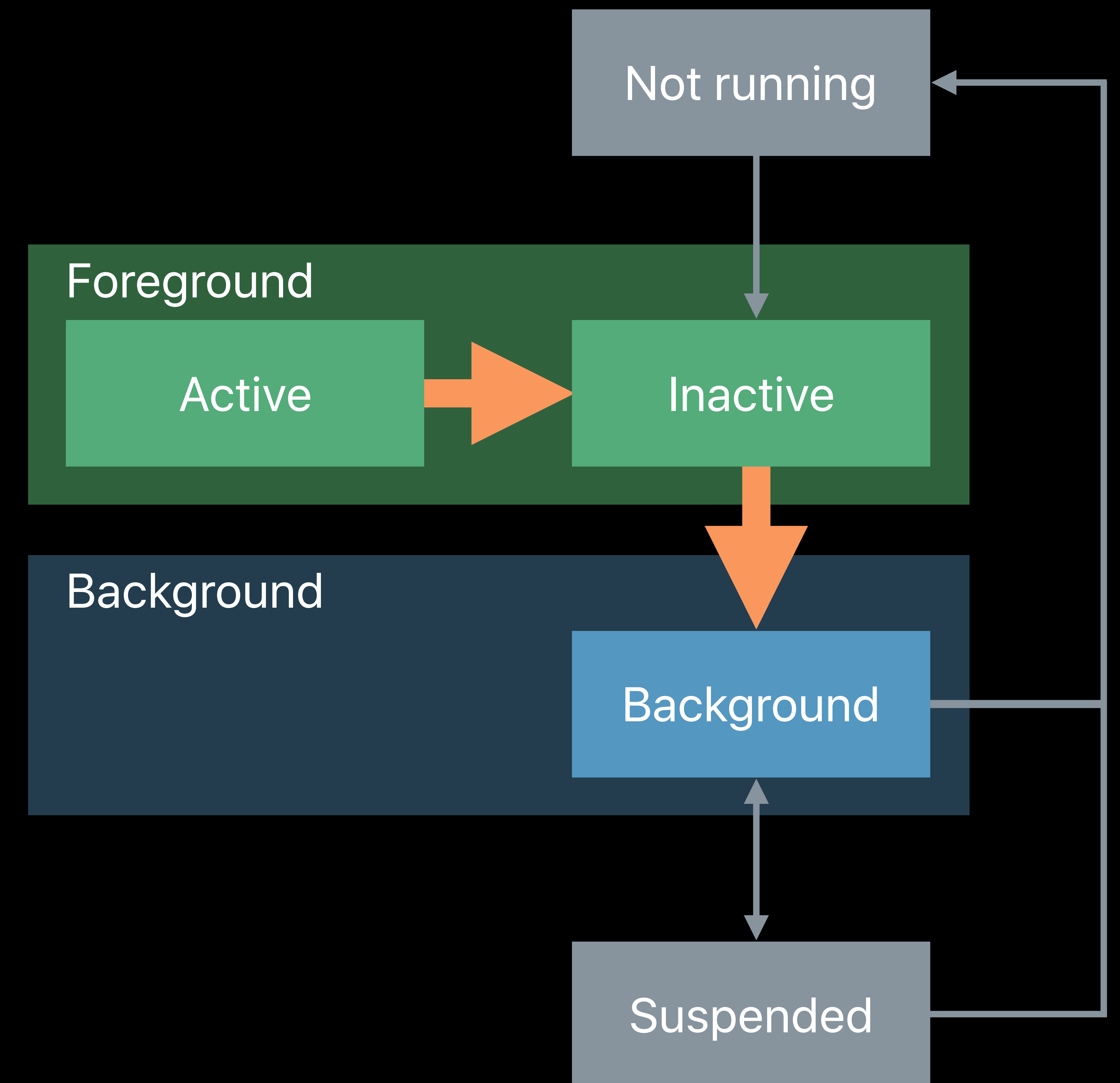


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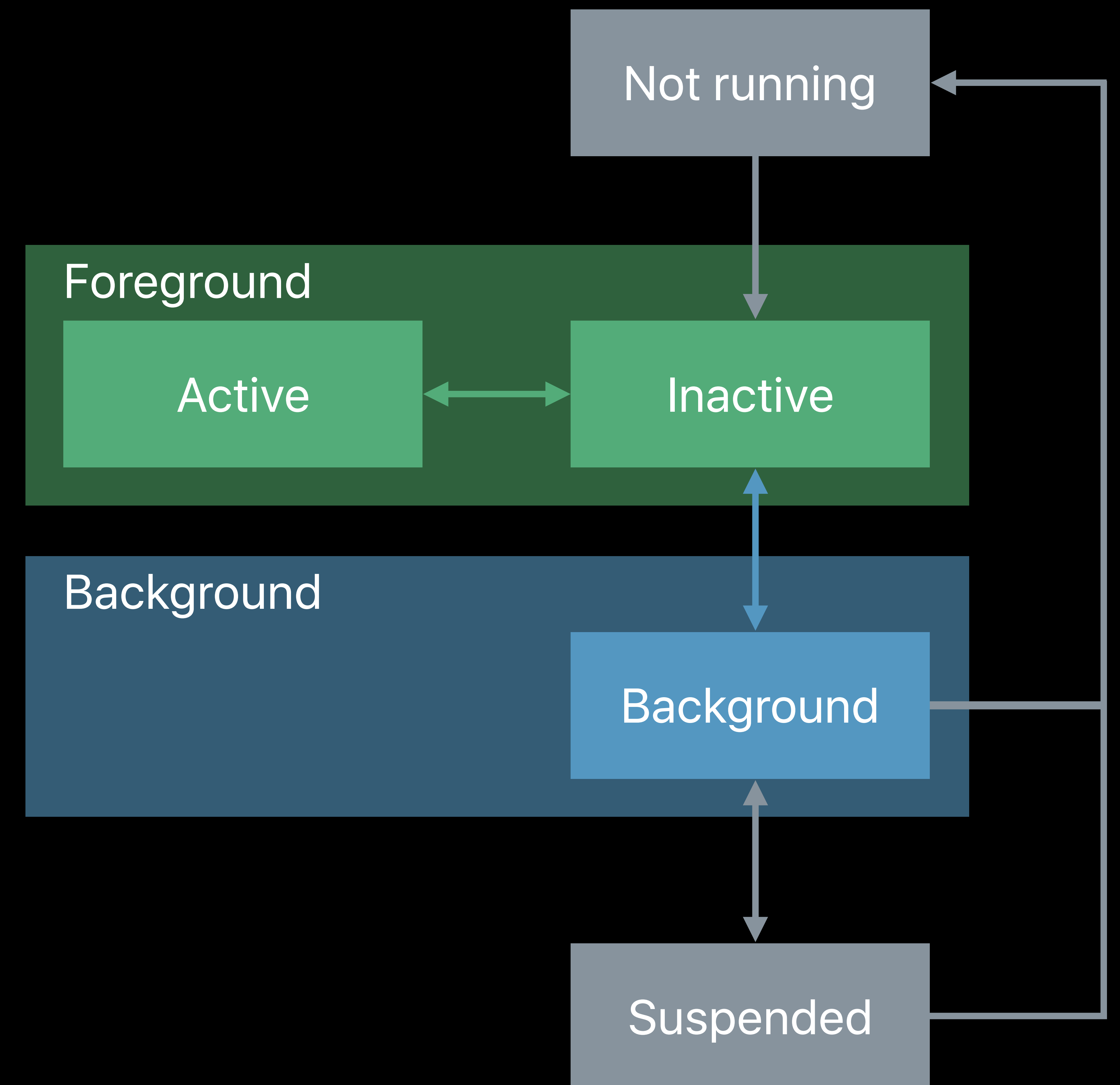


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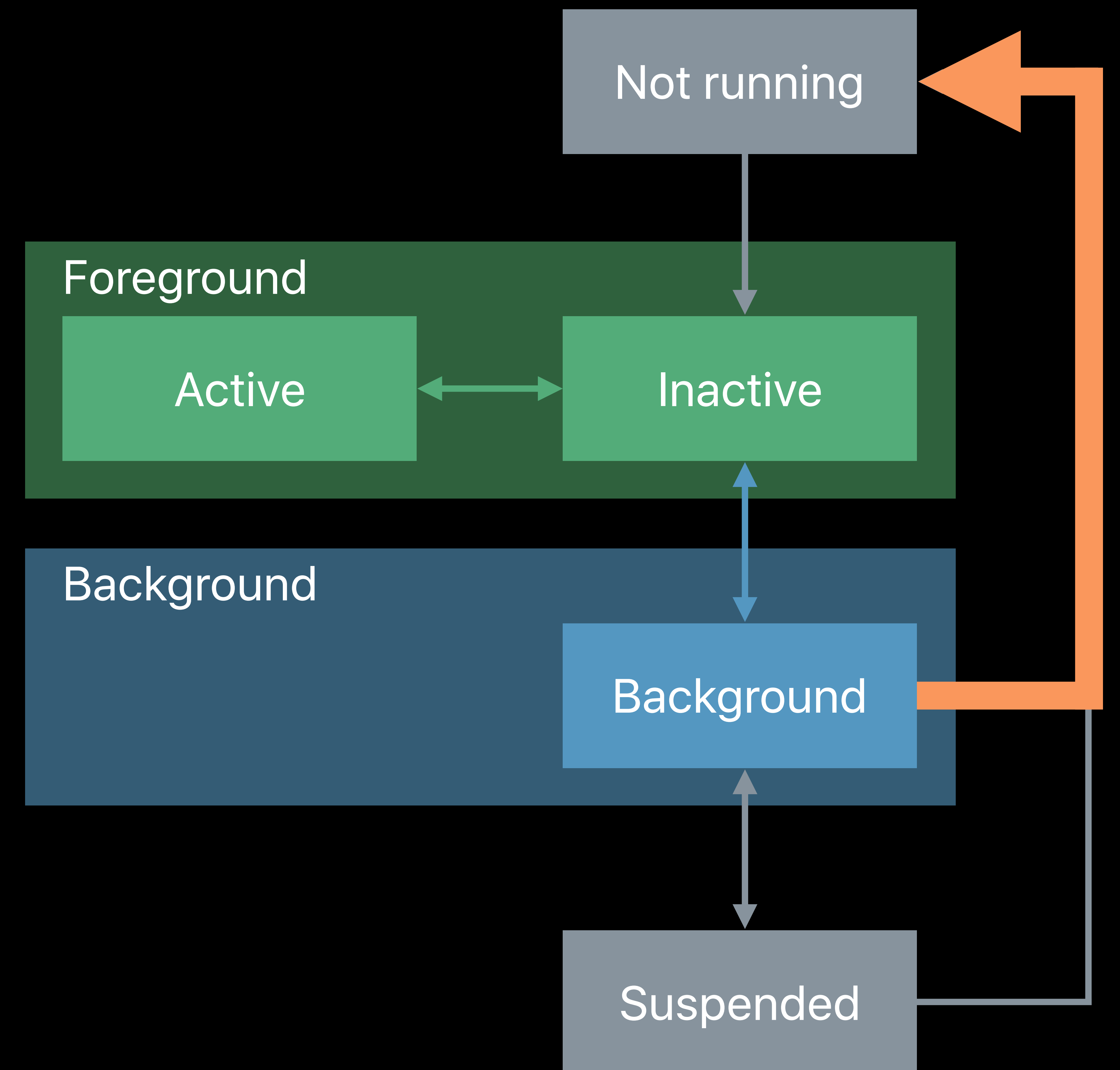


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App Lifecycle States

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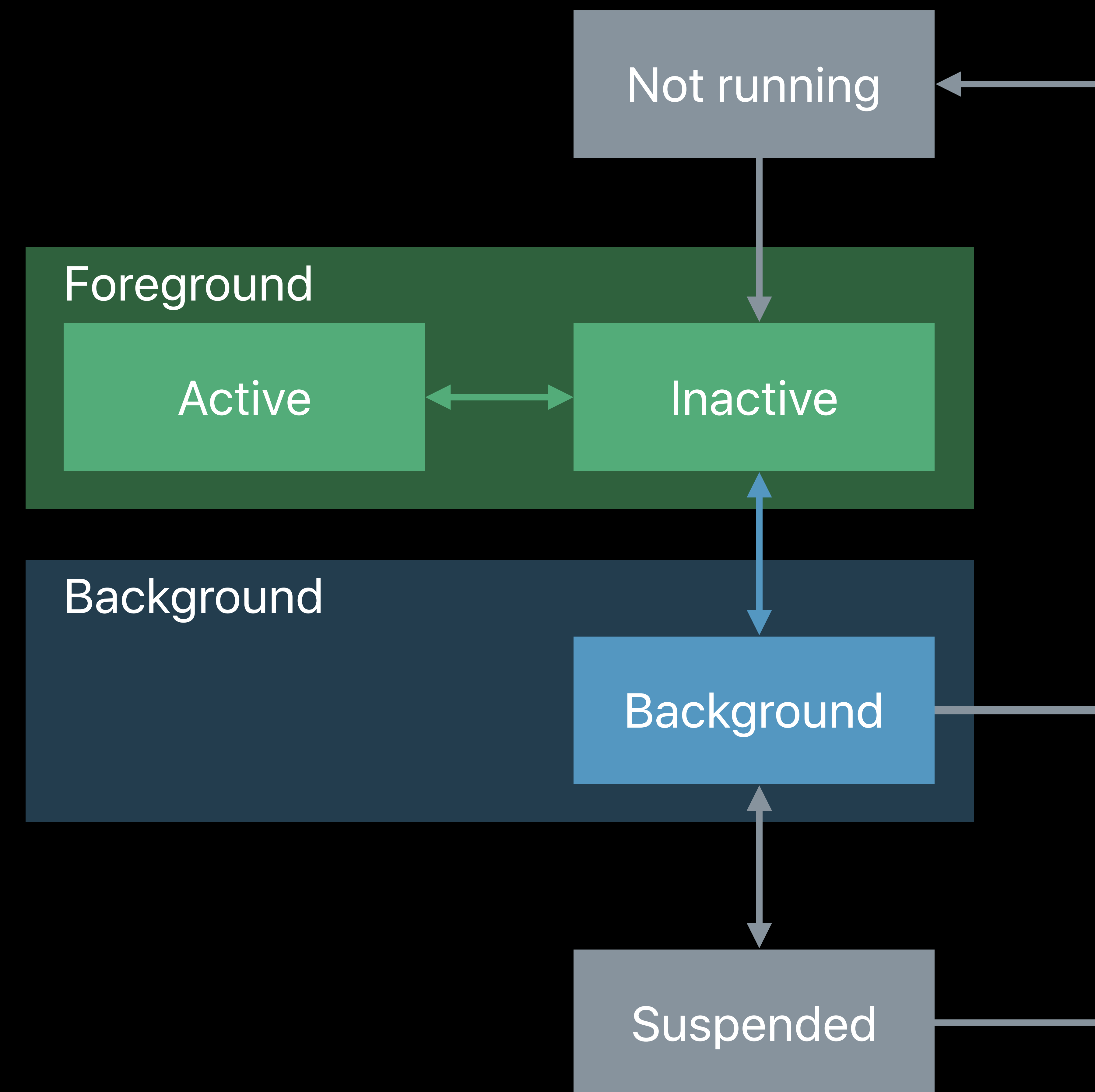


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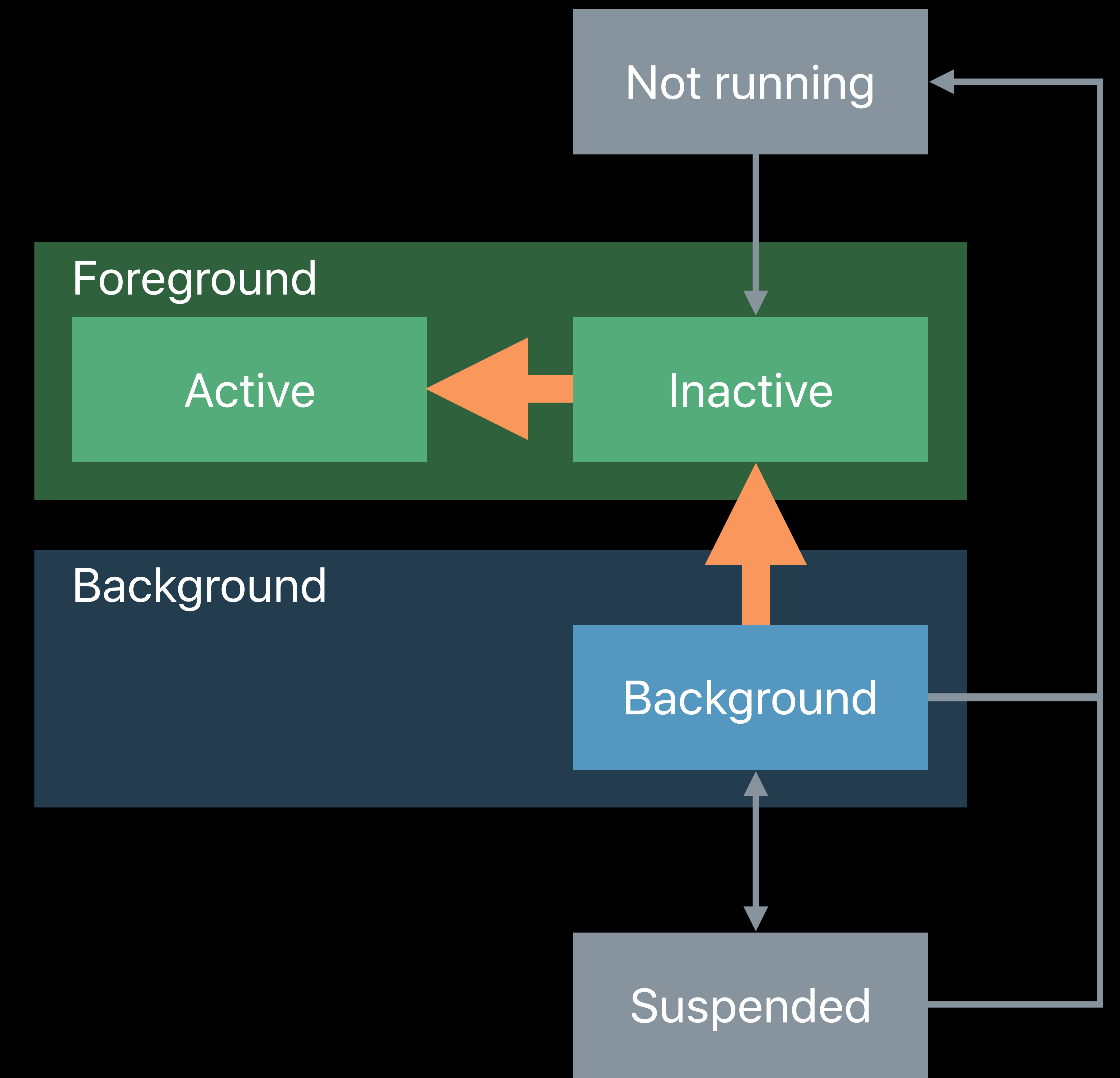


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Responding to State Changes

iOS Review



Deactivation

- Reduce frame rate
- Reduce amount of work
- Pause game

Responding to State Changes

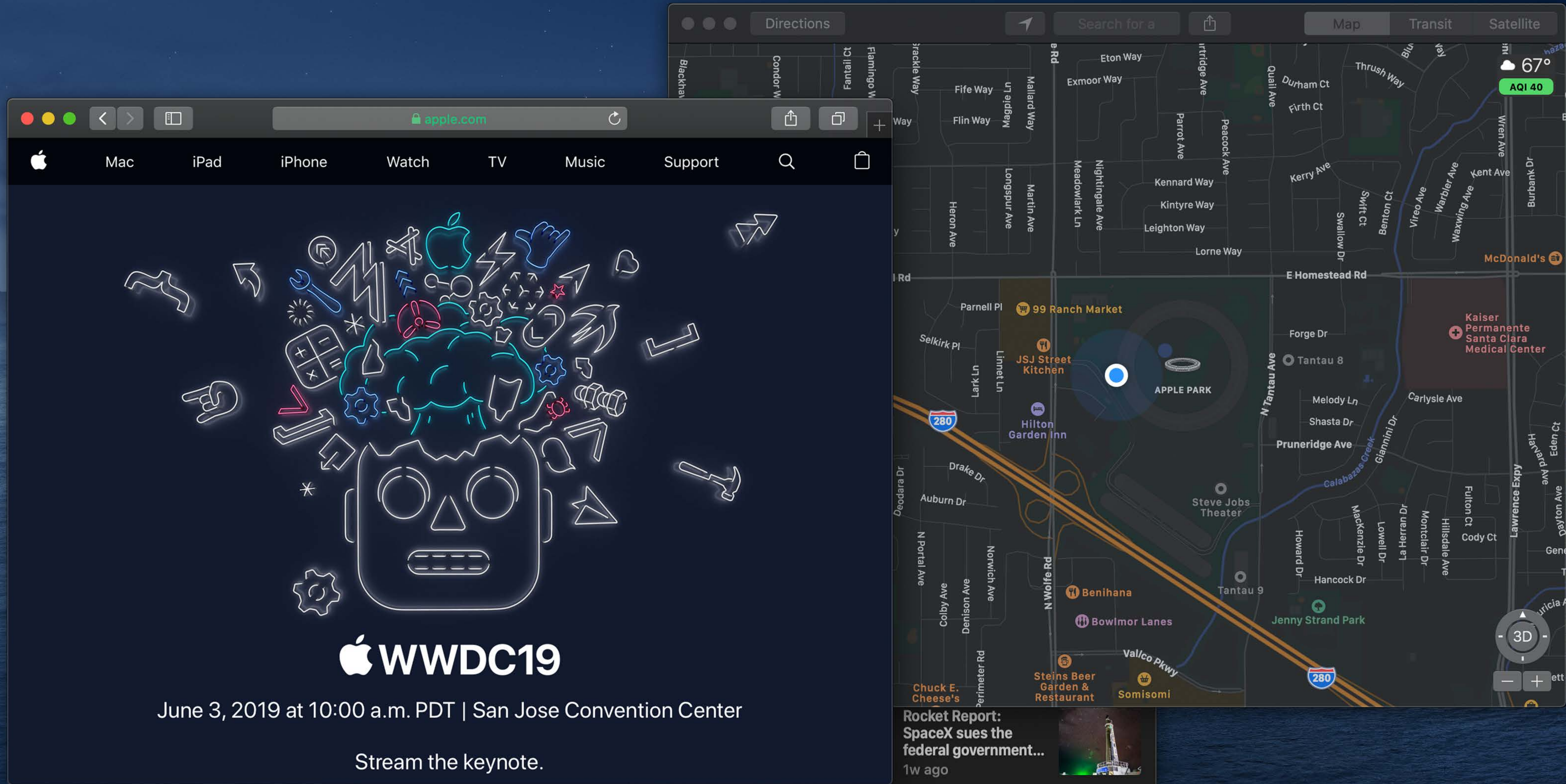
iOS Review



Backgrounding

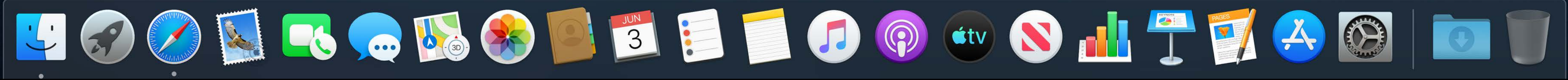
- Stop rendering
- Minimize CPU usage
- Free up memory

Your iPad app is now a Mac app



The main content area of the browser displays the WWDC19 keynote page. At the top, there are navigation links for Mac, iPad, iPhone, Watch, TV, Music, and Support. The central graphic features a stylized robot head composed of various icons representing different Apple products and services. Below the graphic, the text reads "Apple WWDC19" and "June 3, 2019 at 10:00 a.m. PDT | San Jose Convention Center". A button labeled "Stream the keynote." is positioned below the text.

- Food
 - Health
 - Politics
 - Science
 - Sports
 - Technology
 - Travel
- This Robot Scans Preschoolers' Faces Daily for Signs of Si...
 1w ago
- NASA Just Hired the First Contractor to Build Lunar Space...
 1w ago
- New Research: The Oceans Are Slowly Leaking Into the Ea...
 1w ago
- Elon Musk Ridicules Jeff Bezos' Plan For Space Colonies
 1w ago
- Newsweek 'Potentially Hazardous' Asteroid Nears a Mil...
 1w ago



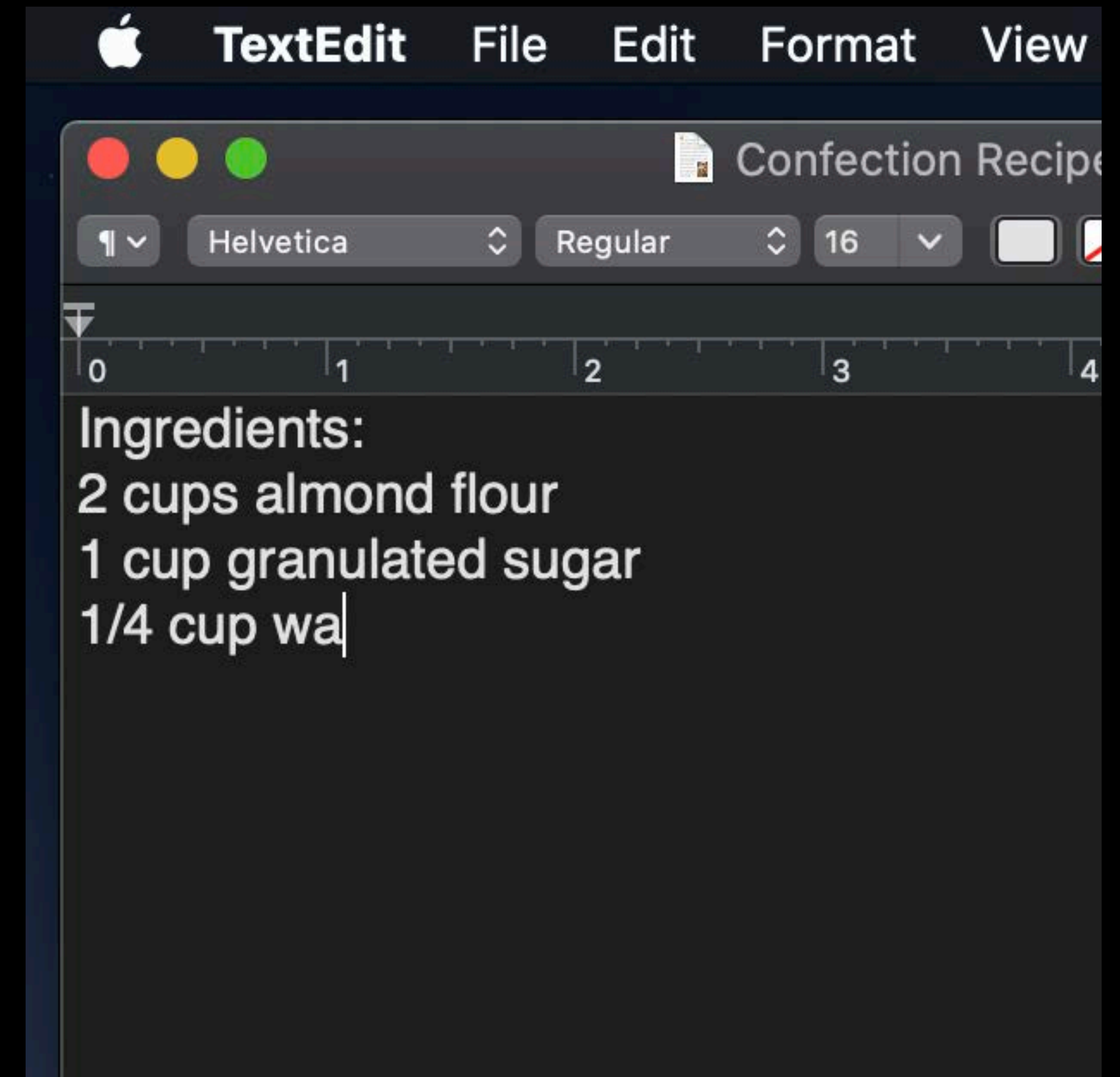
MacBook Pro

macOS Considerations



Frontmost app

- Receives key events
- Controls menu bar



macOS Considerations



Window visibility

- Occluded
- Minimized
- In another space



macOS Considerations

mac
OS

App visibility

- App hidden
- No windows
- Different login session



19A471p on vm.apple.com

Control Scaling Clipboard

News File Edit View Window Help Internal Mon 9:41 AM

News

Channels, Topics, and Stories

History

Following

- News Top Stories
- Apple News Spotlight

Suggested

- Science
- Health
- Politics
- Business
- Entertainment
- Fashion
- Food
- Sports
- Technology
- Travel

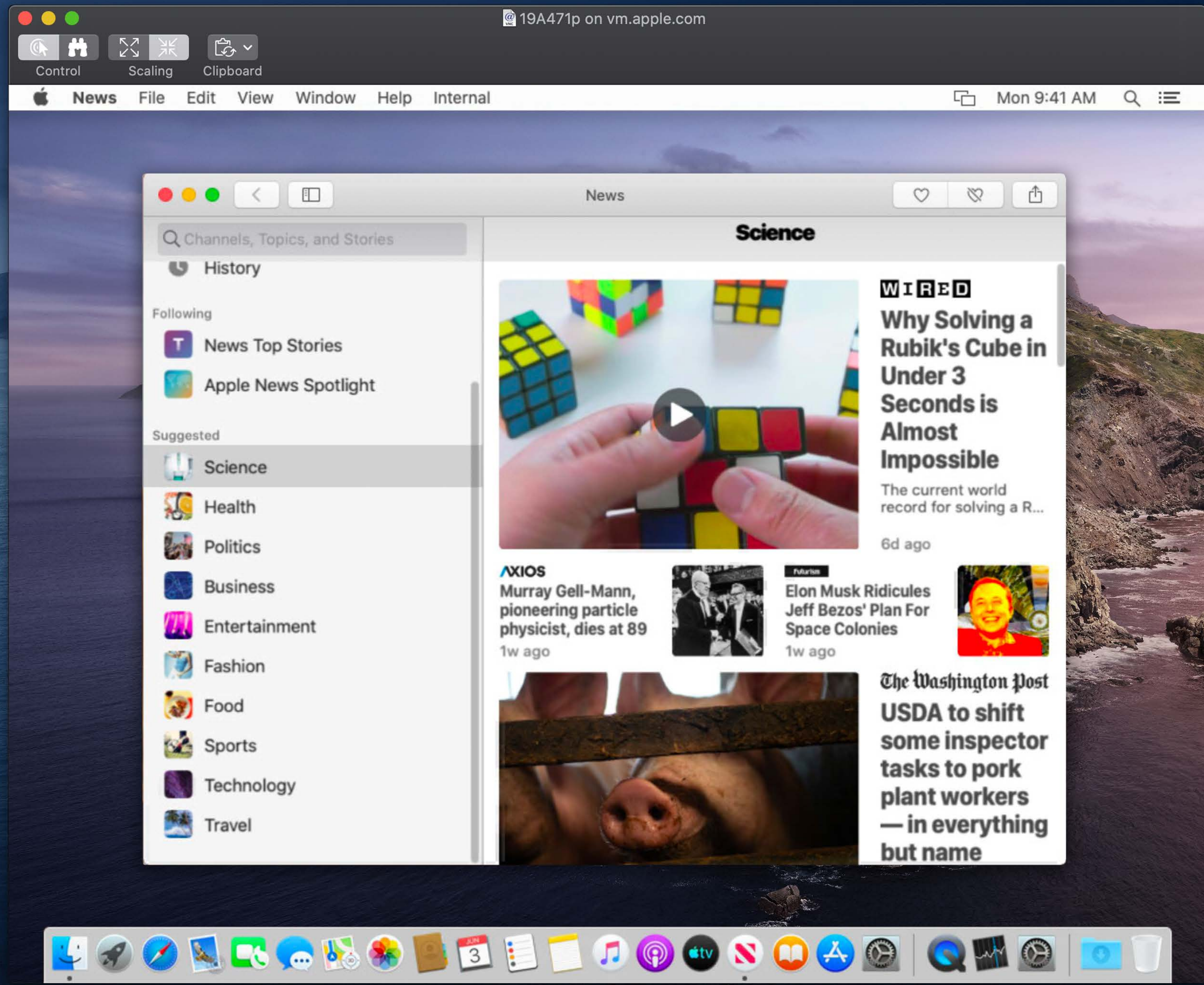
Science

WIRED
Why Solving a Rubik's Cube in Under 3 Seconds is Almost Impossible
The current world record for solving a R...
6d ago

AXIOS
Murray Gell-Mann, pioneering particle physicist, dies at 89
1w ago

Elon Musk Ridicules Jeff Bezos' Plan For Space Colonies
1w ago

The Washington Post
USDA to shift some inspector tasks to pork plant workers — in everything but name



MacBook Pro

State changes affect Mac apps less

Foreground + Active

AppNap

macOS



AppNap applies to iPad apps

- macOS observes apps for lack of use
- Automatic throttling when appropriate

App Termination

Comparison

Switching between apps on iOS

- Multiple macOS mappings

Can be similar to

- Changing frontmost Mac app
- Terminating Mac app

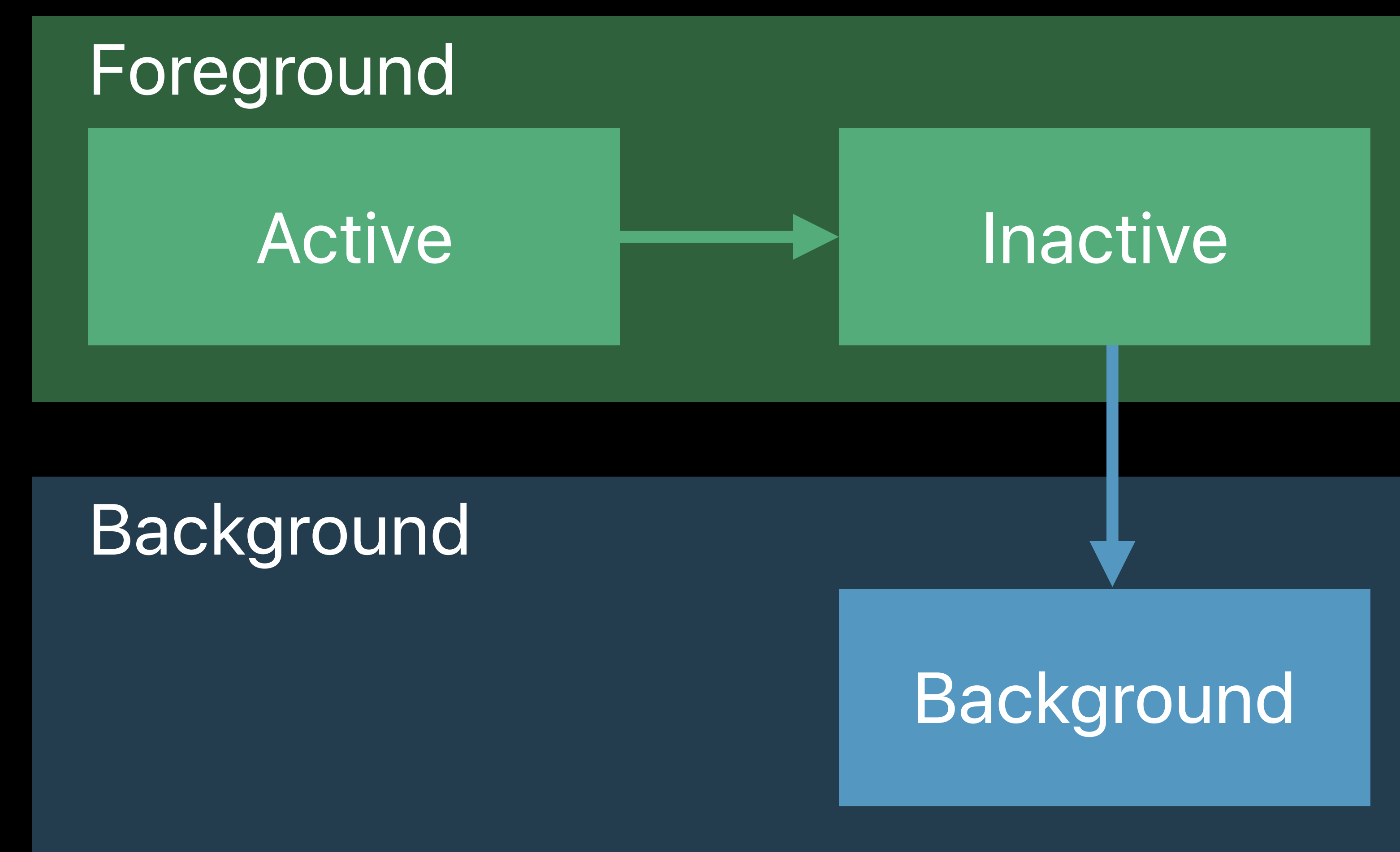
App Termination

iPad Apps for Mac



⌘Q goes to background state

Immediately looks "not running"



App Termination

iPad Apps for Mac

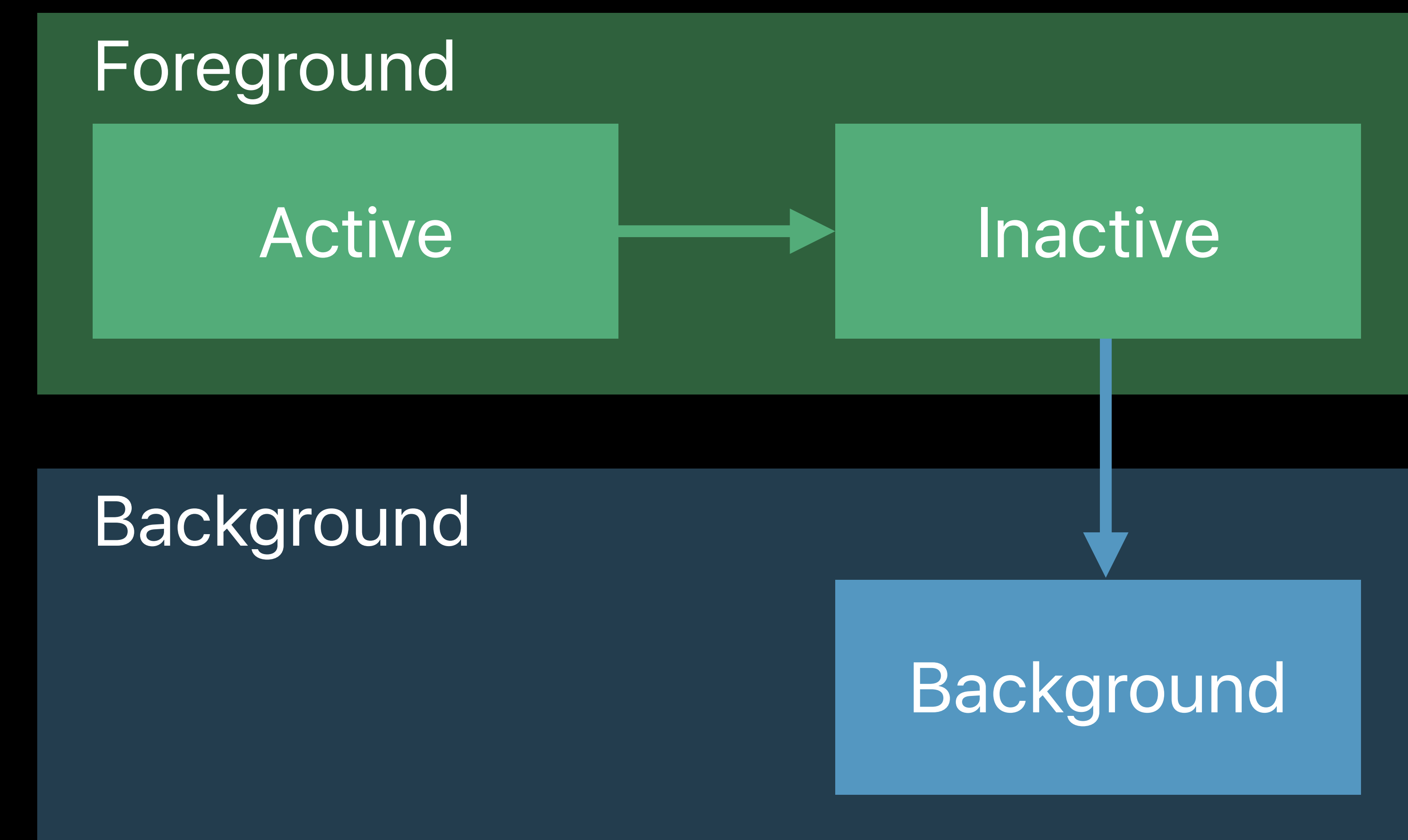


Background tasks may complete

No background audio — Will pause

```
let task = UIApplication.shared.beginBackgroundTask {  
    // handle task expiration  
}
```

```
UIApplication.shared.endBackgroundTask(task)
```



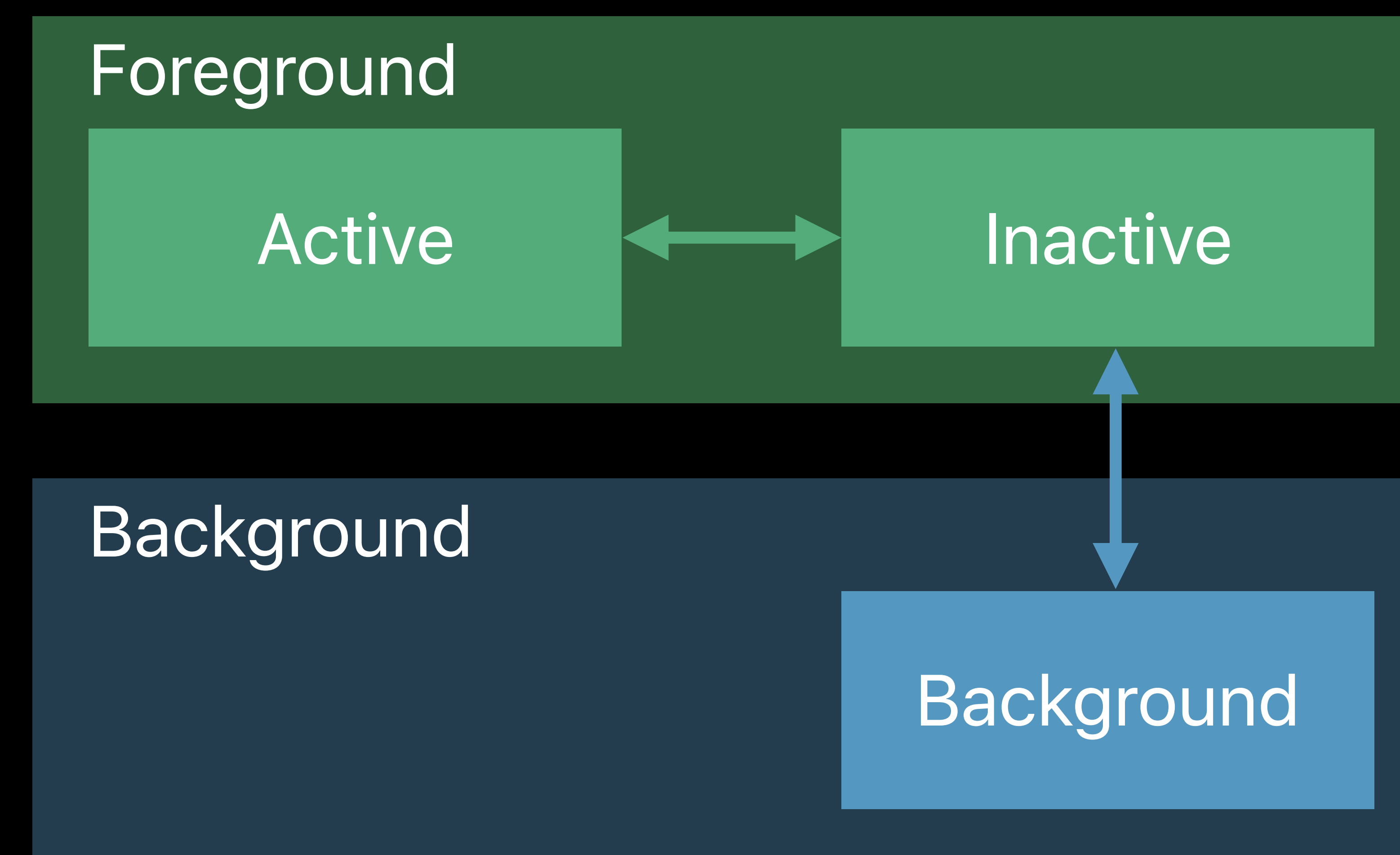
App Termination

iPad Apps for Mac



User can "relaunch" during background tasks

Keep willTerminate short

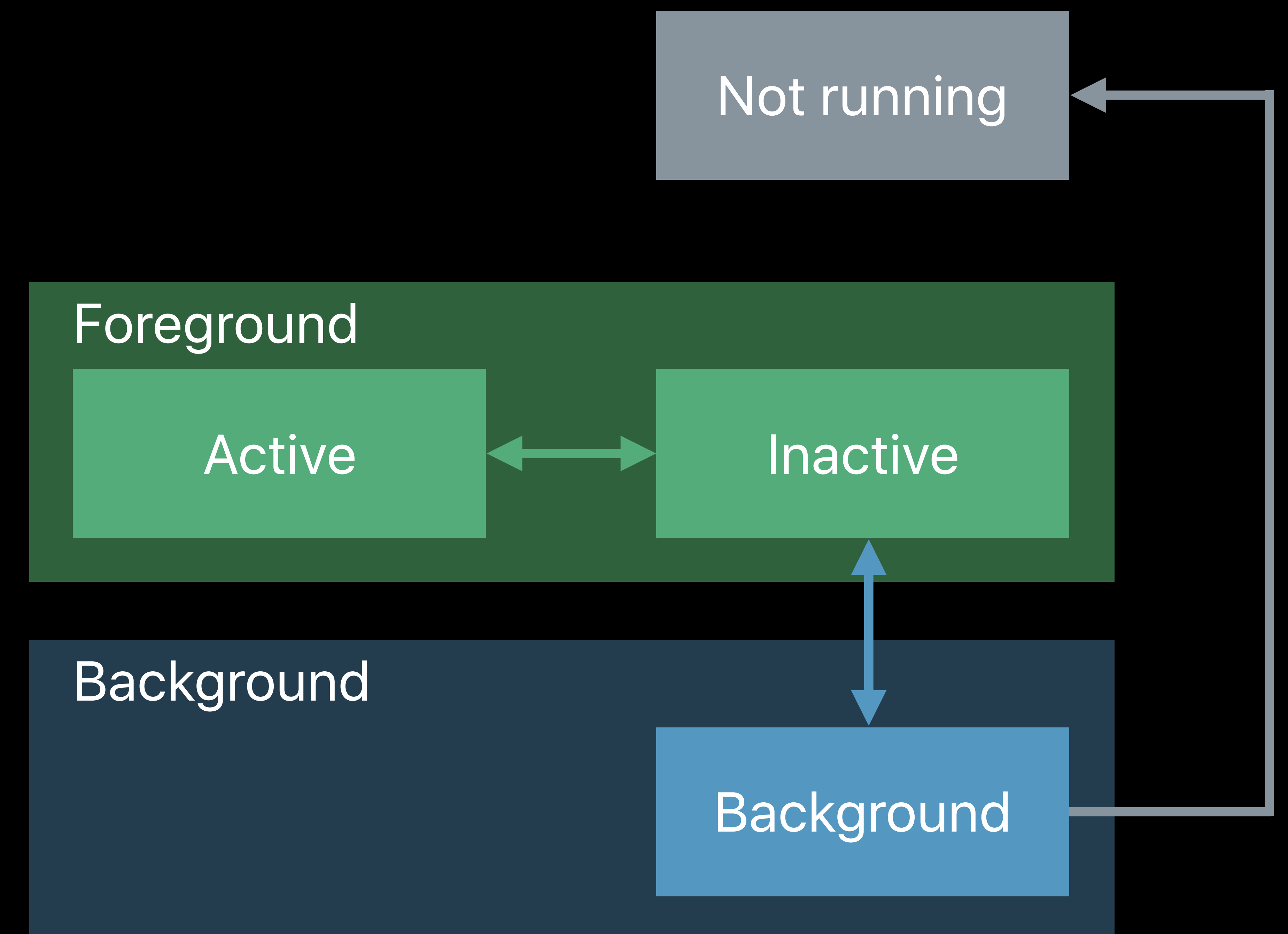


App Termination

iPad Apps for Mac



Process exits after last task



Background App Launch



Several iOS APIs launch to background

Background App Launch

iPad Apps for Mac



Several iOS APIs launch to background

Subset supported

- Background URL sessions
- Silent push notifications
- Notification actions
- BackgroundTasks (`BGProcessingTask`, `BGAppRefreshTask`)

Background App Launch

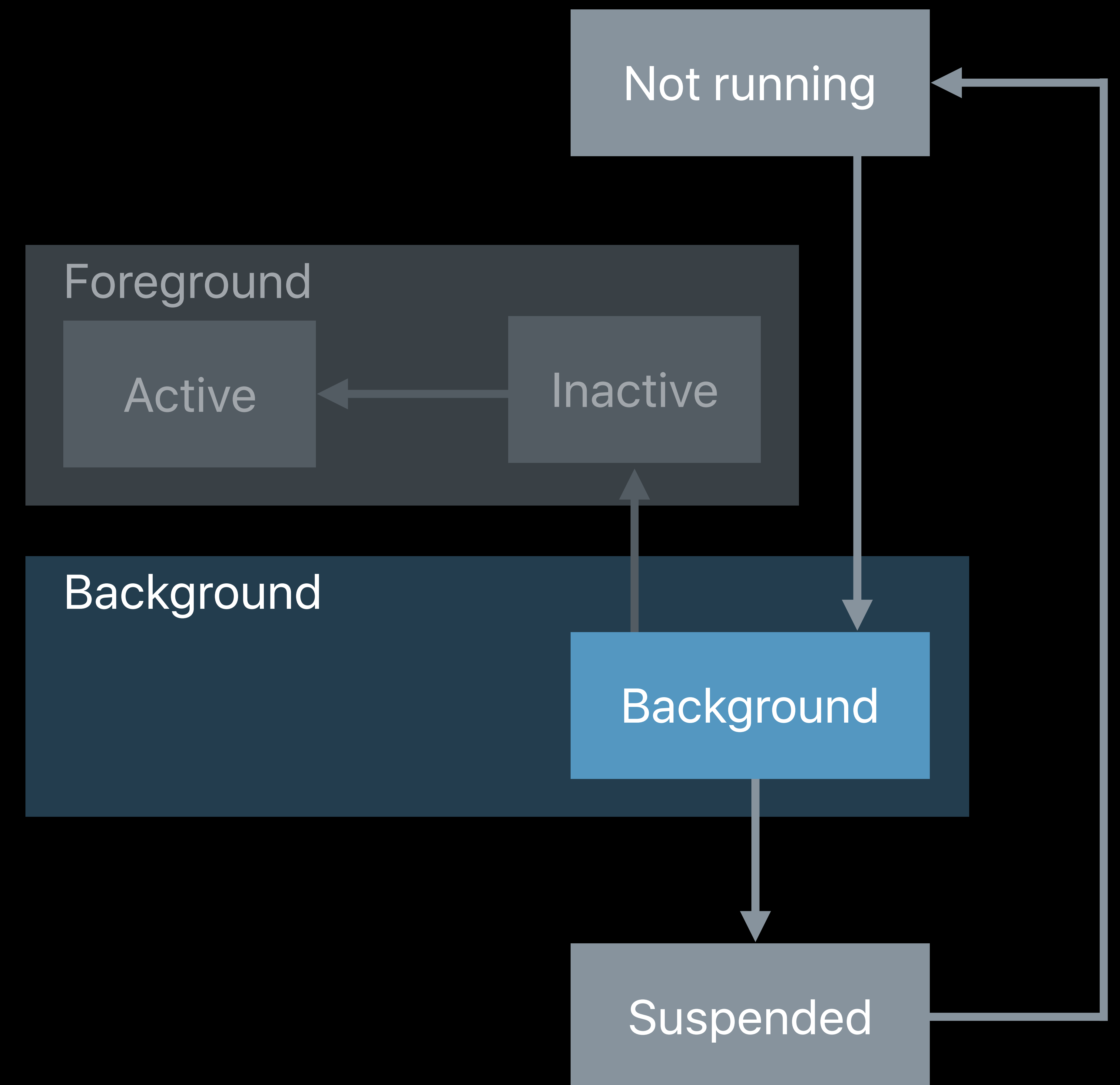
iPad Apps for Mac



Usual restrictions apply

User can "launch" app fully

Standard state transitions



Suspension

iPad Apps for Mac



Apps rarely suspended

Suspension = immediate termination

No memory limits

Apps live longer: Fix leaks

Suspension

iPad Apps for Mac



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Summary

Usually Foreground + Active

Background only during

- Termination
- Background launches

No background audio

Handle state changes as usual

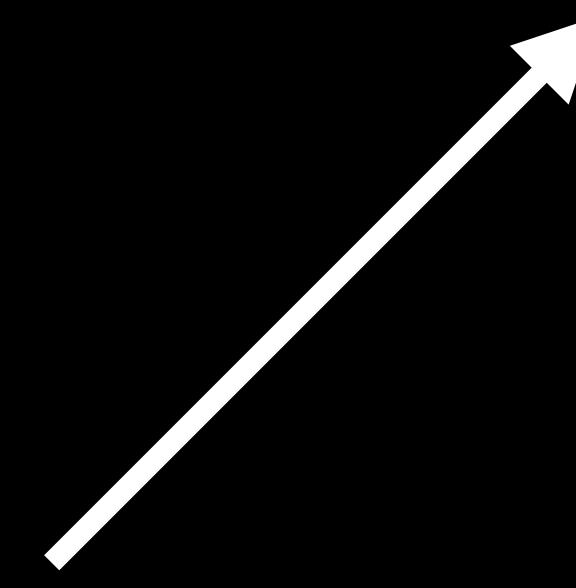
Distribution

Chris D'Angelo, Xcode





App Store
TestFlight
Development Signing
Ad Hoc
Enterprise



ChocolateChip | Build **Succeeded** | Today at 9:53 AM

ChocolateChip

ChocolateChip ▾ **General** Signing & Capabilities Resource Tags Info Build Settings Build Phases Build Rules

▼ **Identity**

App Category Lifestyle

Display Name ChocolateChip

Bundle Identifier com.cookies.ChocolateChip

UIKitFormMac.com.cooki...ChocolateChip on Mac ?

Version 1.0

Build 5

▼ **Deployment Info**

| Target | Device |
|----------|--|
| iOS 13.0 | <input checked="" type="checkbox"/> iPhone |
| | <input checked="" type="checkbox"/> iPad |
| | <input checked="" type="checkbox"/> Mac (requires macOS 10.15) |

Main Interface Main

Device Orientation Portrait Upside Down Landscape Left Landscape Right

Status Bar Style Default

Hide status bar

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ChocolateChip | Build **Succeeded** | Today at 9:53 AM

ChocolateChip

ChocolateChip ▾ General **Signing & Capabilities** Resource Tags Info Build Settings Build Phases Build Rules

+ Capability **All** Debug Release

▼ **Signing**

Automatically manage signing
Xcode will create and update profiles, app IDs, and certificates.

Team

Platform iOS

Bundle Identifier

Provisioning Profile Xcode Managed Profile ⓘ


Signing Certificate Apple Development: Johnny Appleseed (RJ7LVTK...)


Platform macOS


Bundle Identifier


Provisioning Profile Xcode Managed Profile ⓘ



Signing Certificate Apple Development: Johnny Appleseed (RJ7LVTK...)

▶  **App Sandbox** ×

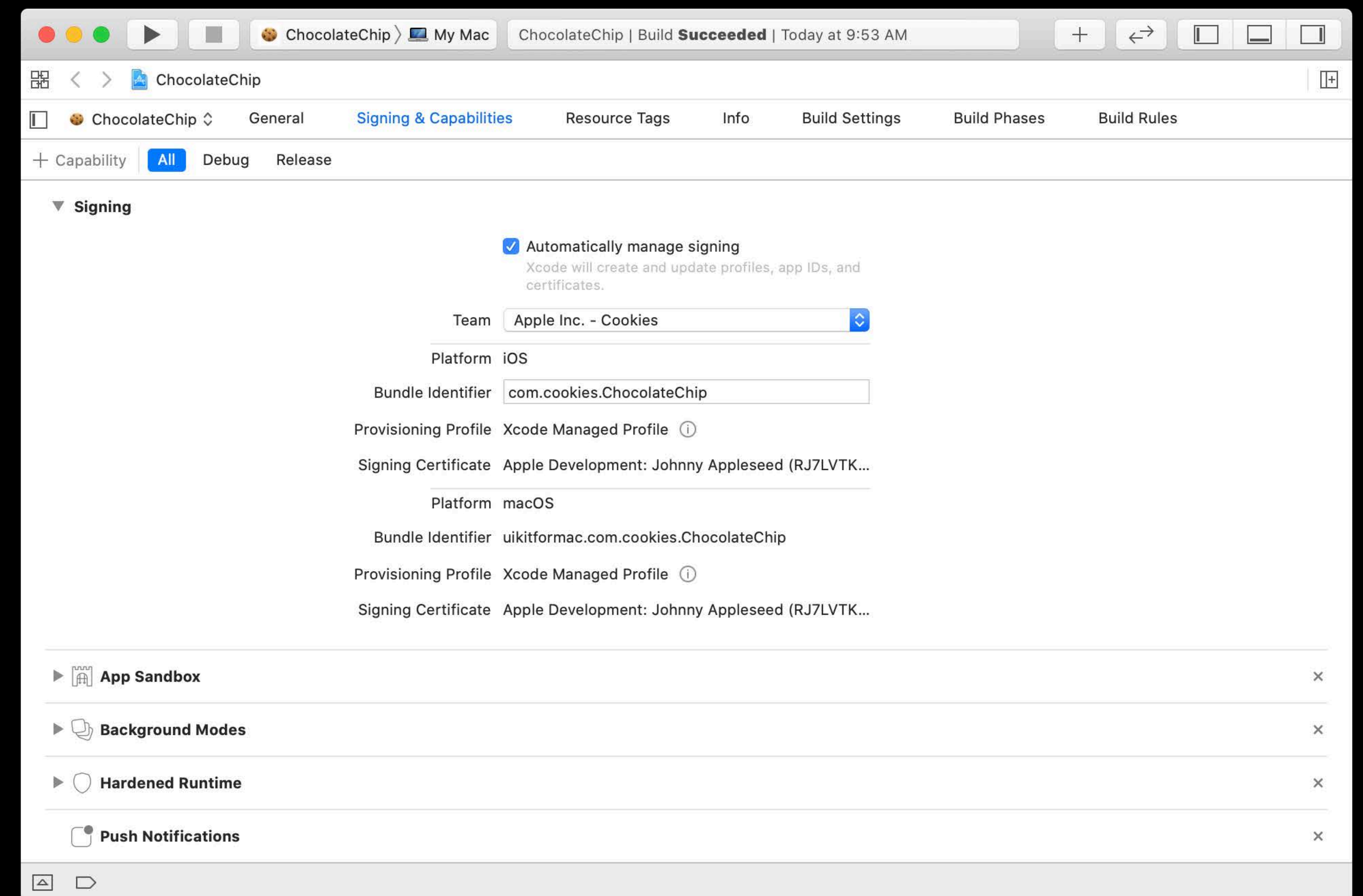
▶  **Background Modes** ×

▶  **Hardened Runtime** ×

 **Push Notifications** ×

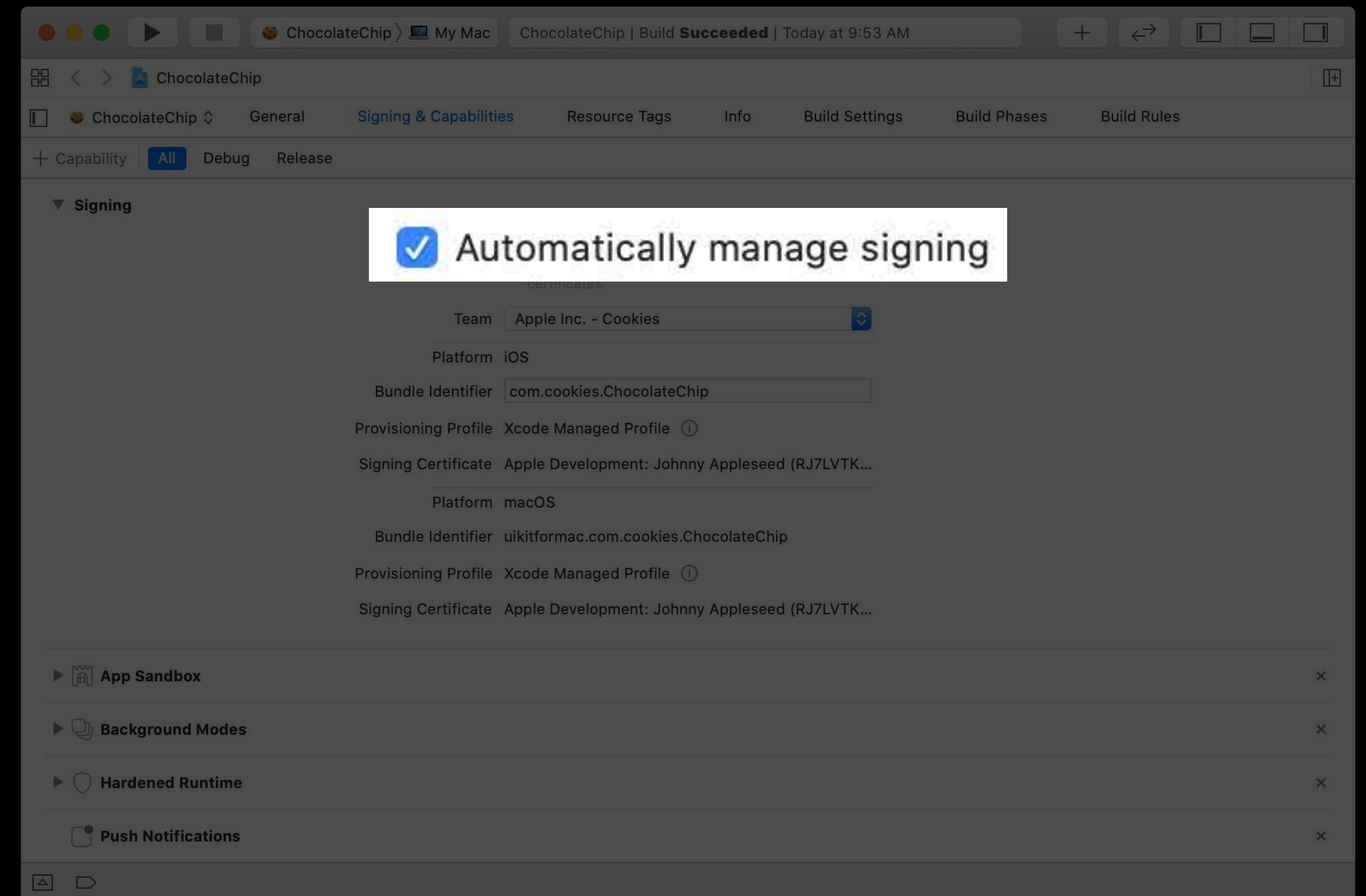
 

Signing for Mac



Signing for Mac

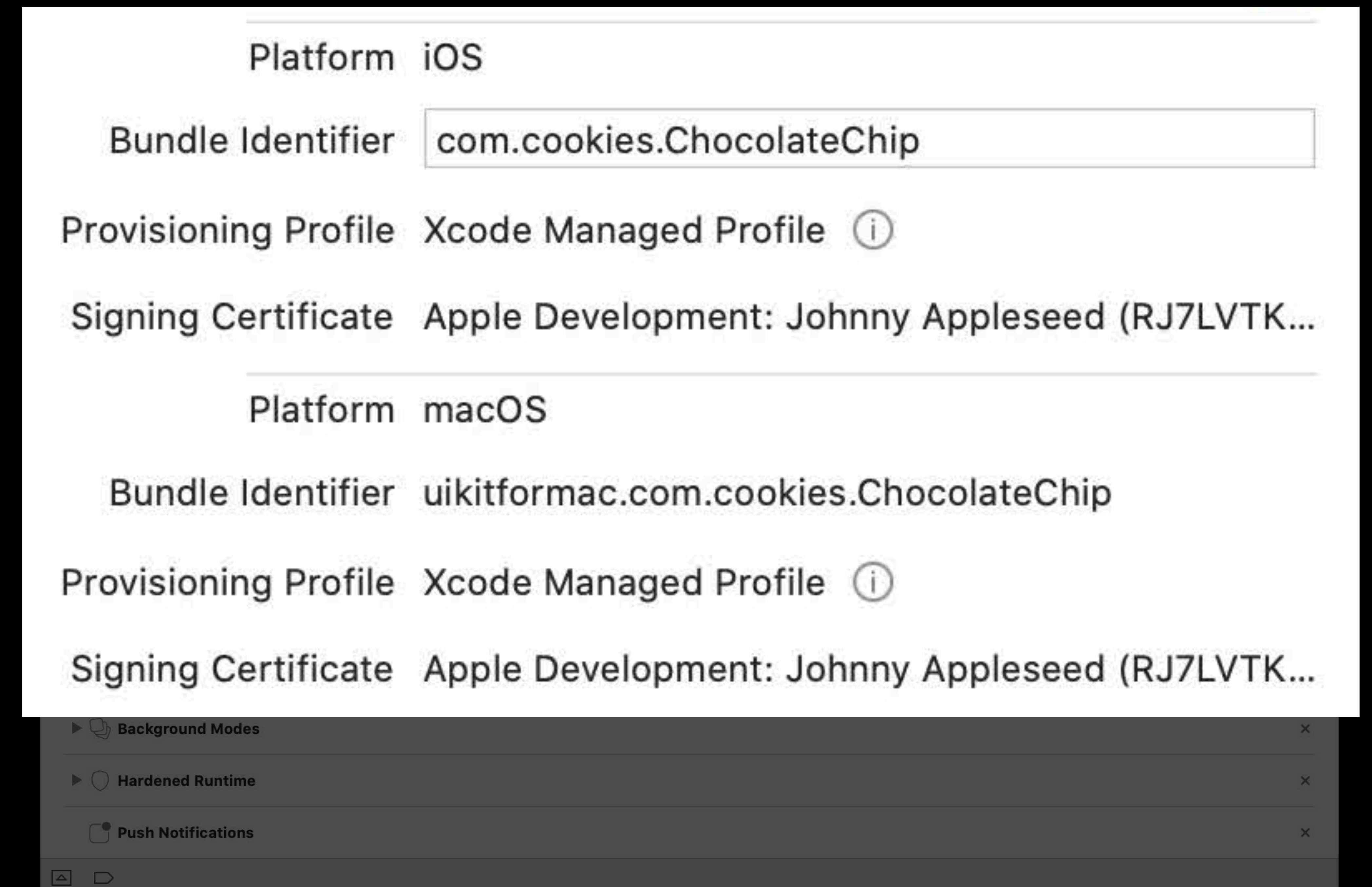
Use Automatic Signing



Signing for Mac

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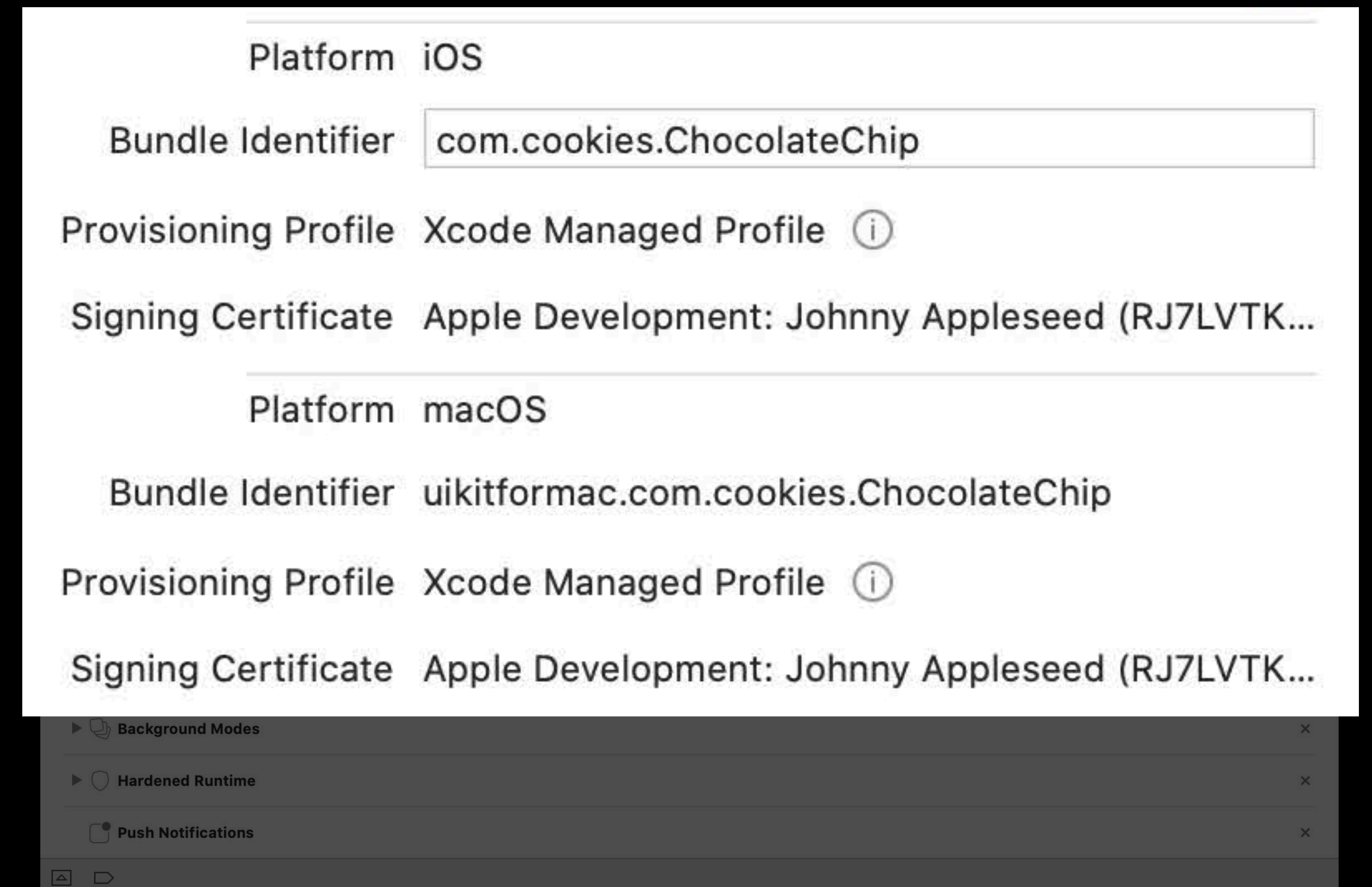
One Profile for Mac, one for iOS



Signing for Mac

Use Automatic Signing

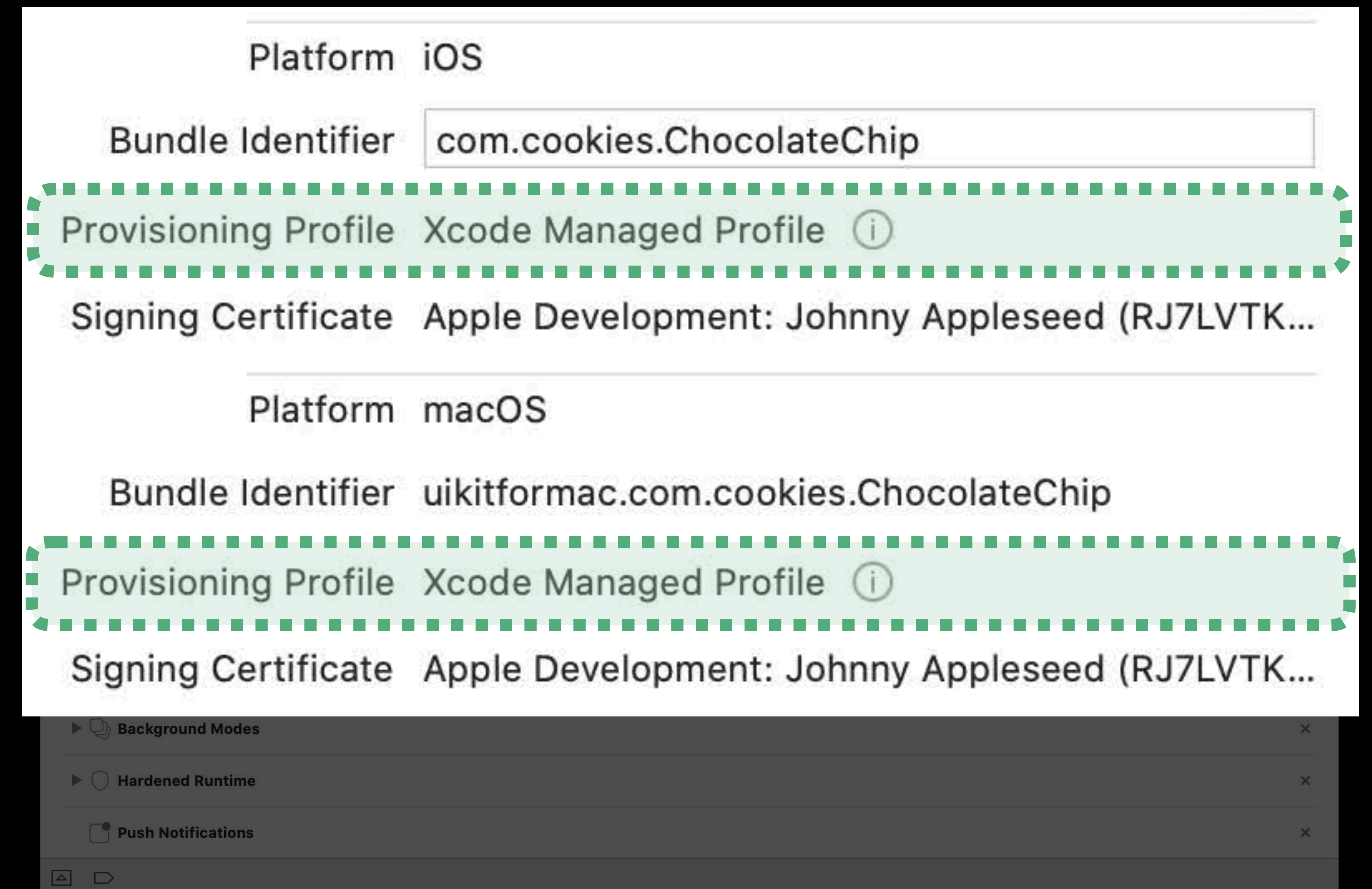
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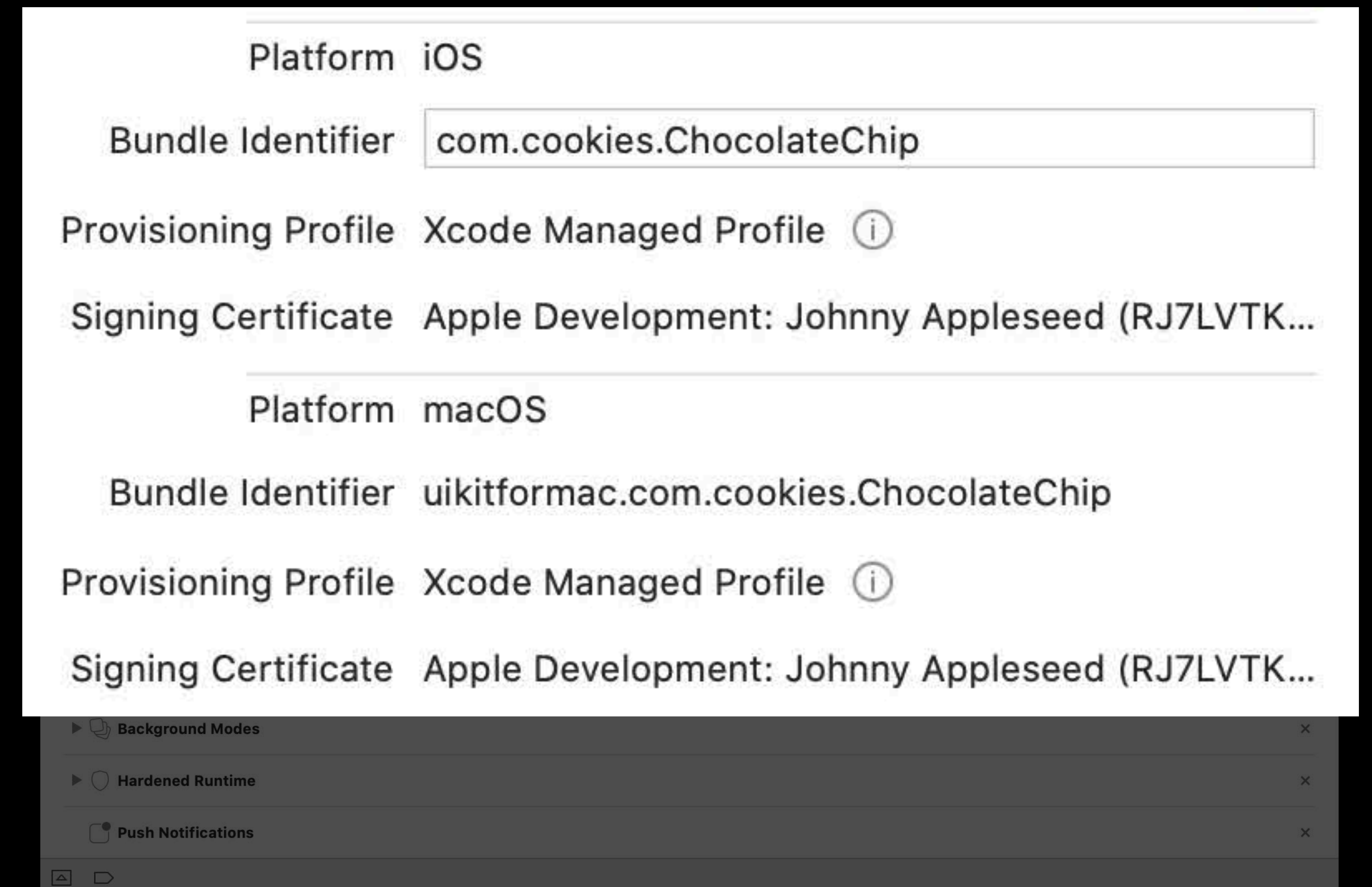


Signing for Mac

Use Automatic Signing

One Profile for Mac, one for iOS

Apple Development Certificates

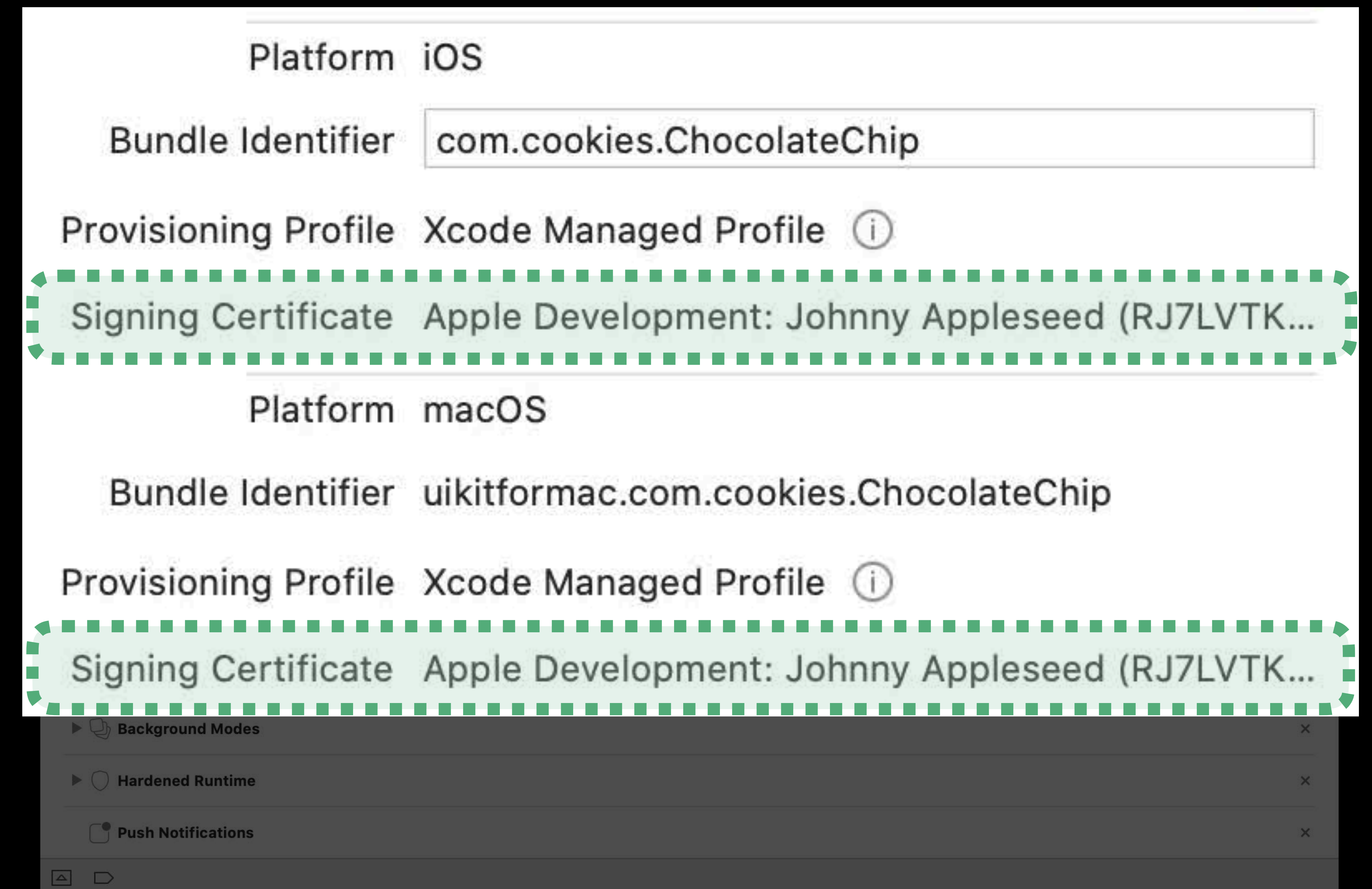


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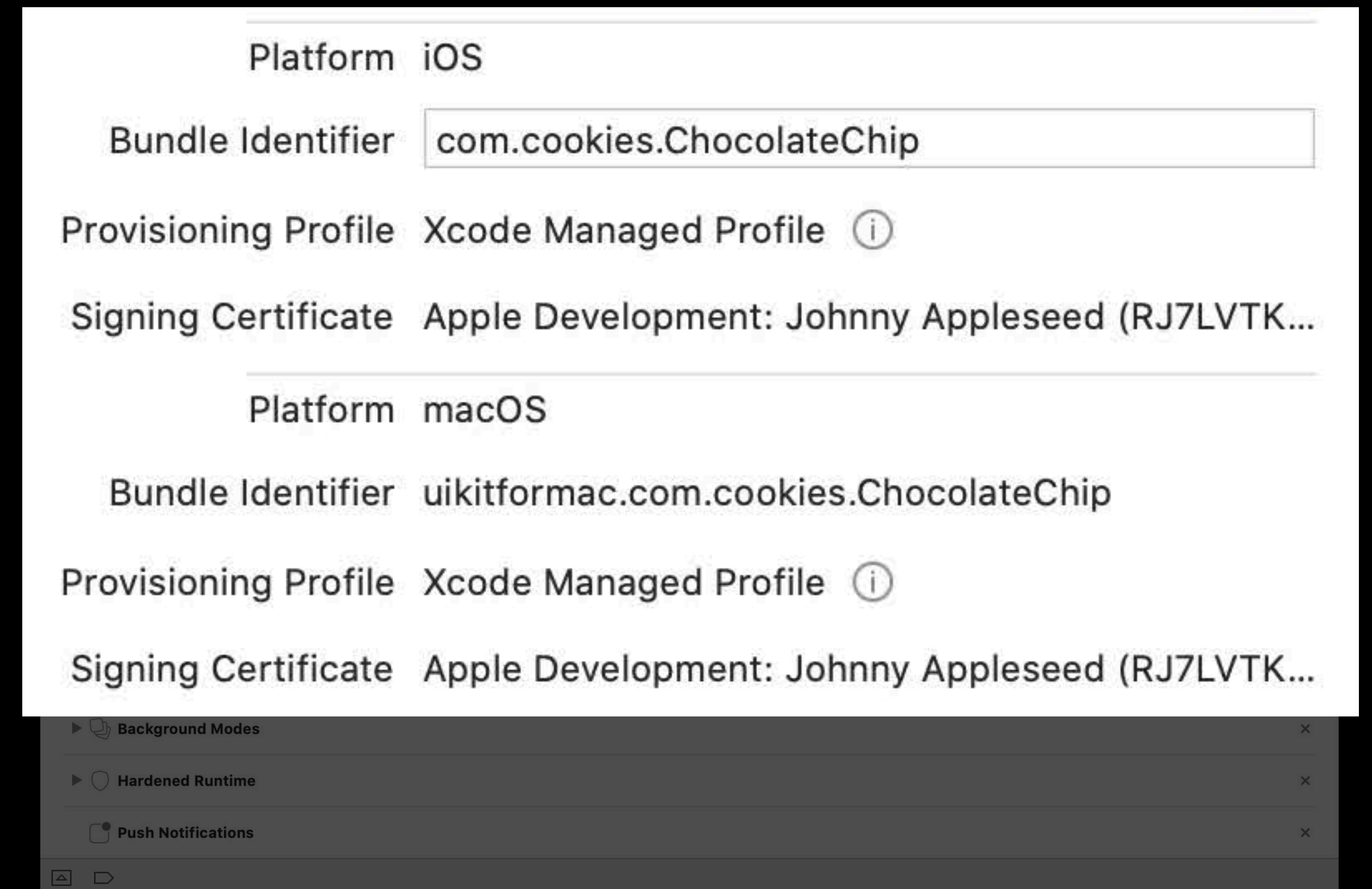
Signing for Mac

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One Profile for Mac, one for iOS

Apple Development Certificates

Unique Bundle Identifier



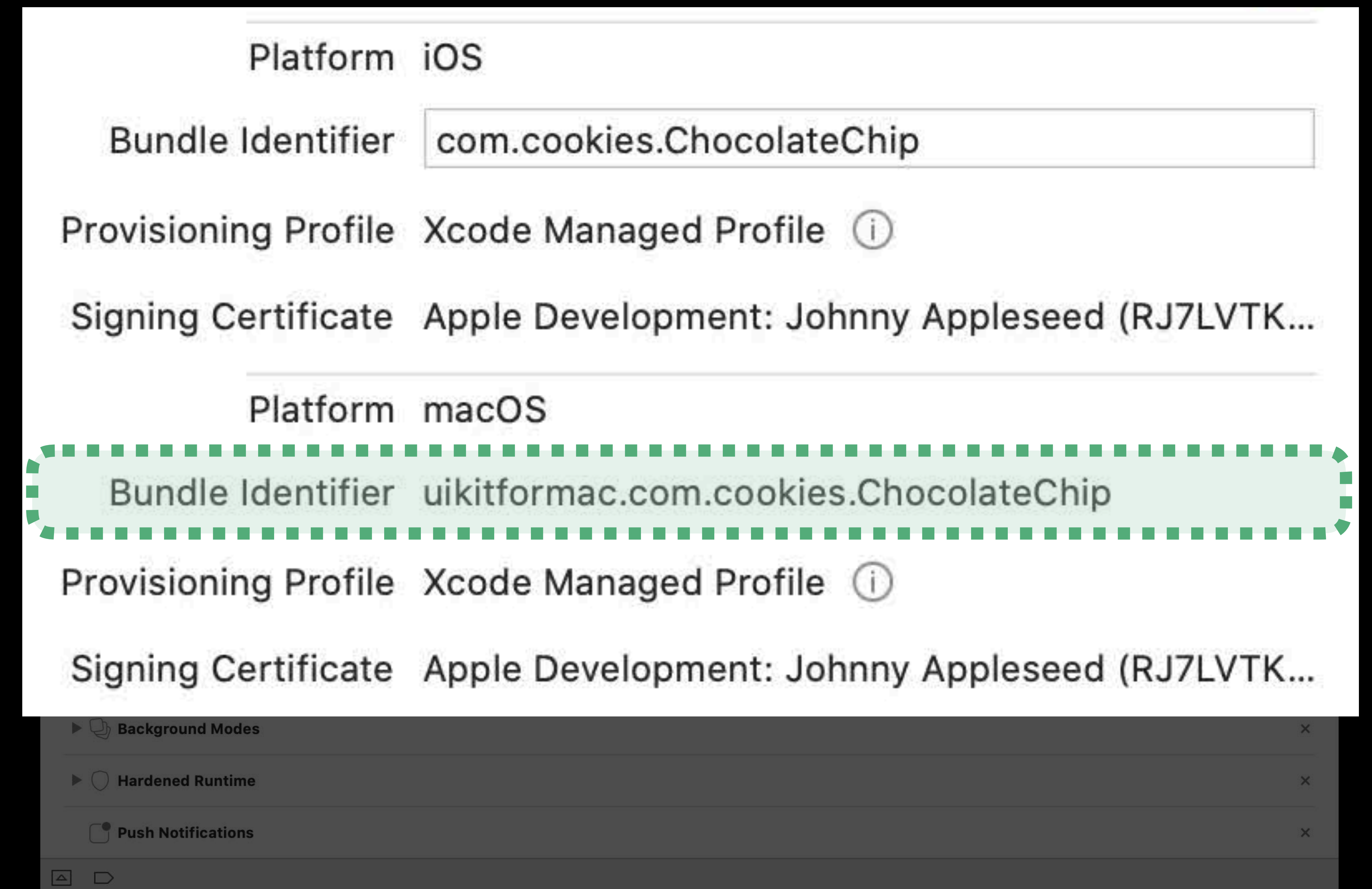
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Apple Development Certificates

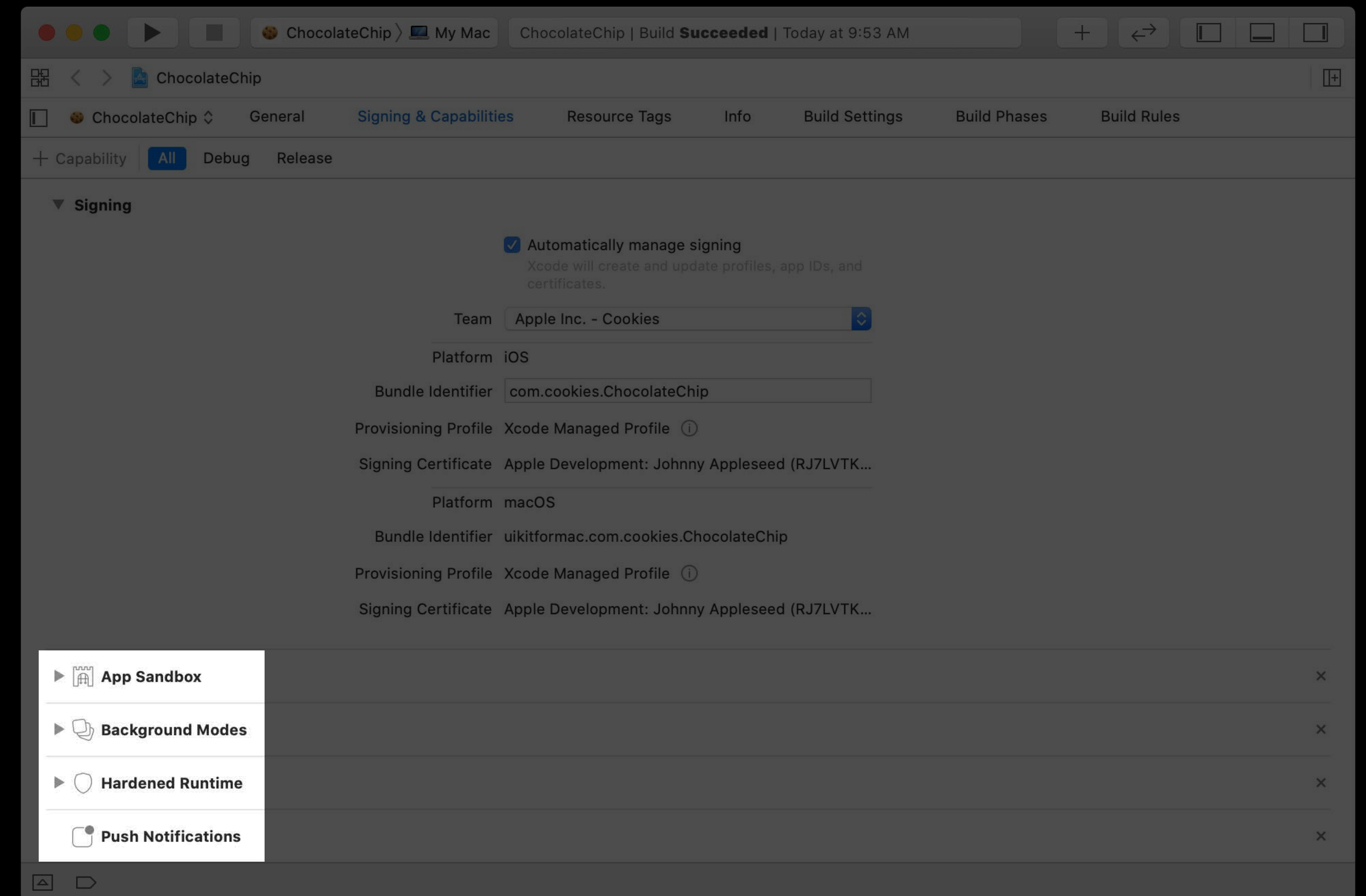
Unique Bundle Identifier



Signing for Mac

Capabilities

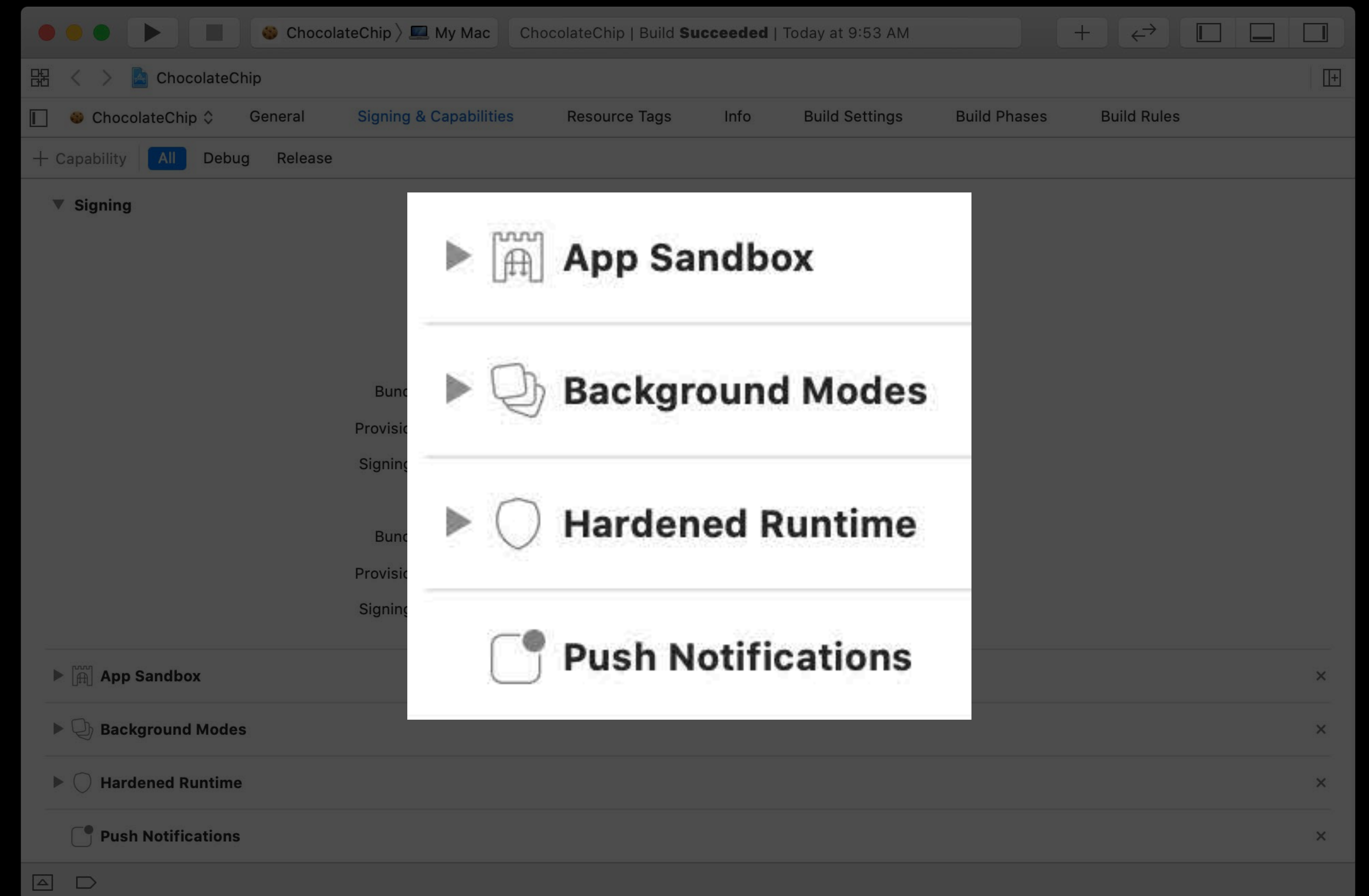
Share Entitlements



Signing for Mac

Capabilities

Share Entitlements

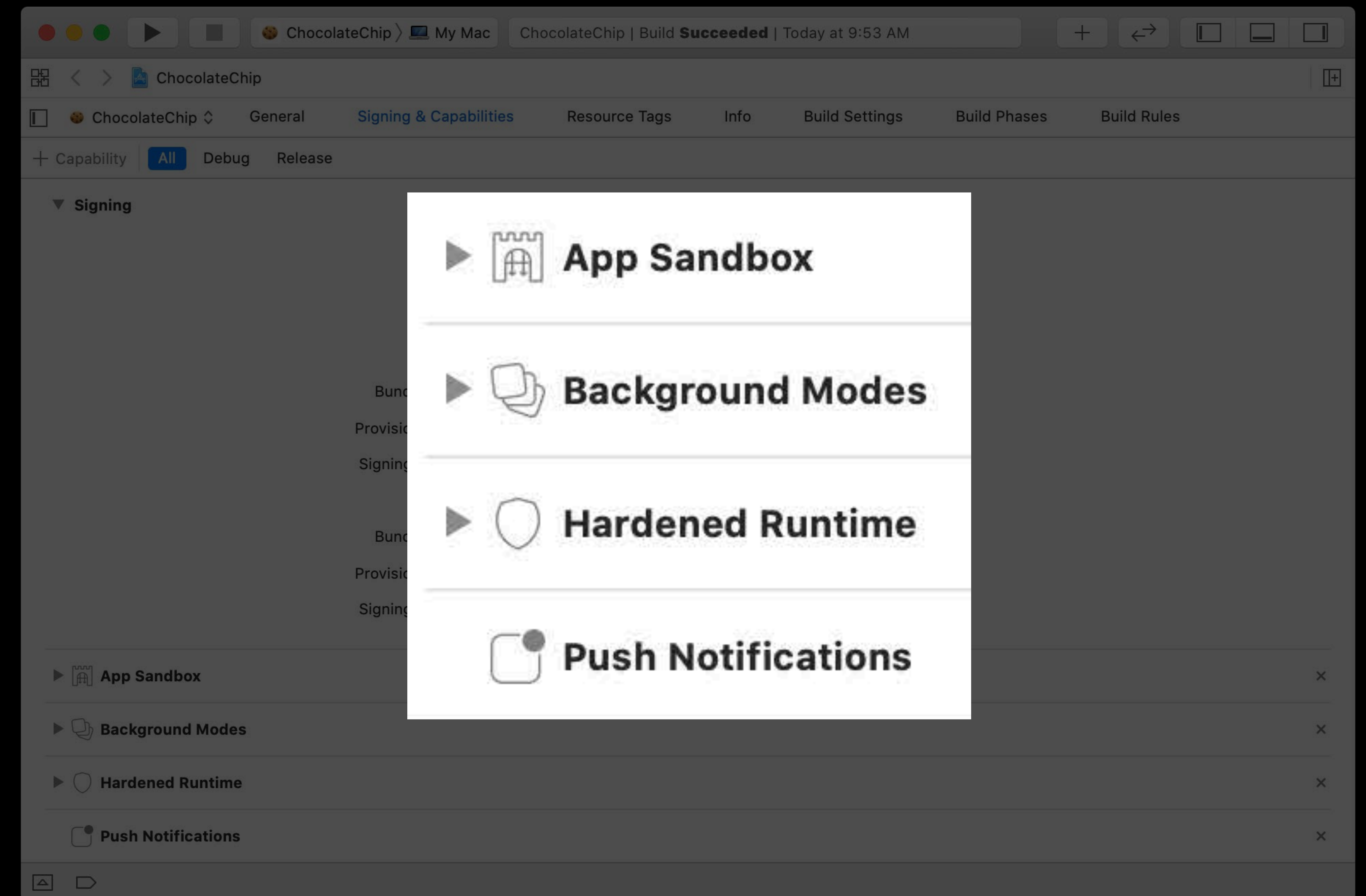


Signing for Mac

Capabilities

Share Entitlements

Mac Capabilities added

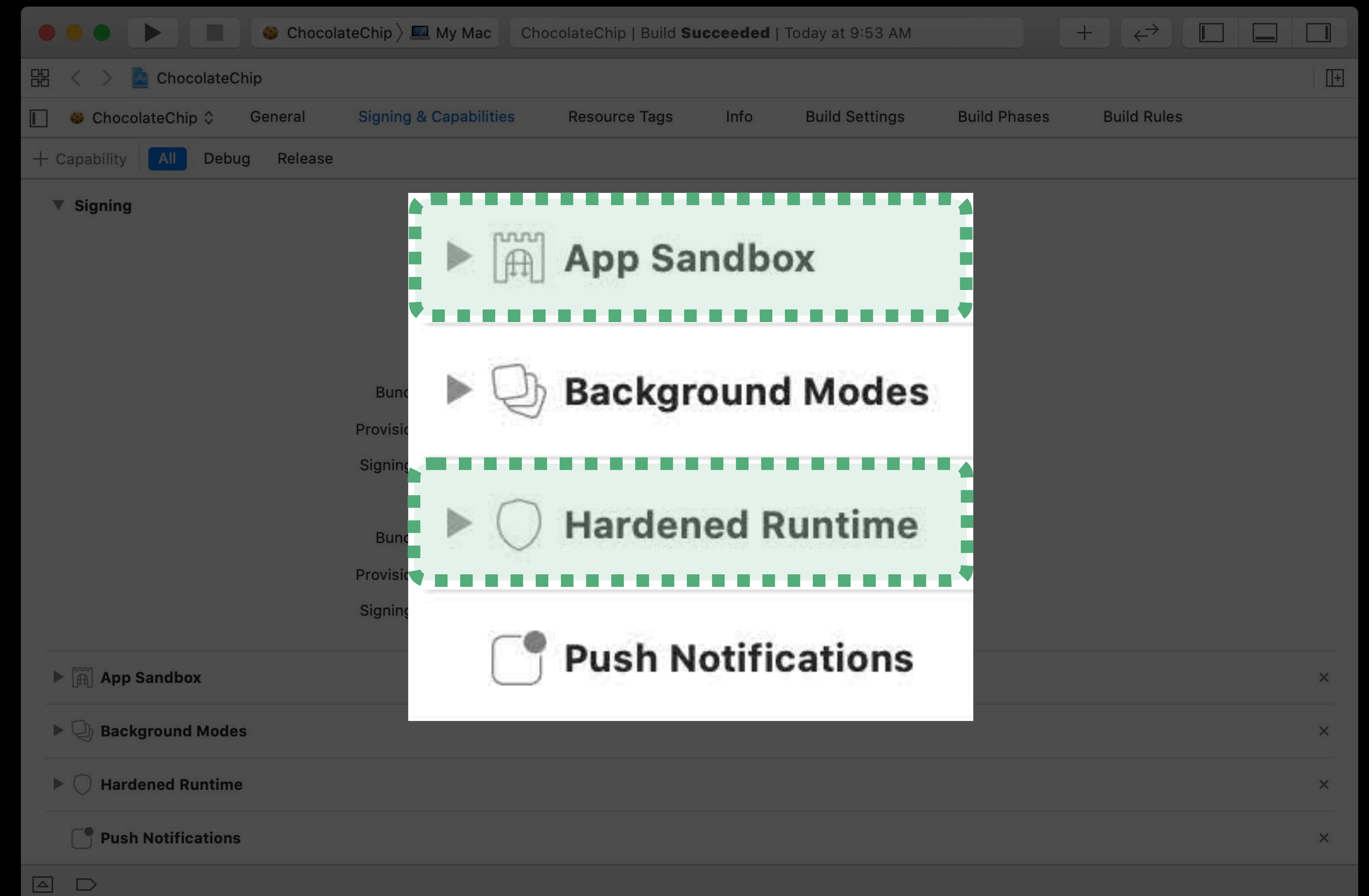


Signing for Mac

Capabilities

Share Entitlements

Mac Capabilities added



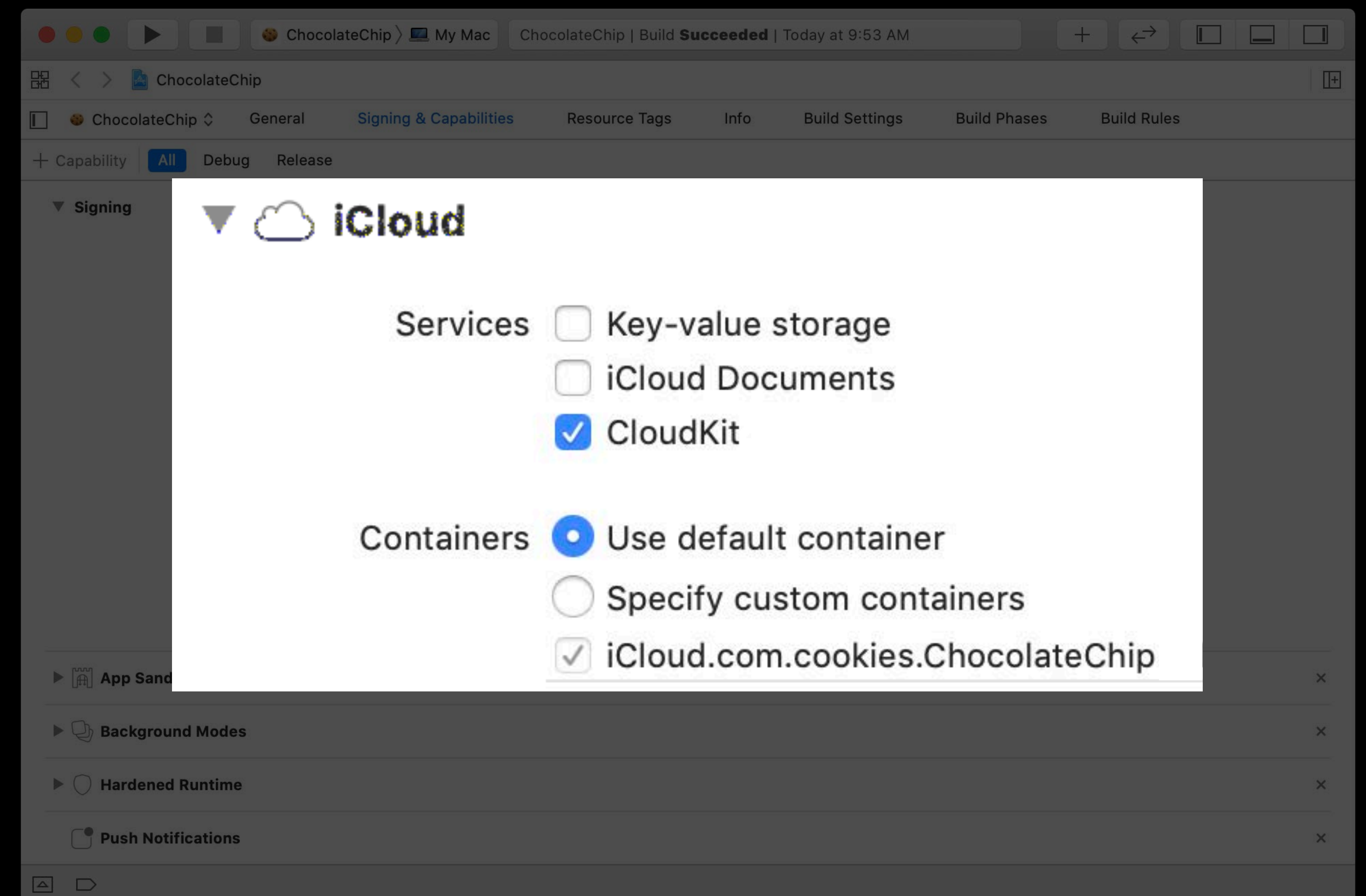
Signing for Mac

Capabilities

Share Entitlements

Mac Capabilities added

Explicit iCloud Container



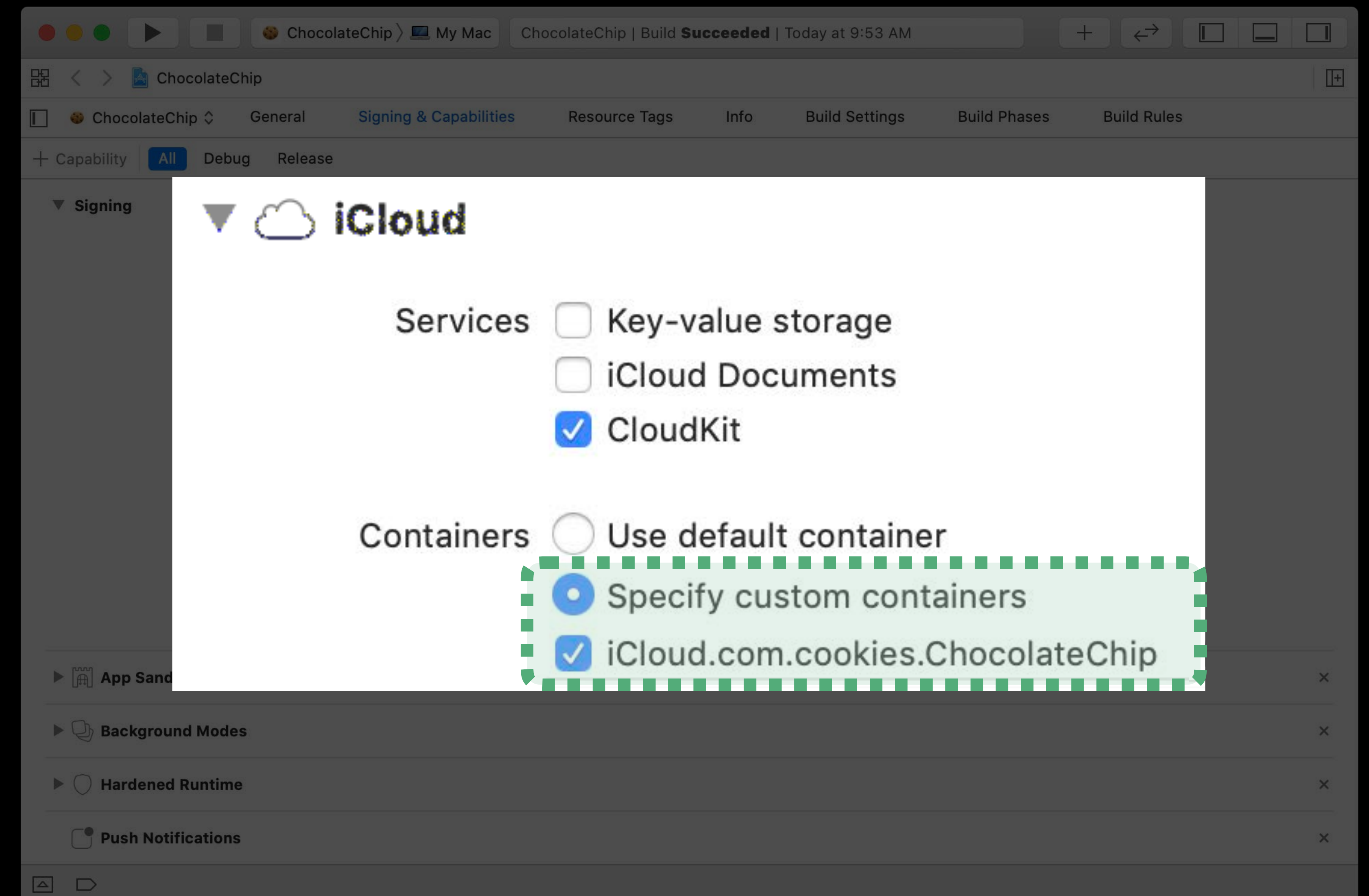
Signing for Mac

Capabilities

Share Entitlements

Mac Capabilities added

Explicit iCloud Container



Capabilities

Manual migration checklist

Capabilities

Manual migration checklist

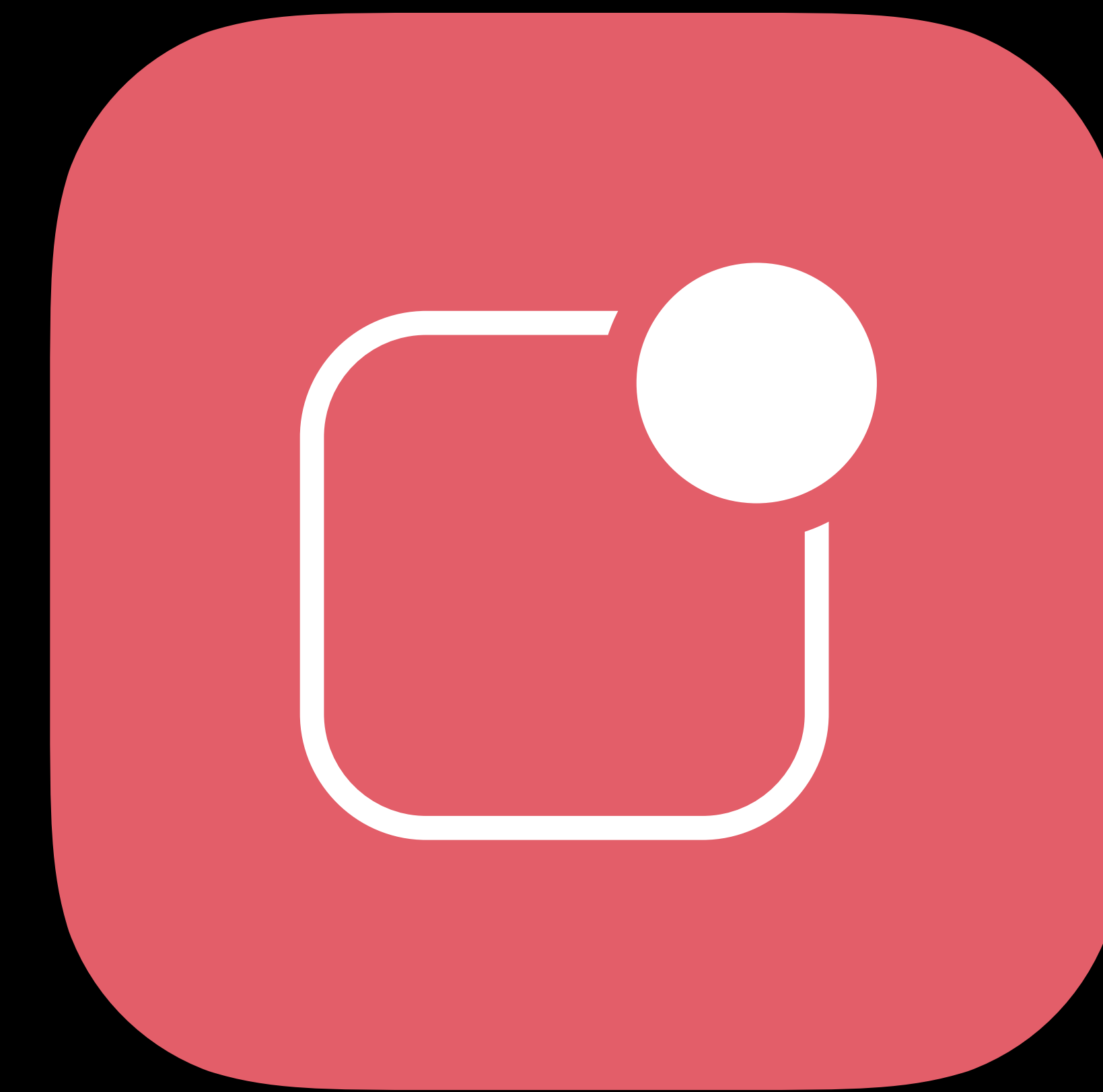
✓ Add Keychain Sharing Capability



Capabilities

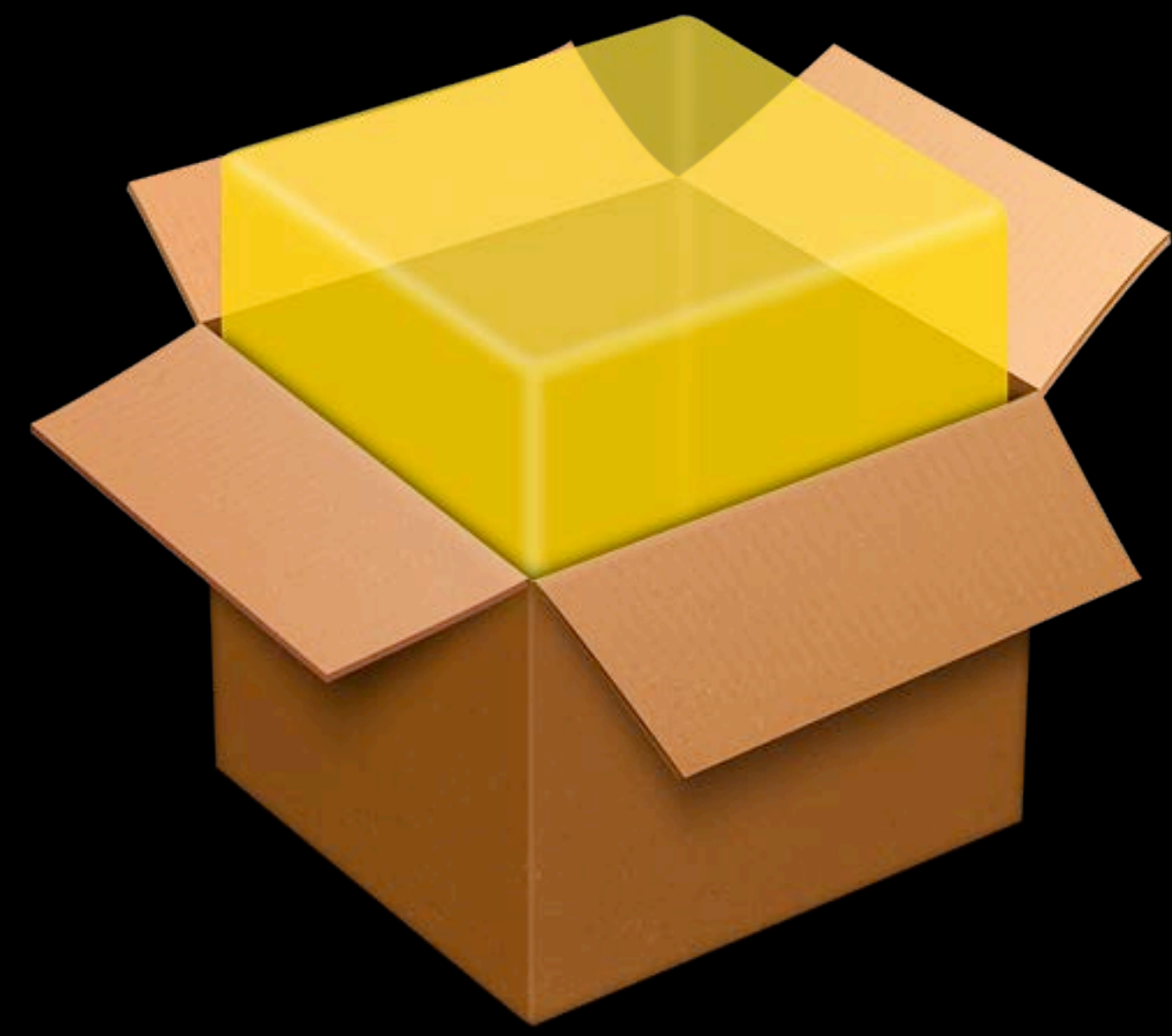
Manual migration checklist

- ✓ Add Keychain Sharing Capability
- ✓ Send push notifications to your iOS app









- Run ⌘R
- Test ⌘U
- Profile ⌘I
- Analyze ⇧⌘B
- Archive
- Install ^⌘A

- Build For ▶
- Perform Action ▶

- Build ⌘B
- Clean ⇧⌘K
- Stop ⌘.

- Scheme ▶

- Destination** ▶
- Test Plan ▶

Create Bot...

- Choose Destination ^⇧O
- Select Next Destination ^⌘]]
- Select Previous Destination ^⌘[[

- ✓ **My Mac**
- Build Only Device
 - Generic iOS Device
- iOS Simulators
 - iPhone X
 - iPhone Xs
- Add Additional Simulators...

Run ⌘R

Test ⌘U

Profile ⌘I

Analyze ⇧⌘B

Archive

Install ^⌘A

Build For ▶

Perform Action ▶

Build ⌘B

Clean ⇧⌘K

Stop ⌘.

Scheme ▶

Destination ▶

Test Plan ▶

Create Bot...

Archives Crashes Energy Metrics


iOS Apps
ChocolateChip

macOS Apps
ChocolateChip
Frosting

tvOS Apps
Sprinkles

| Name | Creation Date | Version |
|---------------|-------------------------|---------|
| ChocolateChip | May 29, 2019 at 8:36 PM | 1.0 (1) |

Archive Information

 **ChocolateChip**
May 29, 2019 at 8:36 PM

[Distribute App](#)

[Validate App](#)

Details

Version 1.0 (1)
Identifier uikitformac.com.cookies.Ch...
Type macOS App Archive

Description

No Description


Filter 1 archive

Archives Crashes Energy Metrics

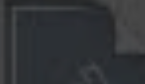
iOS Apps
ChocolateChip

macOS Apps
ChocolateChip
Frosting

tvOS Apps
Sprinkles

| Name | Creation Date | Version |
|---|-------------------------|---------|
|  ChocolateChip | May 29, 2019 at 8:36 PM | 1.0 (1) |

Archive Information

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May 29, 2019 at 8:36 PM

[Distribute App](#)

[Validate App](#)

Details

Version 1.0 (1)
Identifier uikitformac.com.cookies.Ch...
Type macOS App Archive

Description

No Description

Filter 1 archive

Archives Crashes Energy Metrics


iOS Apps
ChocolateChip

macOS Apps
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Archives Crashes Energy Metrics


iOS Apps
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[Distribute App](#)

[Validate App](#)

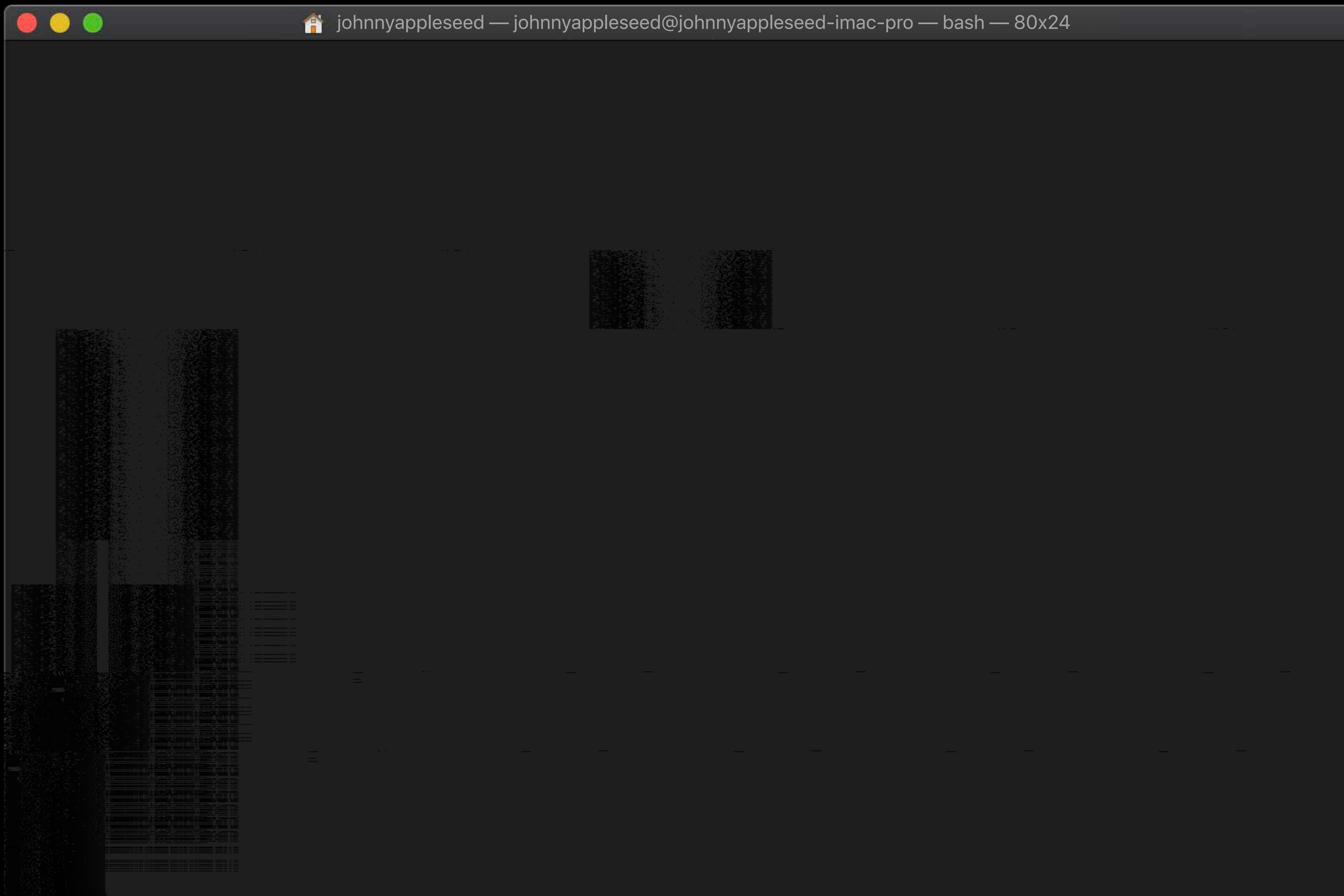
Details

Version 1.0 (1)
Identifier uikitformac.com.cookies.Ch...
Type macOS App Archive

Description

No Description

Filter 1 archive





```
$ xcodebuild archive  
    -scheme ChocolateChip\  
    -archivePath ChocolateChip.xcarchive
```

...

```
** ARCHIVE SUCCEEDED **
```

```
johnnyappleseed — johnnyappleseed@johnnyappleseed-imac-pro — bash — 80x24

$ xcodebuild archive
    -scheme ChocolateChip\
    -archivePath ChocolateChip.xcarchive

...
** ARCHIVE SUCCEEDED **

$ xcodebuild -exportArchive\
    -archivePath ChocolateChip.xcarchive\
    -exportOptionsPlist ExportOptions.plist

...
** EXPORT SUCCEEDED **
```



```
johnnyappleseed — johnnyappleseed@johnnyappleseed-imac-pro — bash — 80x24

$ xcodebuild archive
    -scheme ChocolateChip\
    -archivePath ChocolateChip.xcarchive

...
** ARCHIVE SUCCEEDED **

$ xcodebuild -exportArchive\
    -archivePath ChocolateChip.xcarchive\
    -exportOptionsPlist ExportOptions.plist

...
** EXPORT SUCCEEDED **
```

Mac App Store

Getting started

Mac App Store

Getting started

- ✔ Create an App Record on App Store Connect

Mac App Store

Getting started

- ✓ Create an App Record on App Store Connect
- ✓ Associate your Mac synthesized App Identifier

Mac App Store

Getting started

- ✓ Create an App Record on App Store Connect
- ✓ Associate your Mac synthesized App Identifier
- ✓ Always increment your build number

Mac App Store

Getting started

- ✓ Create an App Record on App Store Connect
- ✓ Associate your Mac synthesized App Identifier
- ✓ Always increment your build number
- ✓ Upload from Xcode

Mac App Store

Getting started

- ✓ Create an App Record on App Store Connect
- ✓ Associate your Mac synthesized App Identifier
- ✓ Always increment your build number
- ✓ Upload from Xcode
- ✓ Release for sale



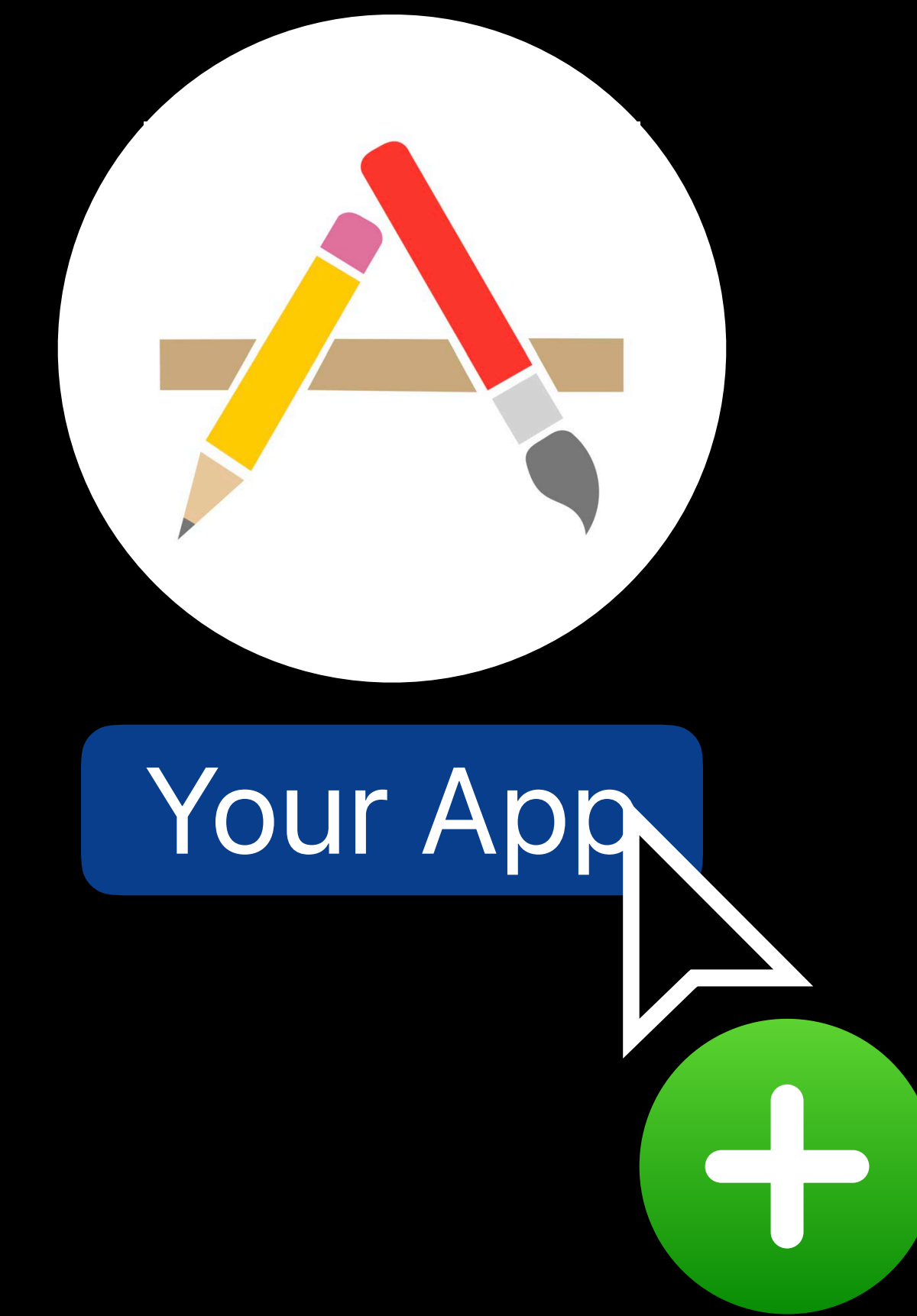


Drag and Drop Installation



Drag and Drop Installation

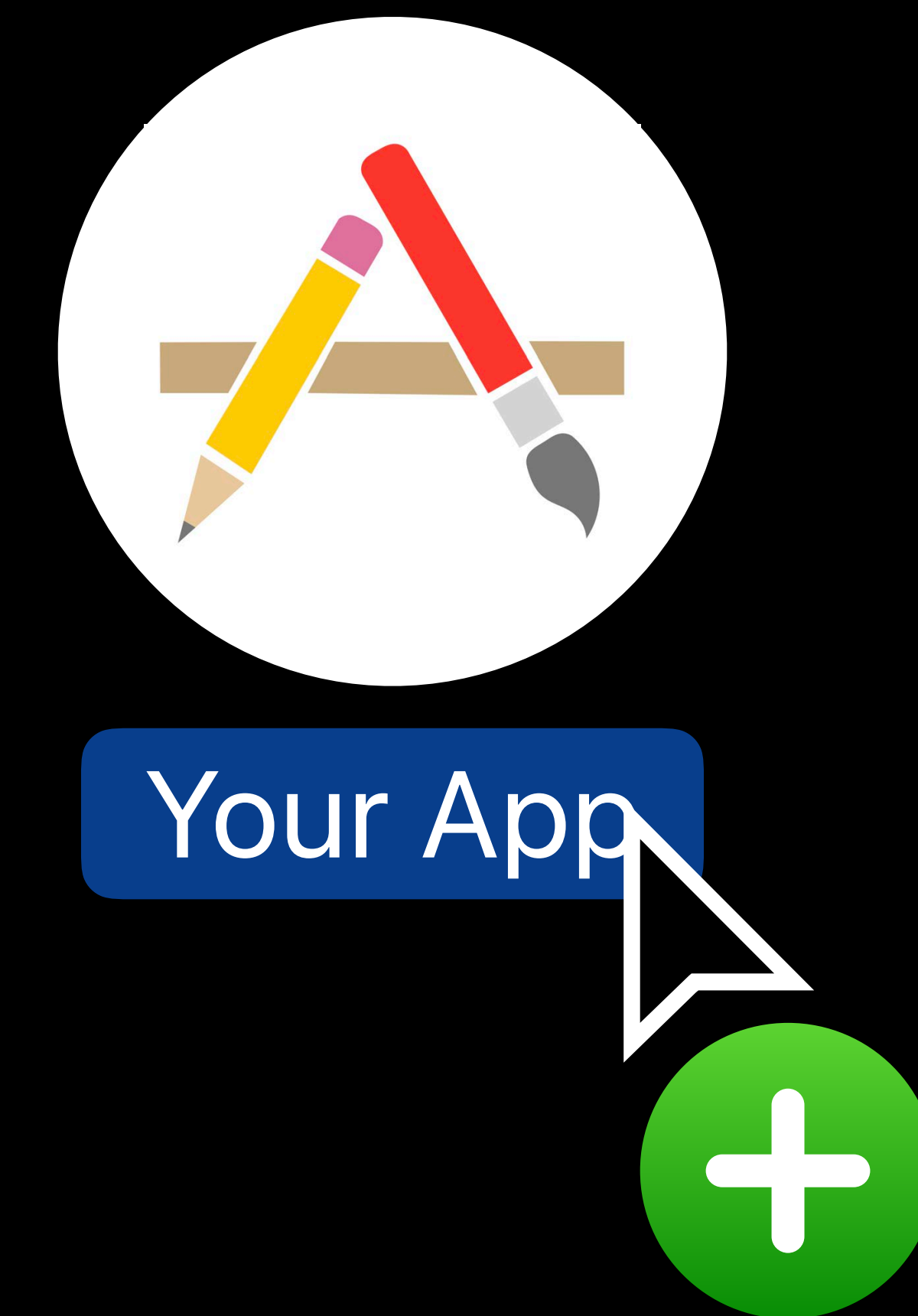
Mac App Store migration checklist



Drag and Drop Installation

Mac App Store migration checklist

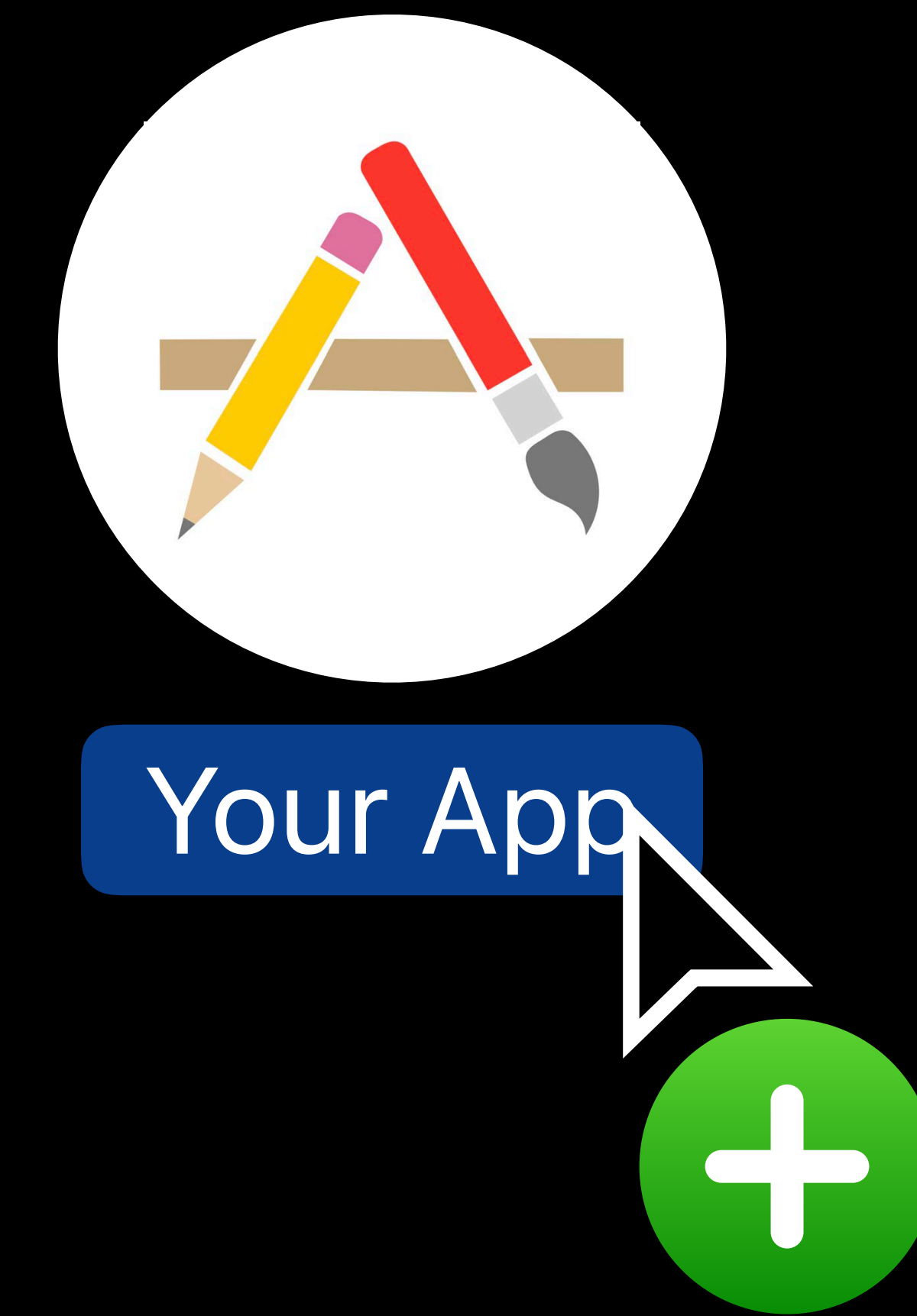
- ✓ App Thinning is unsupported



Drag and Drop Installation

Mac App Store migration checklist

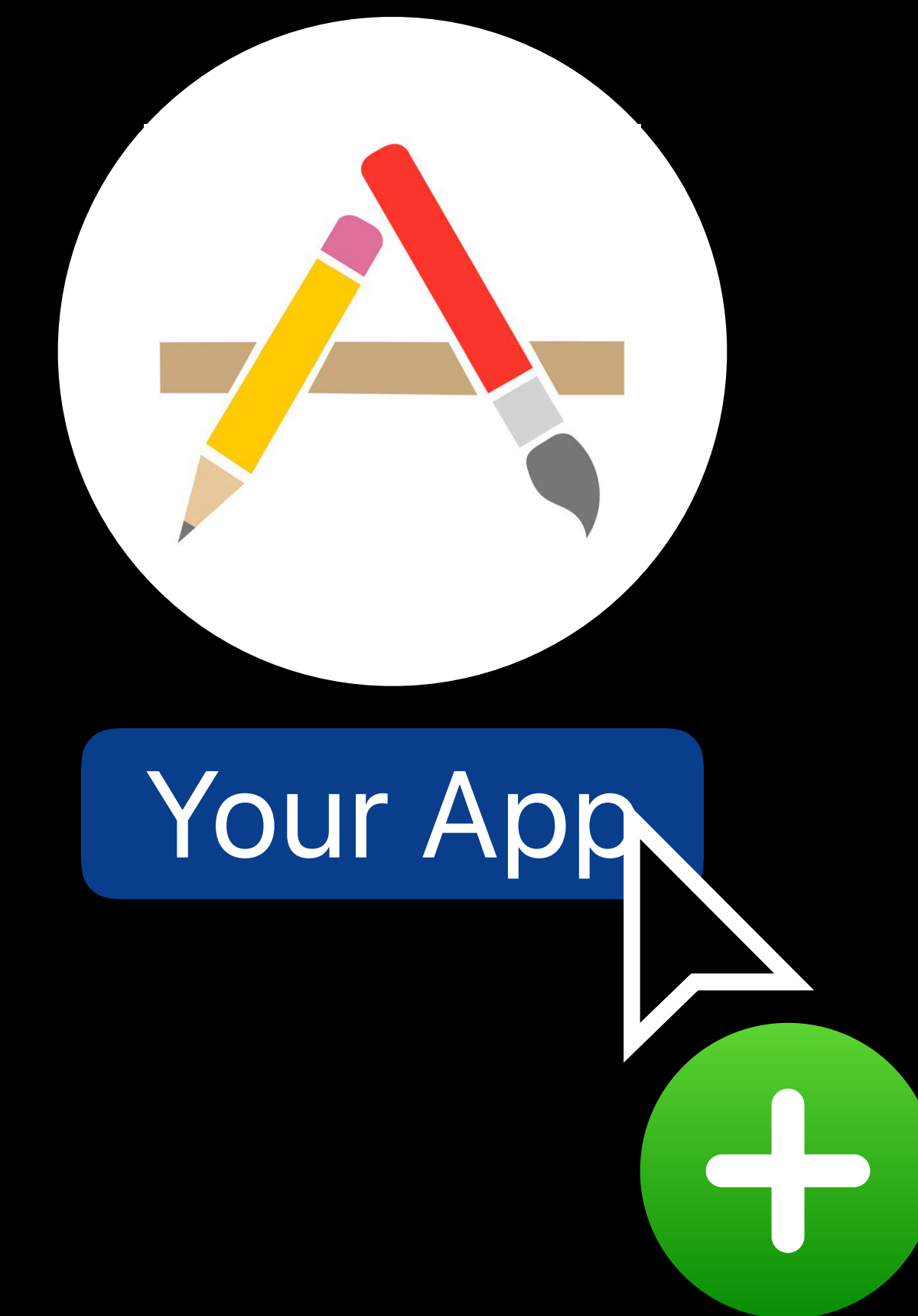
- ✓ App Thinning is unsupported
- ✓ Add Receipt Validation for DRM



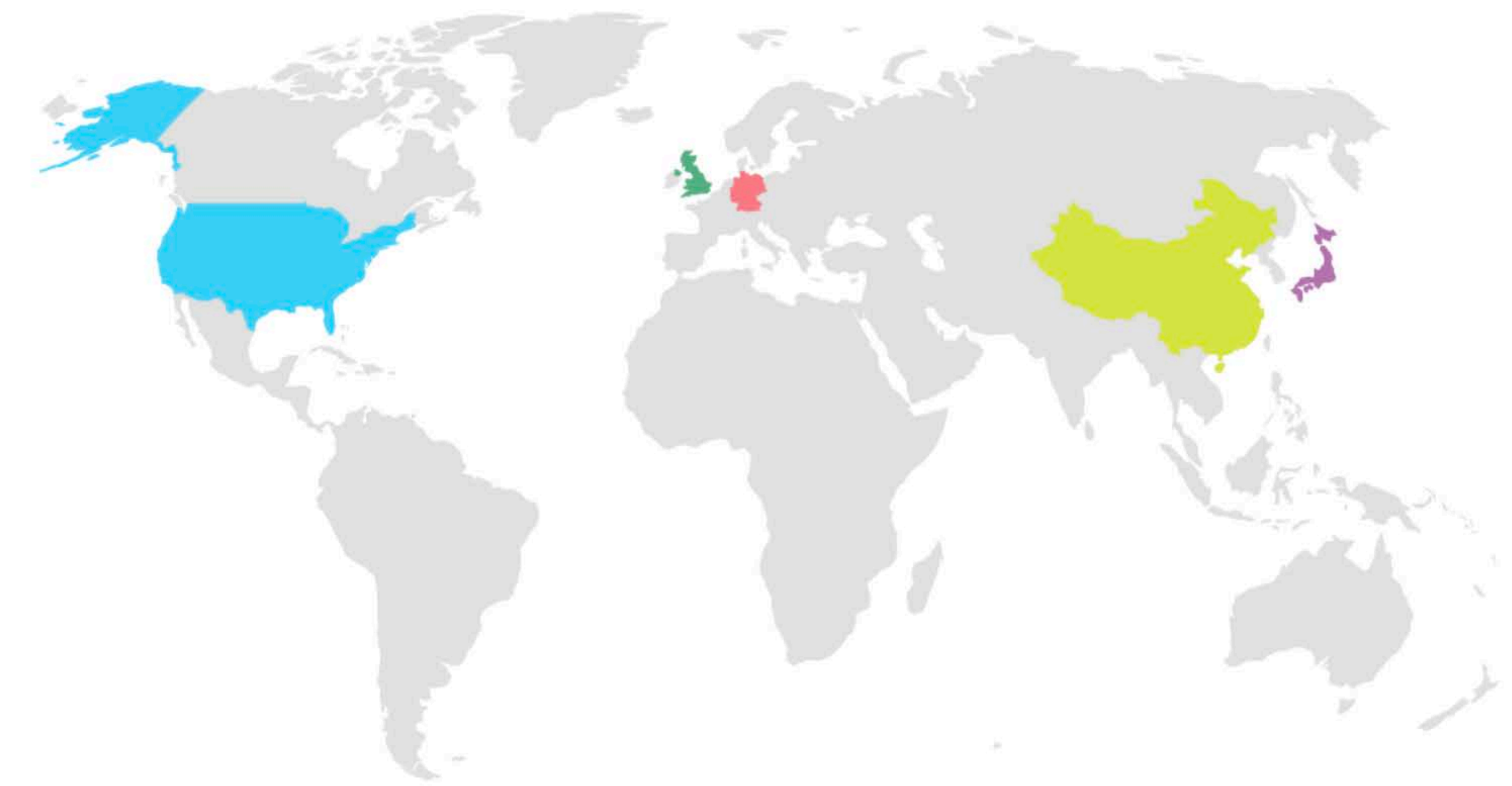
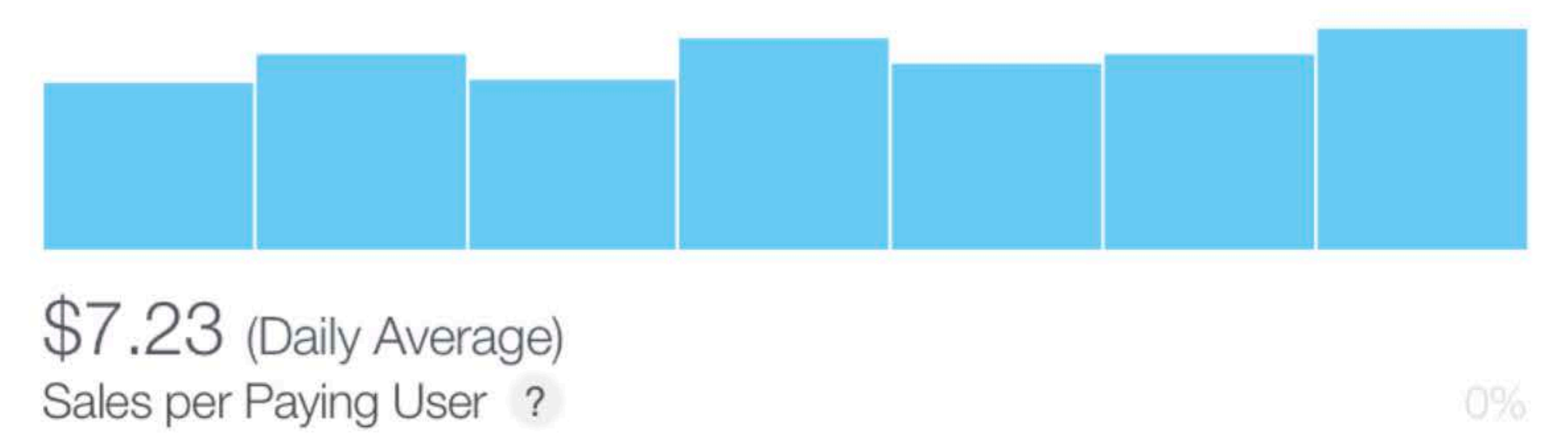
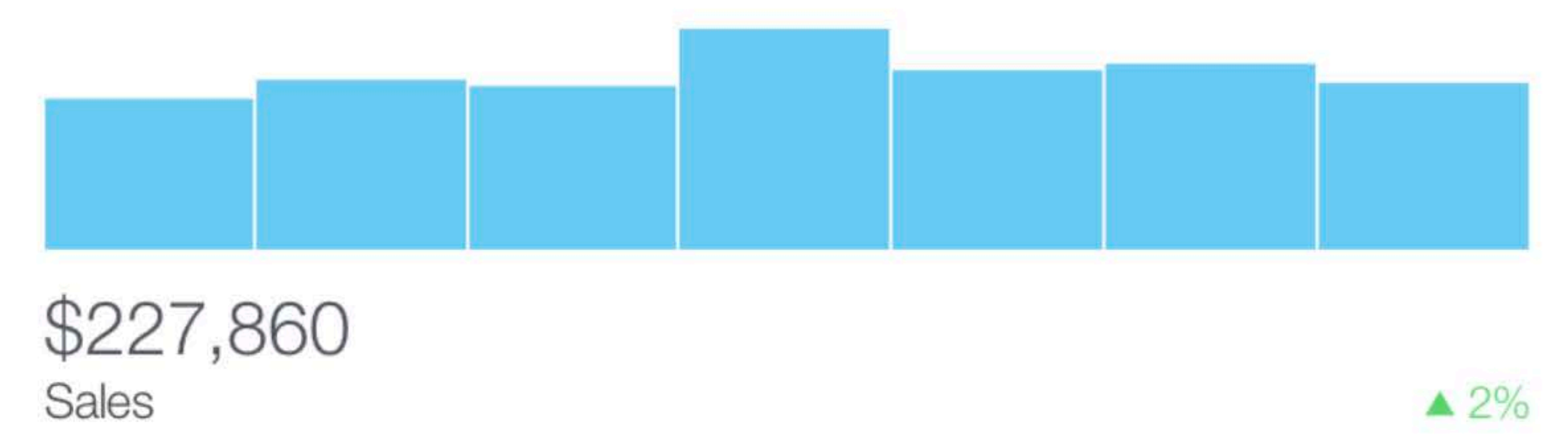
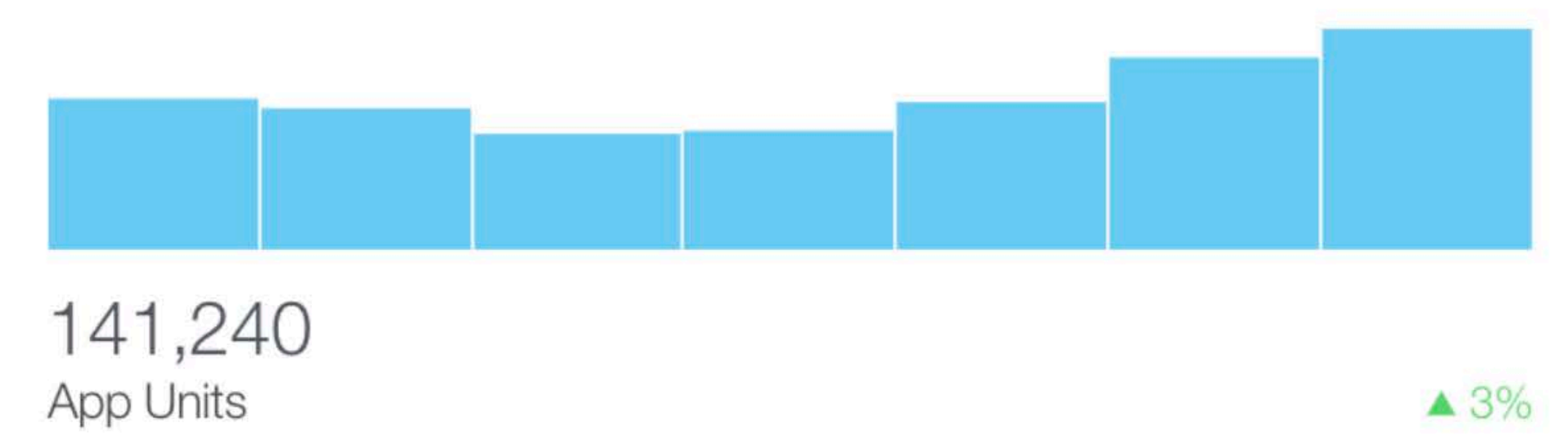
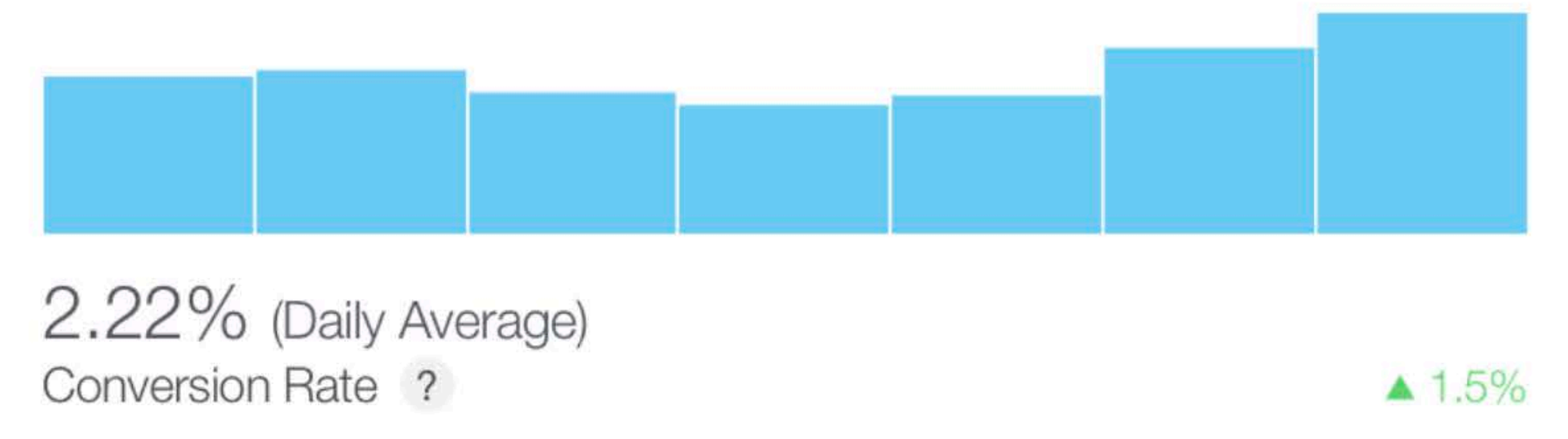
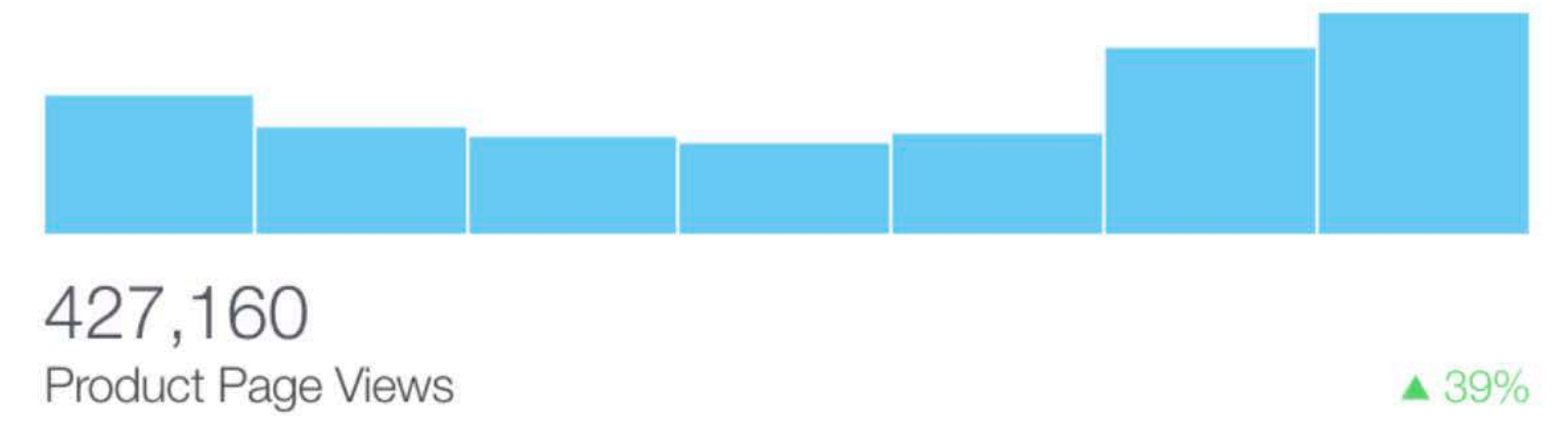
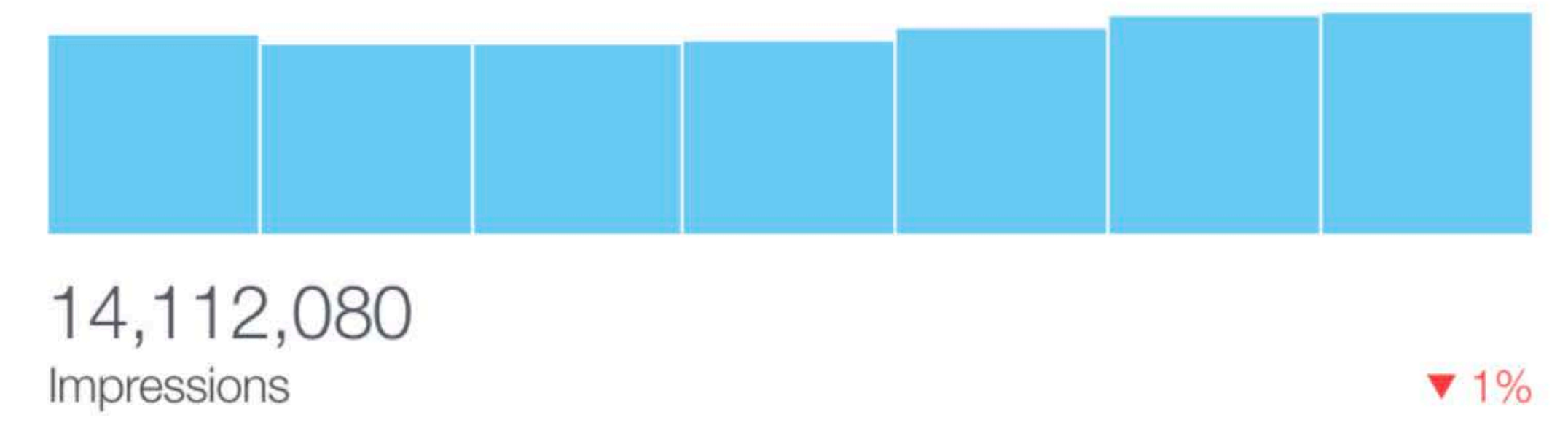
Drag and Drop Installation

Mac App Store migration checklist

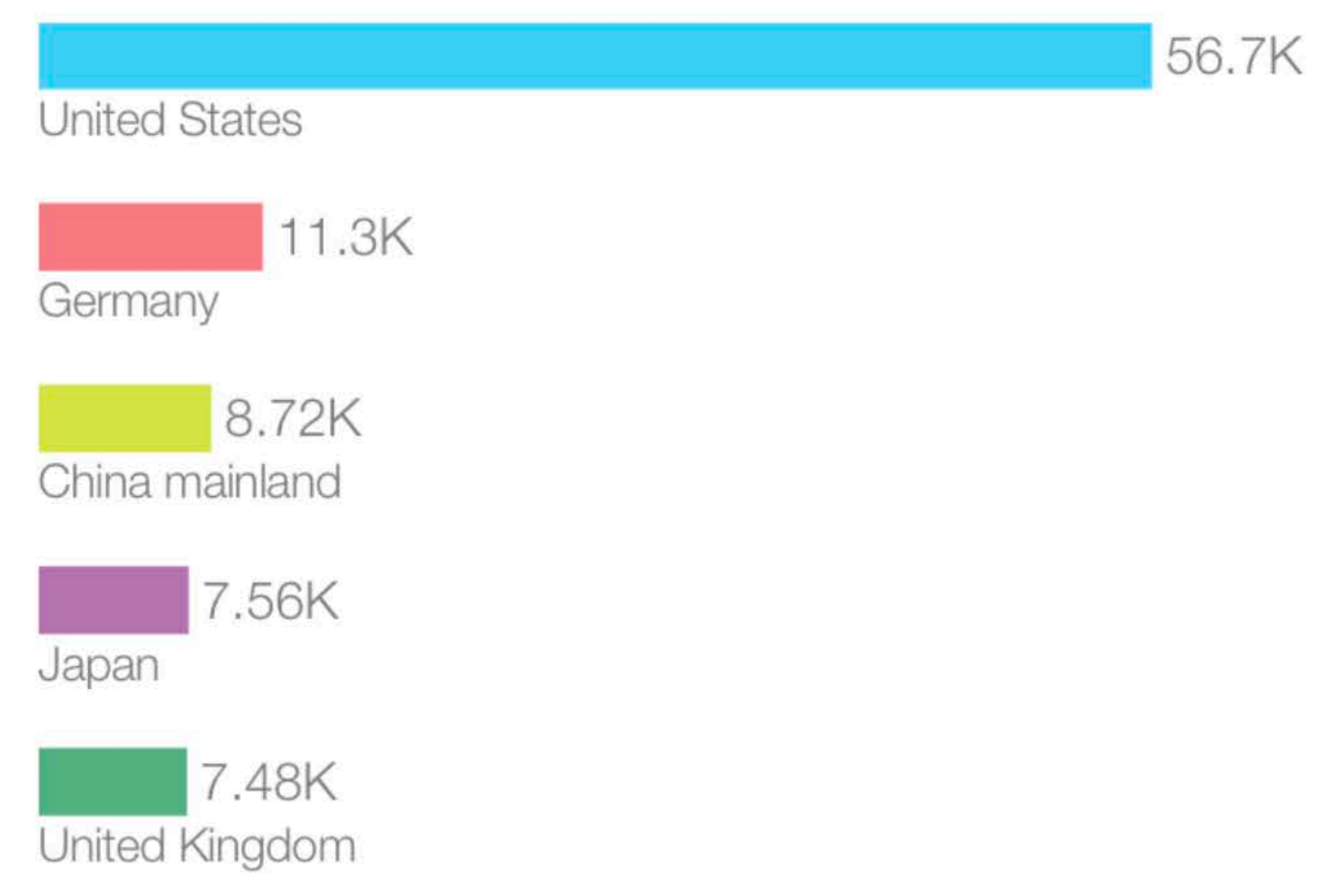
- ✓ App Thinning is unsupported
- ✓ Add Receipt Validation for DRM



Last 7 Days (May 23-29)



App Units by Territory



App Units by Source

Archives
Crashes
Energy
Metrics

iOS Apps

- ChocolateChip

macOS Apps

- ChocolateChip
- Frosting

tvOS Apps

- Sprinkles

App Store > Build 5

- ChocolateChip: RecipeSection.init(:) + ...**
242 devices
- ChocolateChip: _VariantDictionaryBuffer...**
124 devices
- ChocolateChip: RecipeStore.recipes() + ...**
108 devices
- ChocolateChip: RecipeStore.init(serializ...**
88 devices
- ChocolateShare: -[RecipePackager seri...**
42 devices
- ChocolateChip: RecipeSection.init(:) + ...**
41 devices
- ChocolateChip: -[RecipeSync syncStep...**
10 devices

Previous Top Crash Logs

- ChocolateChip: RecipeSection.init(:) + ...**
72 devices
- ChocolateShare: _46-[OtherShareView...**
13 devices
- ChocolateChip: StepsViewController.set...**
8 devices

ChocolateChip: RecipeSection.init(:) + 268

▼ Thread 0

| | | |
|----|--------------------|--|
| 1 | libswiftCore.dylib | _assertionFailure(_:_:file:line:flags:) |
| 2 | libswiftCore.dylib | default argument 1 of precondition(_:_:file:line:) |
| 3 | ChocolateChip | RecipeSection.init(:) |
| 4 | ChocolateChip | @objc RecipeDetailViewController.tableView(_:_:titleForHeaderInSection:) |
| 5 | UIKit | -[UITableView _delegateWantsHeaderTitleForSection:] |
| 6 | UIKit | -[UITableView _delegateWantsHeaderForSection:] |
| | | |
| 9 | UIKit | -[UITableView noteNumberOfRowsChanged] |
| 10 | UIKit | -[UITableView reloadData] |
| | | |
| 11 | ChocolateChip | RecipeDetailViewController.recipe.didset |
| 12 | ChocolateChip | RecipesViewController.prepare(for:sender:) |
| 13 | ChocolateChip | @objc RecipesViewController.prepare(for:sender:) |
| 14 | UIKit | -[UIStoryboardSegueTemplate _performWithDestinationViewController:s... |
| 15 | UIKit | -[UIStoryboardSegueTemplate _perform:] |
| | | |
| 26 | GraphicsServices | GSEventRunModal |
| 27 | UIKit | UIApplicationMain |
| 28 | ChocolateChip | main |
| 29 | libdyld.dylib | start |

Crash Information

ChocolateChip: RecipeSe...
242 devices

[Open in Project...](#)

Crash Log Details

Binary ChocolateChip 1.0 (5)
Thread 0
macOS 10.15 (19A471q)
Device iMac Pro

Last 2 Weeks Operating System ▾

242
TOTAL

■ OSX 10.15 100%

Notes

No Notes

[Mark As Resolved](#)

Filter
1 of 5 >

🔴 🟡 🟢

All Breakfast Lunch Dinner Dessert +

Recipes

- 🍪 Chocolate Chip Cookies ❤️
- 🍩 Donuts ❤️
- 🥧 Humble Pie
- 🍪 Marzipan ❤️
- 🥞 Pancakes
- 🍕 Pizza
- 🍝 Spaghetti
- 🌮 Tacos
- 🍓 Whipped Cream

Chocolate Chip Cookies

INGREDIENTS

Baking Soda
0.5 teaspoons

Brown Sugar
5.25 ounces

Egg
1.0

Egg Yolk
1.0

Flour
8.75 ounces

Salt
1.0 teaspoon

Semisweet Chocolate Chips
1.25 cups

Unsalted Butter
14.0 tablespoons

Vanilla Extract
2.0 teaspoons

STEPS

Heat oven to 375 degrees.

Capabilities

Mac App Store migration checklist

Capabilities

Mac App Store migration checklist

- ✓ Recreate In-App Purchases and subscriptions



Capabilities

Mac App Store migration checklist

- ✓ Recreate In-App Purchases and subscriptions
- ✓ Track purchase history server-side



Capabilities

Mac App Store migration checklist

- ✓ Recreate In-App Purchases and subscriptions
- ✓ Track purchase history server-side
- ✓ Use Game Center Groups



Capabilities

Mac App Store migration checklist

- ✓ Recreate In-App Purchases and subscriptions
- ✓ Track purchase history server-side
- ✓ Use Game Center Groups
- ✓ Update Game Center Multiplayer Compatibility

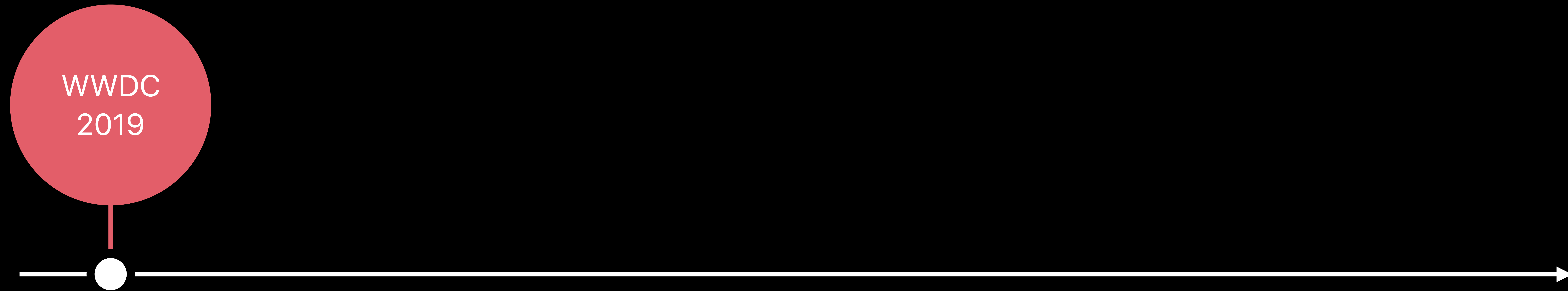


Mac App Store

Submission timeline

Mac App Store

Submission timeline



Create new App Record

Mac App Store

Submission timeline

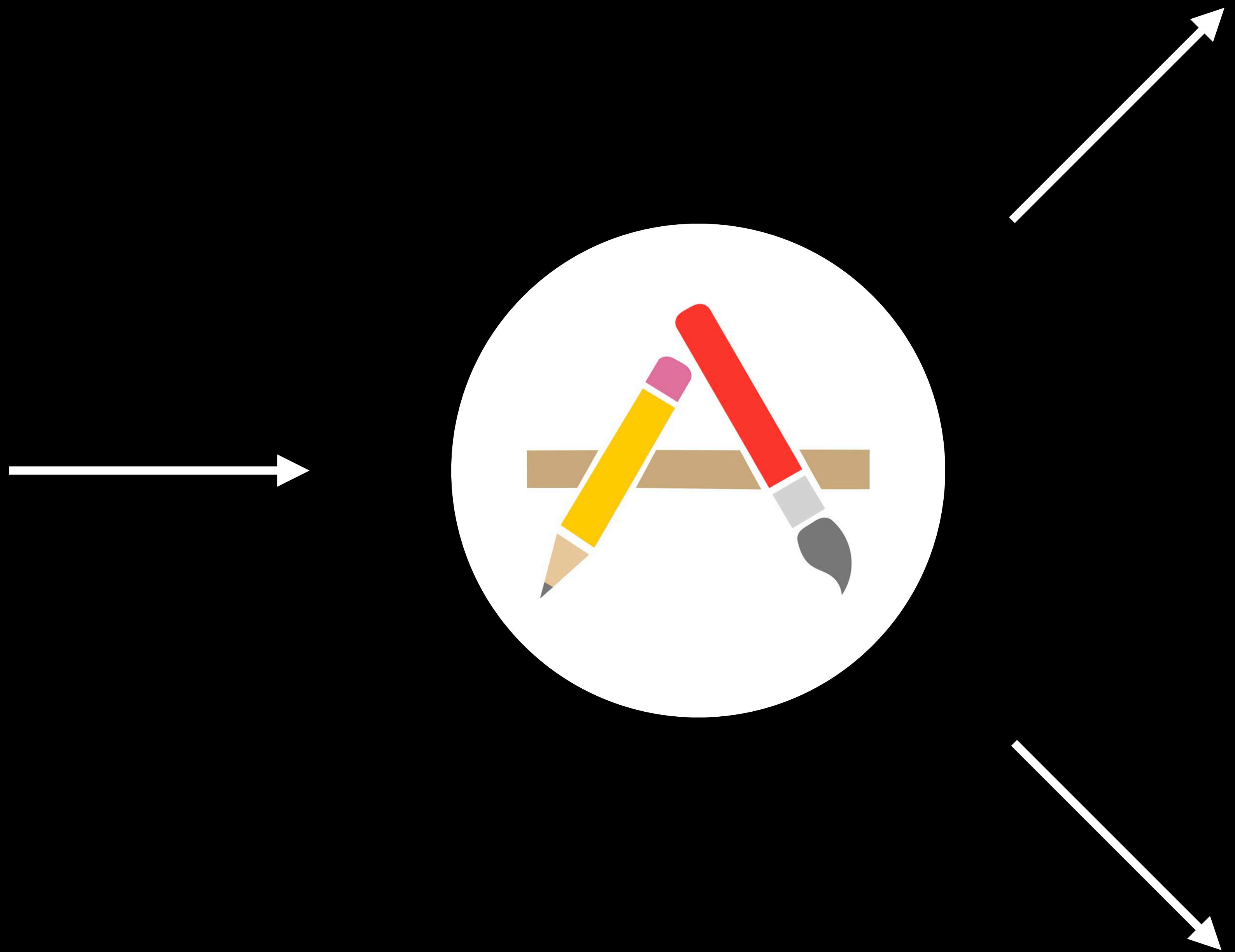


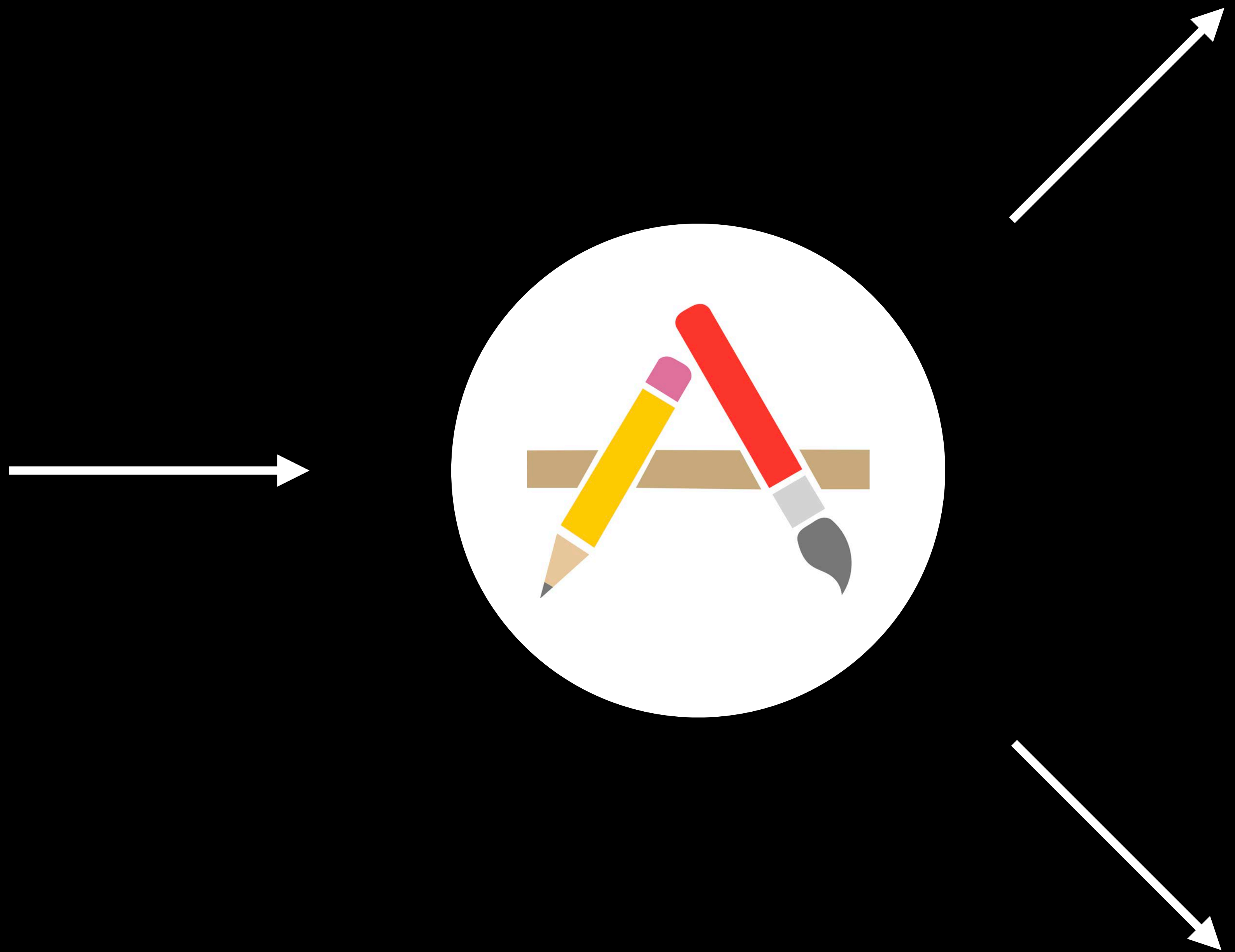
Mac App Store

Submission timeline









Notarized Apps

Highlights

Notarized Apps

Highlights

Apple verified signature

Notarized Apps

Highlights

Apple verified signature

Hardened Runtime required

Notarized Apps

Highlights

Apple verified signature

Hardened Runtime required

`altool`, `stapler`, `xcodebuild` command line support

Notarized Apps

Highlights

Apple verified signature

Hardened Runtime required

`altool`, `stapler`, `xcodebuild` command line support

Alternative to TestFlight

Notarized Apps

Highlights

Apple verified signature

Hardened Runtime required

`altool`, `stapler`, `xcodebuild` command line support

Alternative to TestFlight

GameKit and StoreKit are unavailable

Notarized Apps

Getting started

Notarized Apps

Getting started

- ✓ Upload app with Xcode

Notarized Apps

Getting started

- ✓ Upload app with Xcode
- ✓ Wait for Xcode notification

Notarized Apps

Getting started

- ✓ Upload app with Xcode
- ✓ Wait for Xcode notification
- ✓ Export Notarized app

Notarized Apps

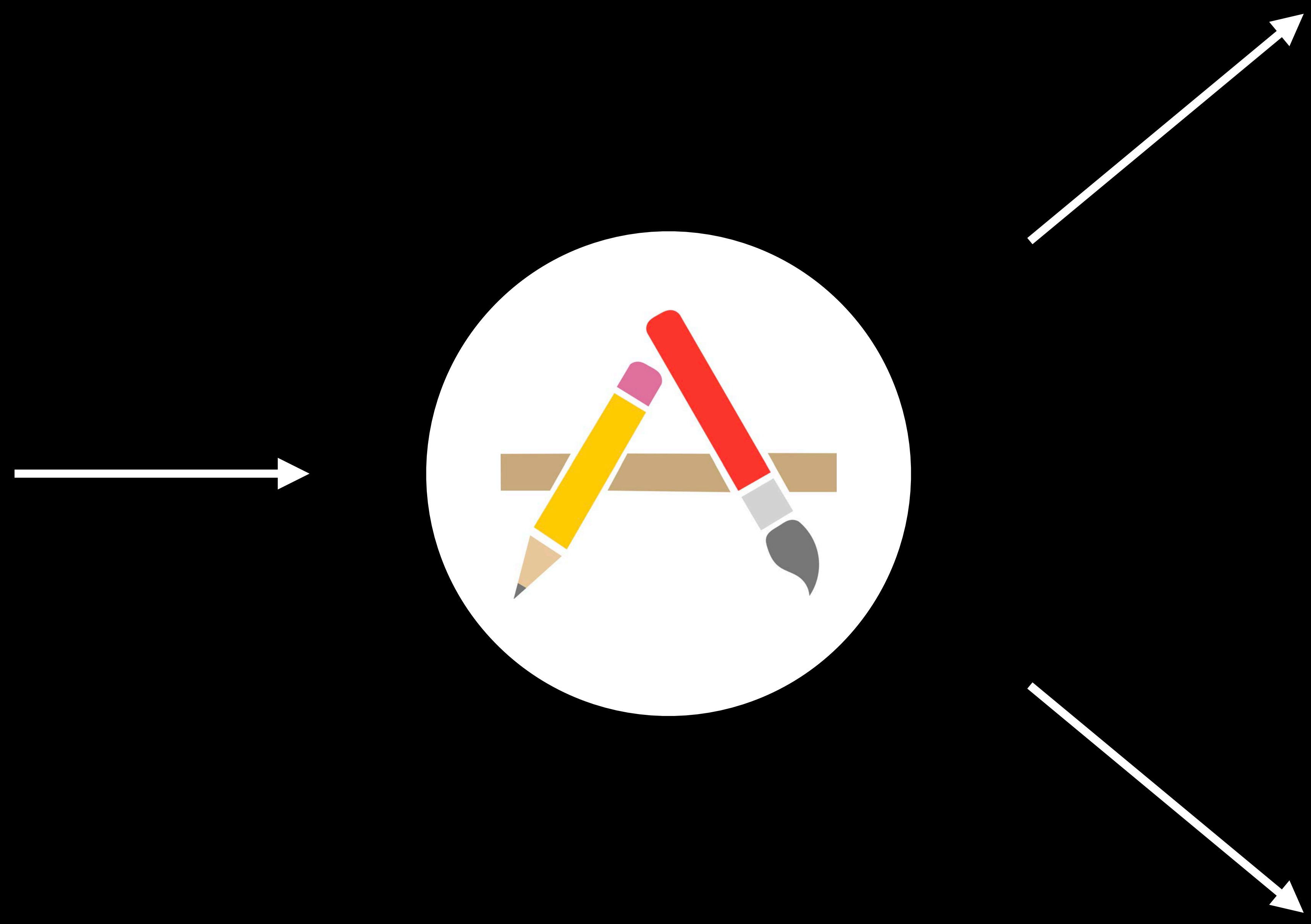
Getting started

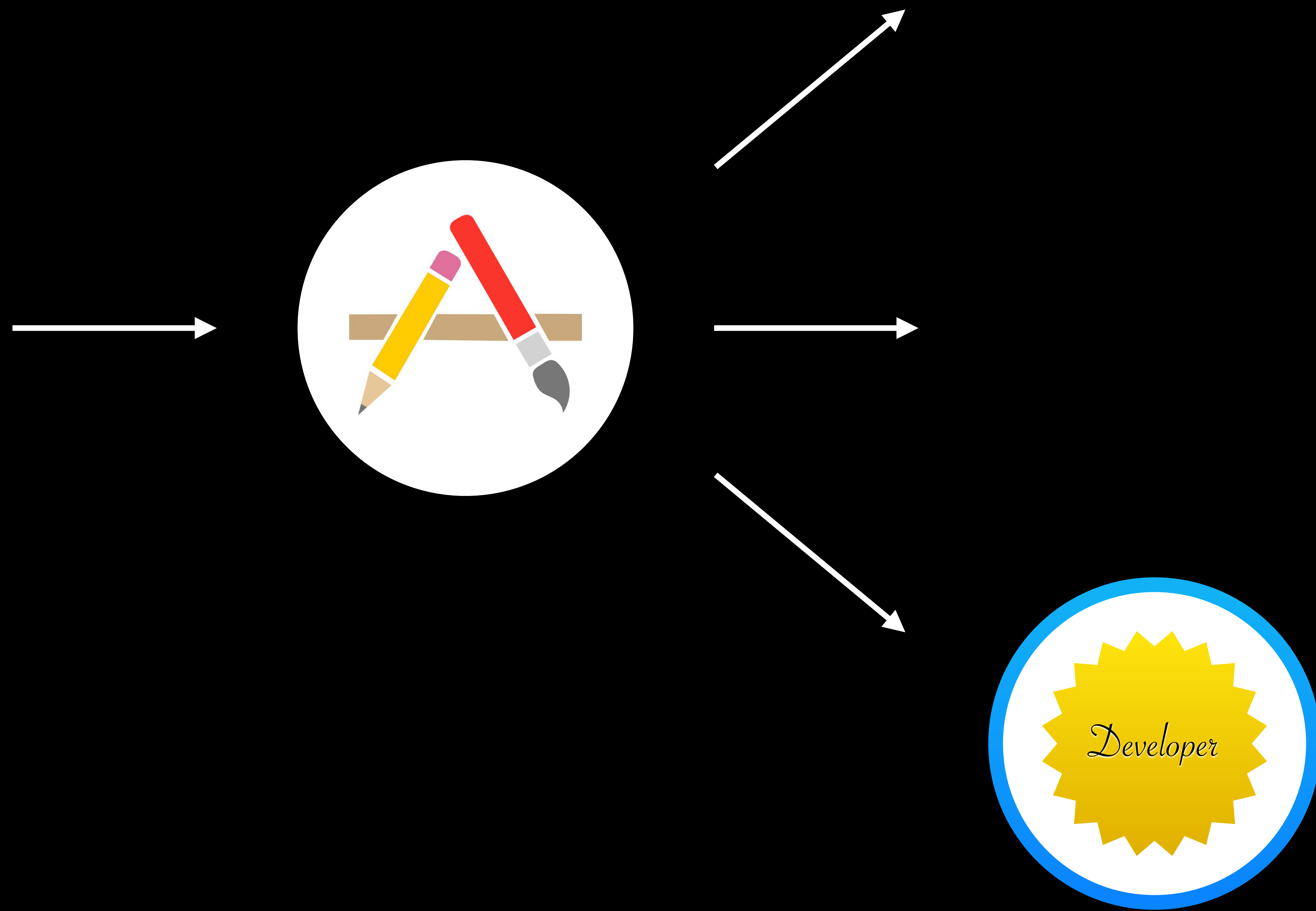
- ✓ Upload app with Xcode
- ✓ Wait for Xcode notification
- ✓ Export Notarized app
- ✓ Host your app

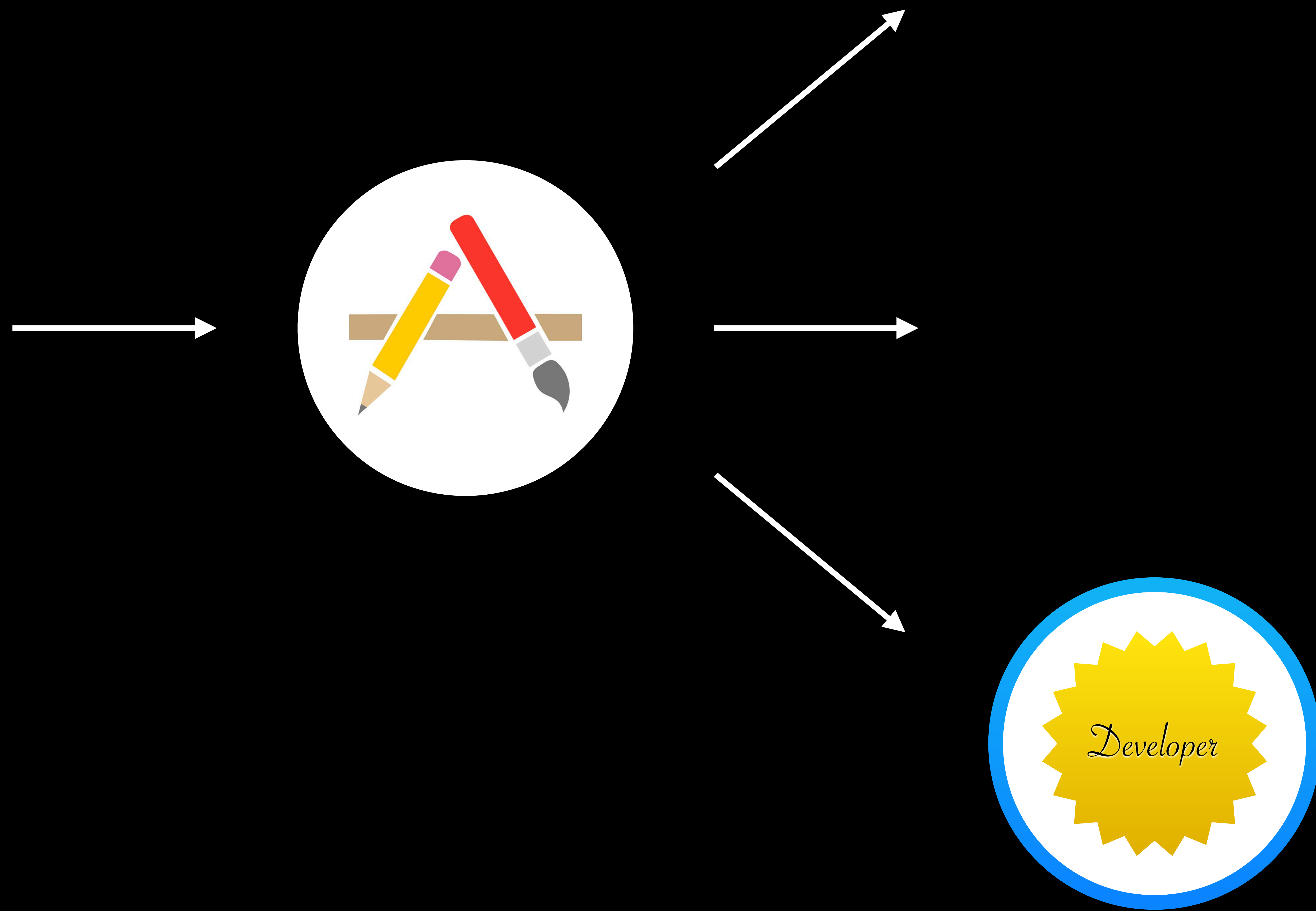
Notarized Apps

Getting started

- ✓ Upload app with Xcode
- ✓ Wait for Xcode notification
- ✓ Export Notarized app
- ✓ Host your app









Development Signing

Highlights

Same as iOS



Development Signing

Highlights

Same as iOS

Alternative to TestFlight



Development Signing

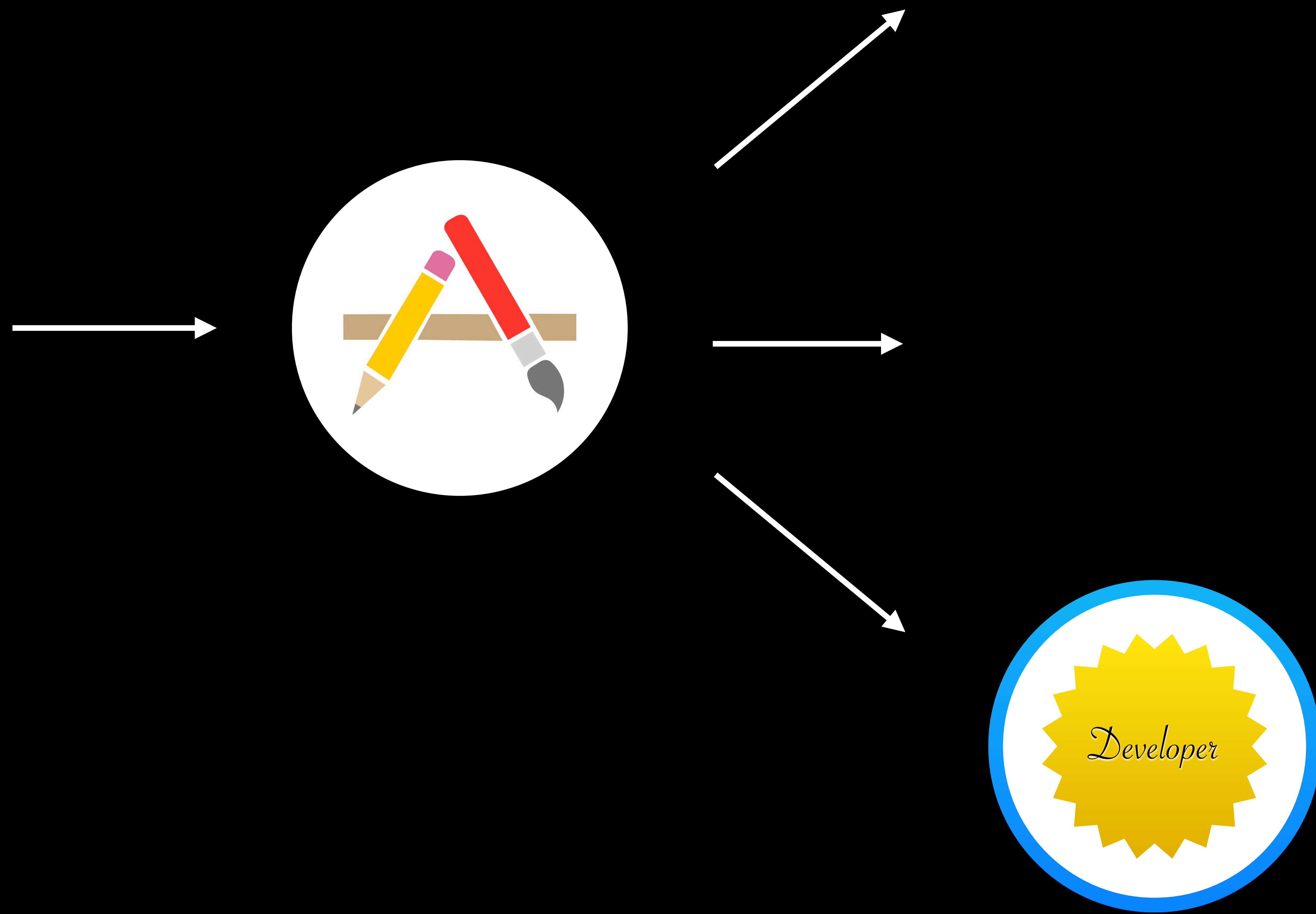
Highlights

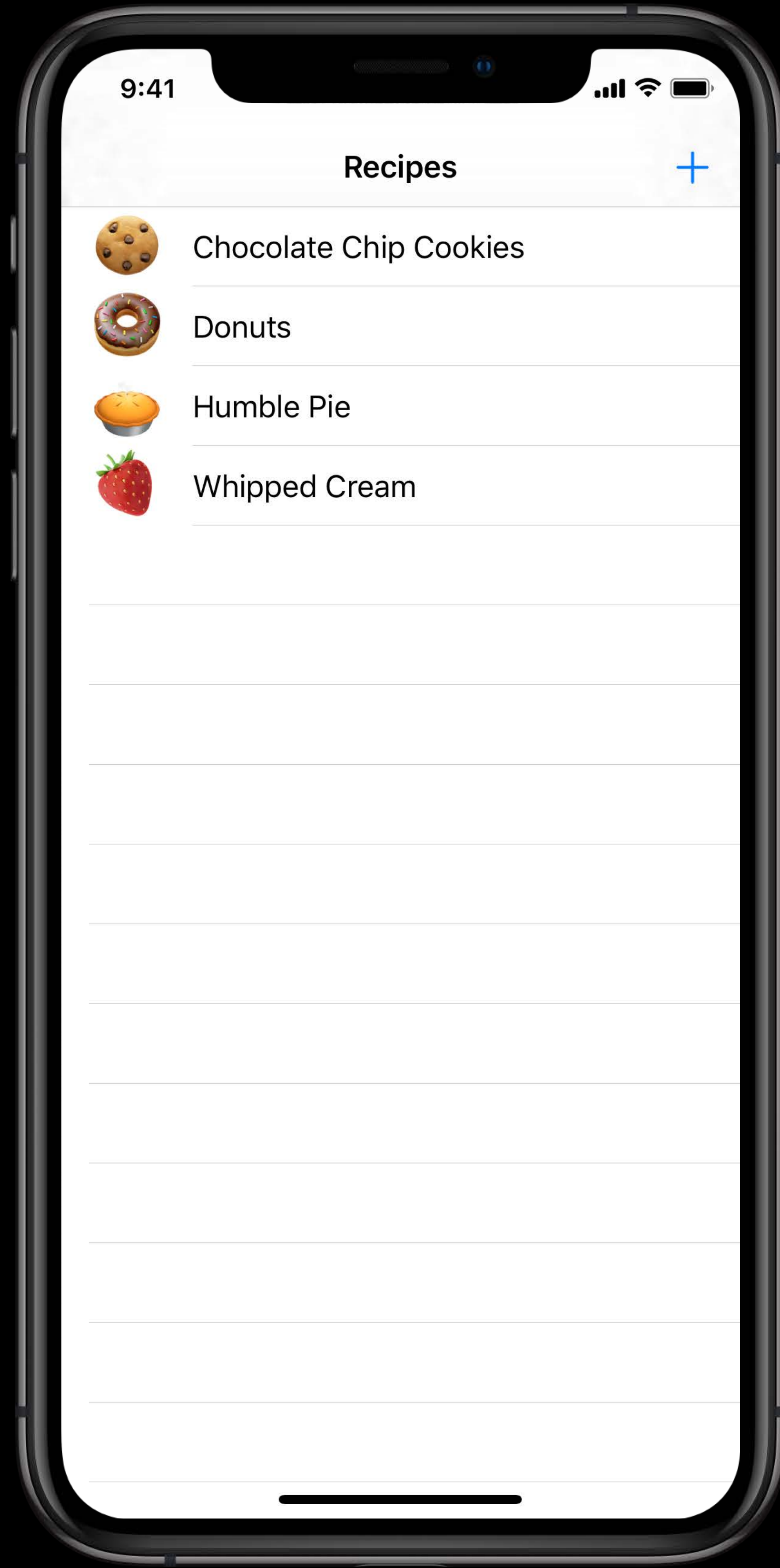
Same as iOS

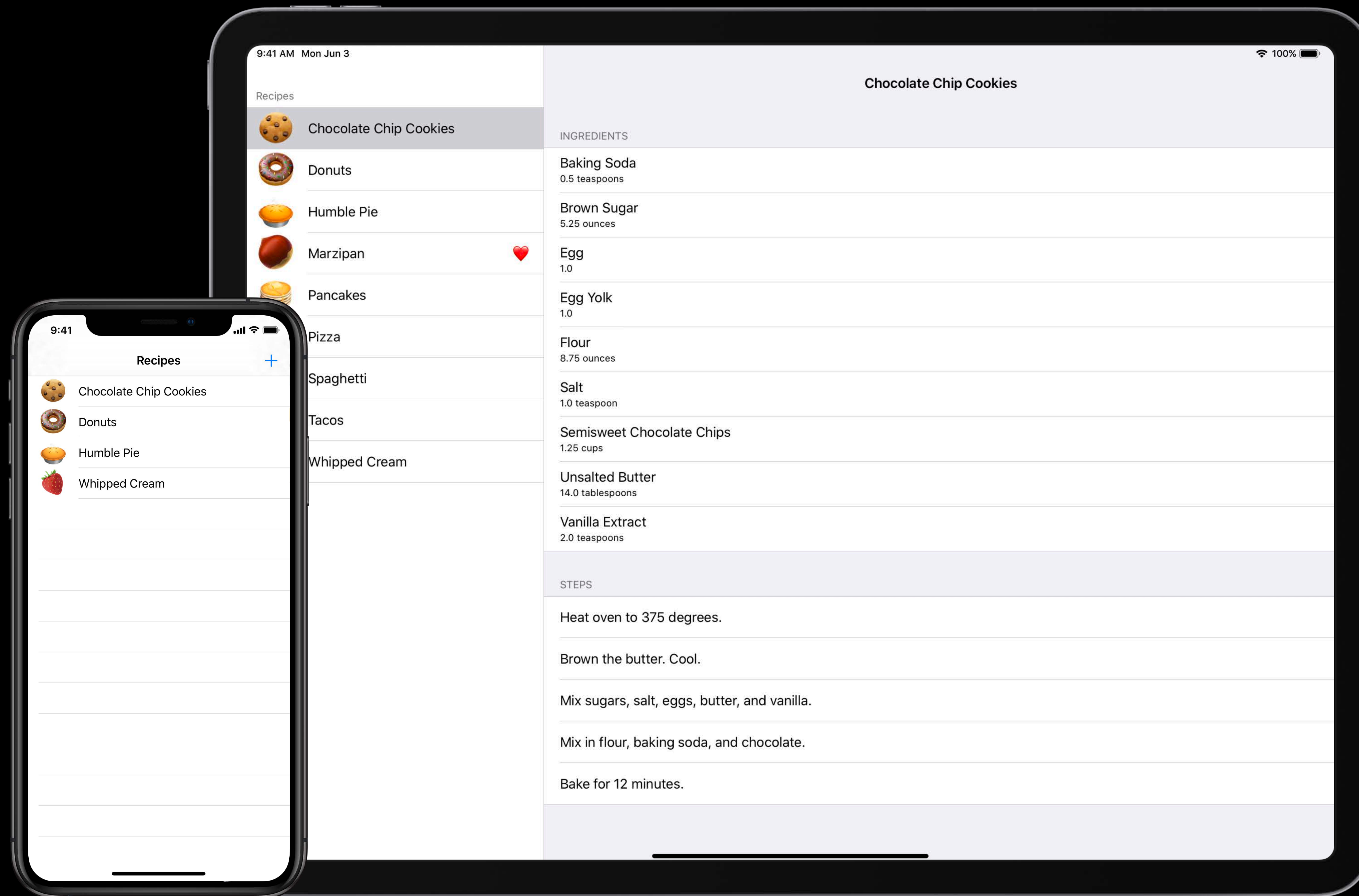
Alternative to TestFlight

StoreKit and GameKit are available



















9:41 AM Mon Jun 3

100%

Recipes

-  Chocolate Chip Cookies
-  Donuts
-  Humble Pie
-  Marzipan 
-  Pancakes
-  Pizza
-  Spaghetti
-  Tacos
-  Whipped Cream

Chocolate Chip Cookies

INGREDIENTS

- Baking Soda**
0.5 teaspoons
- Brown Sugar**
5.25 ounces
- Egg**
1.0
- Egg Yolk**
1.0
- Flour**
8.75 ounces
- Salt**
1.0 teaspoon
- Semisweet Chocolate Chips**
1.25 cups
- Unsalted Butter**
14.0 tablespoons
- Vanilla Extract**
2.0 teaspoons

STEPS

- Heat oven to 375 degrees.
- Brown the butter. Cool.
- Mix sugars, salt, eggs, butter, and vanilla.
- Mix in flour, baking soda, and chocolate.
- Bake for 12 minutes.



- Recipes
- Chocolate Chip Cookies
 - Donuts
 - Humble Pie
 - Marzipan
 - Pancakes
 - Pizza
 - Spaghetti
 - Tacos
 - Whipped Cream

Chocolate Chip Cookies

INGREDIENTS

- Baking Soda
0.5 teaspoons
- Brown Sugar
5.25 ounces
- Egg
1.0
- Egg Yolk
1.0
- Flour
8.75 ounces
- Salt
1.0 teaspoon
- Semisweet Chocolate Chips
1.25 cups
- Unsalted Butter
14.0 tablespoons
- Vanilla Extract
2.0 teaspoons

STEPS

Heat oven to 375 degrees.

Chocolate Chip Cookies

INGREDIENTS

- Baking Soda
0.5 teaspoons
- Brown Sugar
5.25 ounces
- Egg
1.0
- Egg Yolk
1.0
- Flour
8.75 ounces
- Salt
1.0 teaspoon
- Semisweet Chocolate Chips
1.25 cups
- Unsalted Butter
14.0 tablespoons
- Vanilla Extract
2.0 teaspoons

STEPS

Heat oven to 375 degrees.

Brown the butter. Cool.

Mix sugars, salt, eggs, butter, and vanilla.

Mix in flour, baking soda, and chocolate.

Bake for 12 minutes.

Recipes

- Chocolate Chip Cookies
- Donuts
- Humble Pie
- Whipped Cream

More Information

developer.apple.com/wwdc19/235

iPad Apps for Mac Lab

Friday, 10:00

Introducing iPad Apps for Mac

WWDC 2019

 WWDC19