Writing Flexible Code

for Modern iOS Development

Jason Howlin

Overview

Frameworks

Extensions

Tips

Current Universe

More platforms, devices, device sizes

Hardware rivals and exceeds desktop

More features / system frameworks

More extension points

More ways in which your code may run

Goal

Write code that's **reusable**, easy to change

Add and ship features more quickly

Fewer bugs *(well, fewer places to fix bugs)*

Frameworks

What are frameworks?

Convenient way to package up your code and resources

What goes into frameworks?

Code

Nib / storyboard files

Asset catalogs

Header files, documentation

Localized strings

Frameworks

Bundle, with a unique bundle id

Directory on disk with a specific structure

Loaded once into memory

Shared across applications

Why frameworks?

Way to organize your code and resources

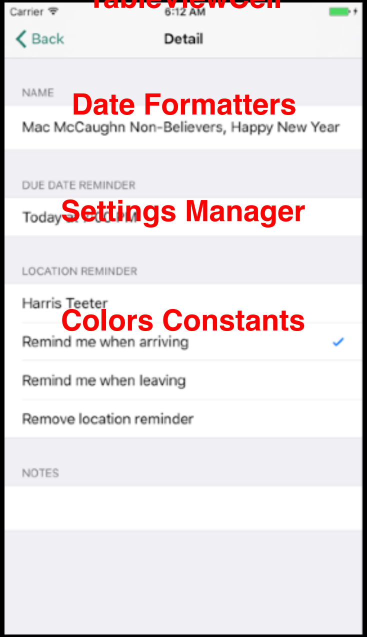
Promotes encapsulation and division of responsibilities

Way to reuse code across multiple applications

Reduces dependencies

Reduce dependencies

Your Project


Carrier 6:12 AM

Back Detail

NAME

Mac McCaughn Non-Believers, Happy New Year

DUE DATE REMINDER

Today at 4:00 PM

LOCATION REMINDER

Harris Teeter

Remind me when arriving ✓

Remind me when leaving

Remove location reminder

NOTES

TableViewCell

Date Formatters

Settings Manager

Colors Constants

Checkmark View

NSLocale Extensions

Apple Frameworks

EventKit

EKEventStore

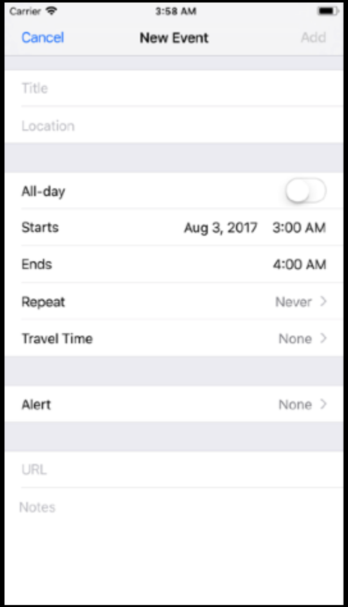
EKEvent

EKCalendar

EKAlarm

EventKitUI

EKEditEvent ViewController



Carrier 3:58 AM

Cancel New Event Add

Title

Location

All-day

Starts Aug 3, 2017 3:00 AM

Ends 4:00 AM

Repeat Never >

Travel Time None >

Alert None >

URL

Notes

Apple Frameworks

Contacts

CNContactStore

CNContact

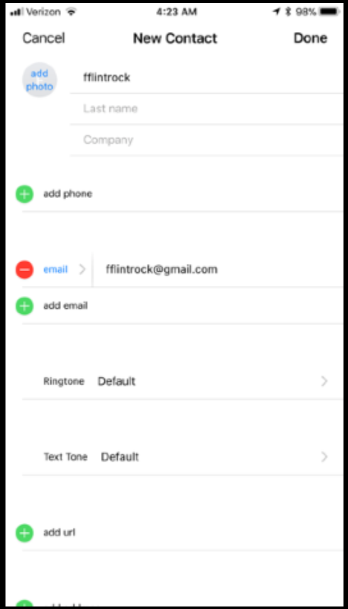
CNContact
FetchRequest

CNContact
SaveRequest

ContactsUI

CNContact
ViewController

CNContactPicker
ViewController



Verizon 4:23 AM 98%

Cancel New Contact Done

add photo

fflintrock

Last name

Company

add phone

email fflintrock@gmail.com

add email

Ringtone Default

Text Tone Default

add url

What goes in your frameworks?

Data model

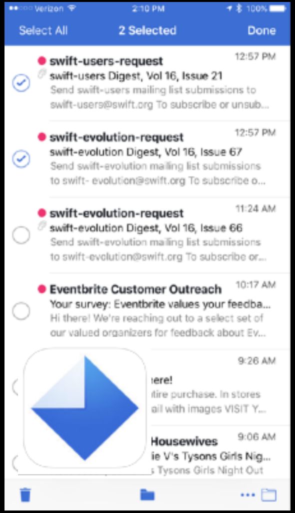
Networking code

Logic code

Utility and helper code

Reusable UI code

You’ve got mail!



swift-users-request 12:57 PM
swift-users Digest, Vol 16, Issue 21
Send swift-users mailing list submissions to swift-users@swift.org To subscribe or unsub...

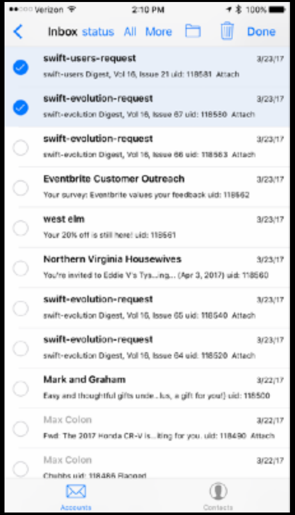
swift-evolution-request 12:57 PM
swift-evolution Digest, Vol 16, Issue 67
Send swift-evolution mailing list submissions to swift- evolution@swift.org To subscribe o...

swift-evolution-request 11:24 AM
swift-evolution Digest, Vol 16, Issue 66
Send swift-evolution mailing list submissions to swift-evolution@swift.org To subscribe or...

Eventbrite Customer Outreach 10:17 AM
Your survey: Eventbrite values your feedba...
Hi there! We're reaching out to a select set of our valued organizers for feedback about Ev...

9:26 AM
ere!
tire purchase. In stores
ail with images VISIT Y...

Housewives 9:06 AM
ie V's Tysons Girls Nig...
Tysons Girls Night Out



swift-users-request 3/23/17
swift-users Digest, Vol 16, Issue 21 uid: 118581 Attach

swift-evolution-request 3/23/17
swift-evolution Digest, Vol 16, Issue 67 uid: 118580 Attach

swift-evolution-request 3/23/17
swift-evolution Digest, Vol 16, Issue 66 uid: 118563 Attach

Eventbrite Customer Outreach 3/23/17
Your survey: Eventbrite values your feedback uid: 118562

west elm 3/23/17
Your 20% off is still here! uid: 118561

Northern Virginia Housewives 3/23/17
You're invited to Eddie V's Tys...ing... (Apr 3, 2017) uid: 118560

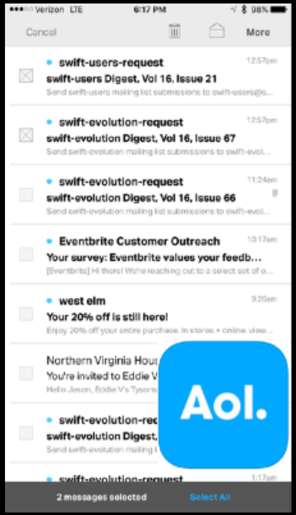
swift-evolution-request 3/23/17
swift-evolution Digest, Vol 16, Issue 65 uid: 118540 Attach

swift-evolution-request 3/23/17
swift-evolution Digest, Vol 16, Issue 64 uid: 118520 Attach

Mark and Graham 3/22/17
Easy and thoughtful gifts unde...lus, a gift for you!) uid: 118500

Max Colon 3/22/17
Fwd: The 2017 Honda CR-V is...iting for you. uid: 118490 Attach

Max Colon 3/22/17
Chubbs uid: 118486 Flagged



swift-users-request 12:57pm
swift-users Digest, Vol 16, Issue 21
Send swift-users mailing list submissions to swift-users@s...

swift-evolution-request 12:57pm
swift-evolution Digest, Vol 16, Issue 67
Send swift-evolution mailing list submissions to swift-evol...

swift-evolution-request 11:24am
swift-evolution Digest, Vol 16, Issue 66
Send swift-evolution mailing list submissions to swift-evol...

Eventbrite Customer Outreach 10:17am
Your survey: Eventbrite values your feedb…
[Eventbrite] Hi there! We're reaching out to a select set of o...

west elm 9:20am
Your 20% off is still here!
Enjoy 20% off your entire purchase. In stores + online. view...

Northern Virginia Hous
You're invited to Eddie V
Hello Jason, Eddie V's Tysons

swift-evolution-req
swift-evolution Digest,
Send swift-evolution mailing l

swift-evolution-request 1:17am

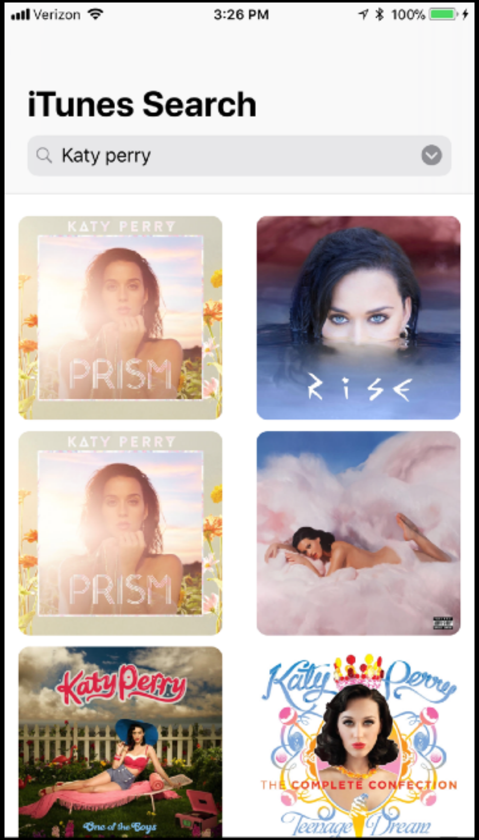
MailKit

Core Data | Networking | Logic

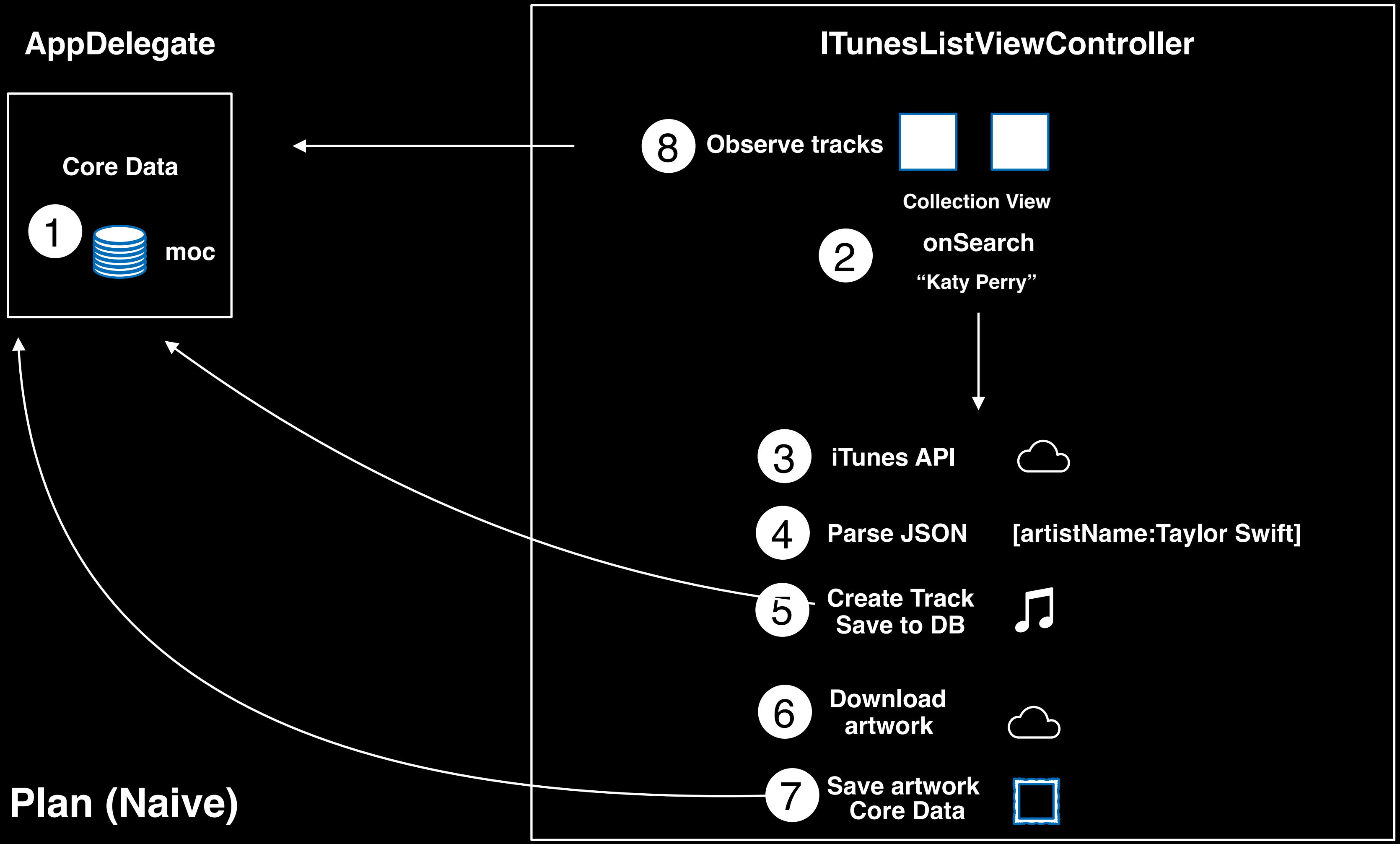
:30 Demo - creating a framework

iTunes Search

iTunes Search



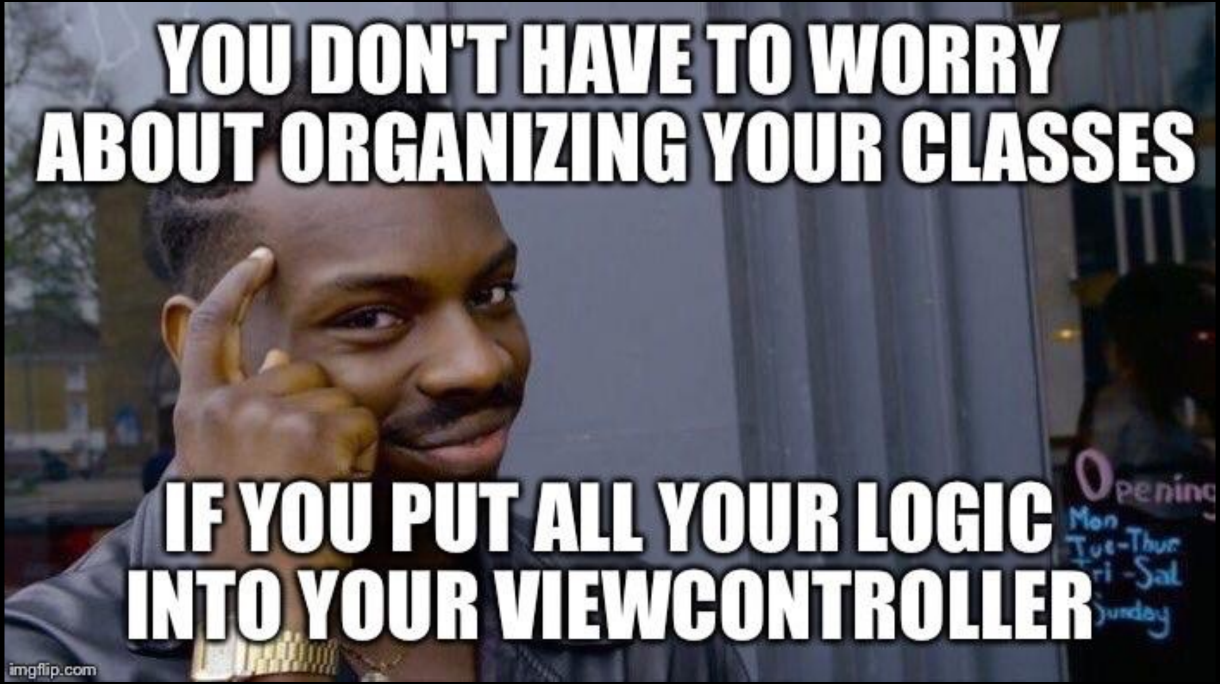
Game Plan (Naive)

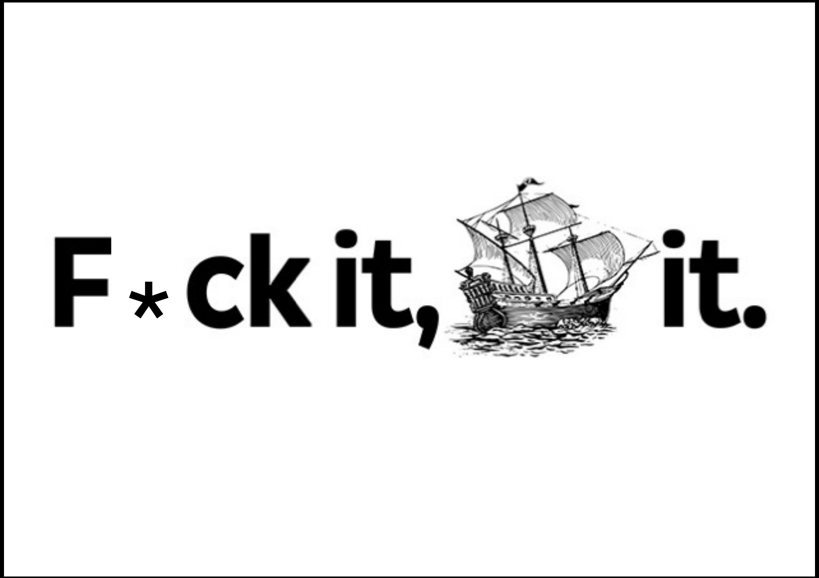


Demo - iTunes Search (Naive)

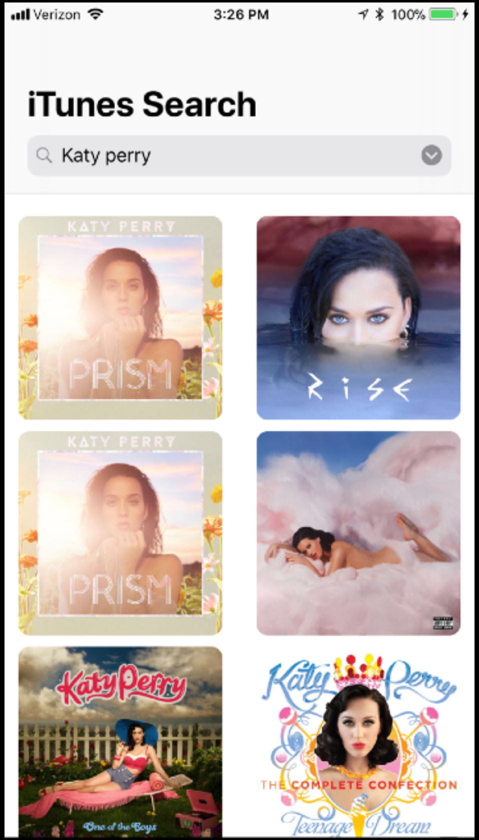
MVC*

*Massive View Controller


YOU DON'T HAVE TO WORRY ABOUT ORGANIZING YOUR CLASSES
IF YOU PUT ALL YOUR LOGIC INTO YOUR VIEWCONTROLLER
imgflip.com

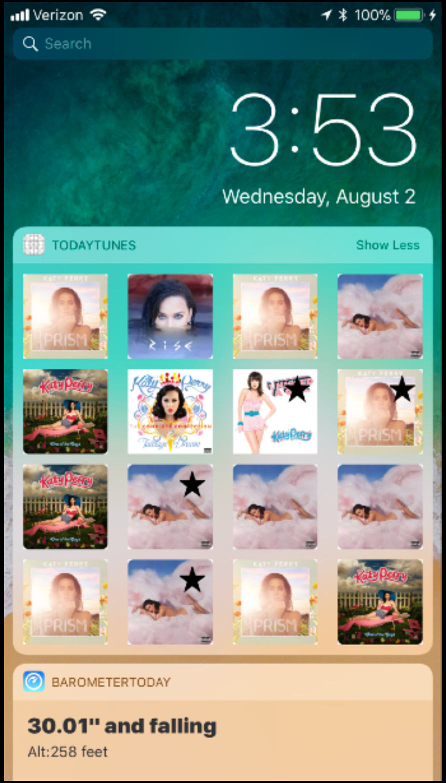

F*ck it,
it.

Smashing Success



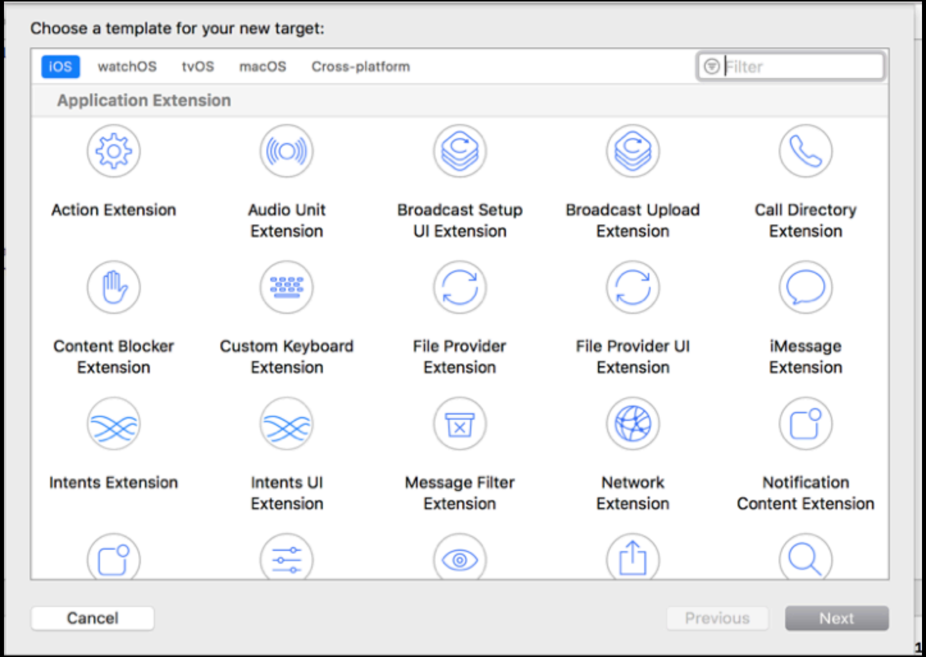
iTunes Search 2.0

Today Extension


Verizon
100%
Search
3:53
Wednesday, August 2
TODAYTUNES
Show Less
BAROMETERTODAY
30.01" and falling
Alt:258 feet

So You Research Extensions…

New Extension Target


Choose a template for your new target:

Application Extension

Action Extension
Audio Unit Extension
Broadcast Setup UI Extension
Broadcast Upload Extension
Call Directory Extension
Content Blocker Extension
Custom Keyboard Extension
File Provider Extension
File Provider UI Extension
iMessage Extension
Intents Extension
Intents UI Extension
Message Filter Extension
Network Extension
Notification Content Extension

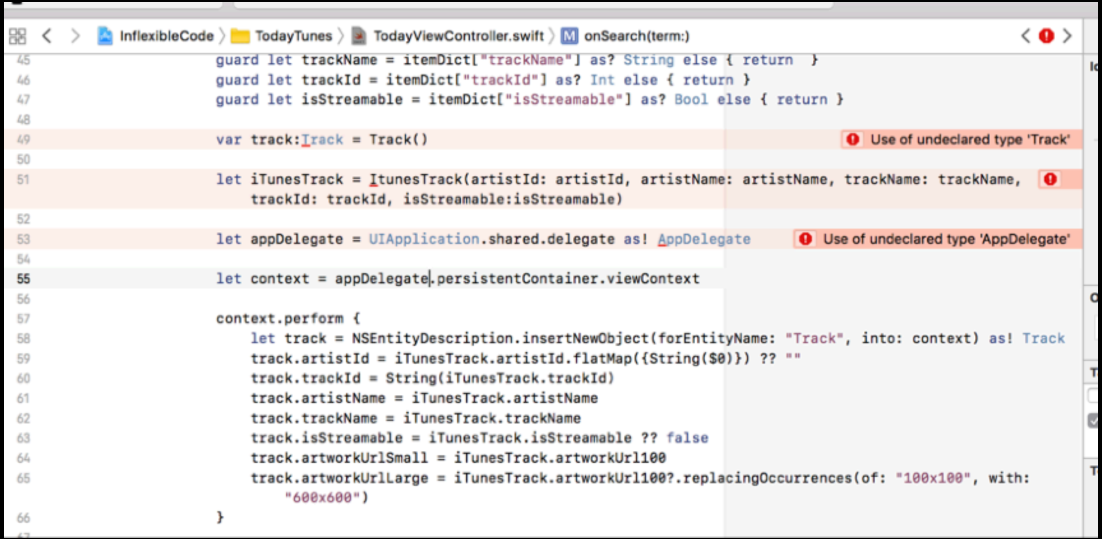
Refactor! 😇

👩‍💻

😈 ⌘C
⌘V

The Moment of Truth

⌘C ⌘V



InflexibleCode 〉 TodayTunes 〉 TodayViewController.swift 〉 onSearch(term:)

```
guard let trackName = itemDict["trackName"] as? String else { return  }
guard let trackId = itemDict["trackId"] as? Int else { return }
guard let isStreamable = itemDict["isStreamable"] as? Bool else { return }

var track:Track = Track()                                        Use of undeclared type 'Track'

let iTunesTrack = ItunesTrack(artistId: artistId, artistName: artistName, trackName: trackName,
    trackId: trackId, isStreamable:isStreamable)

let appDelegate = UIApplication.shared.delegate as! AppDelegate   Use of undeclared type 'AppDelegate'

let context = appDelegate.persistentContainer.viewContext

context.perform {
    let track = NSEntityDescription.insertNewObject(forEntityName: "Track", into: context) as! Track
    track.artistId = iTunesTrack.artistId.flatMap({String($0)}) ?? ""
    track.trackId = String(iTunesTrack.trackId)
    track.artistName = iTunesTrack.artistName
    track.trackName = iTunesTrack.trackName
    track.isStreamable = iTunesTrack.isStreamable ?? false
    track.artworkUrlSmall = iTunesTrack.artworkUrl100
    track.artworkUrlLarge = iTunesTrack.artworkUrl100?.replacingOccurrences(of: "100x100", with:
        "600x600")
}
```

Frameworks and Extensions

Framework support introduced in iOS 8

Extensions introduced in iOS 8

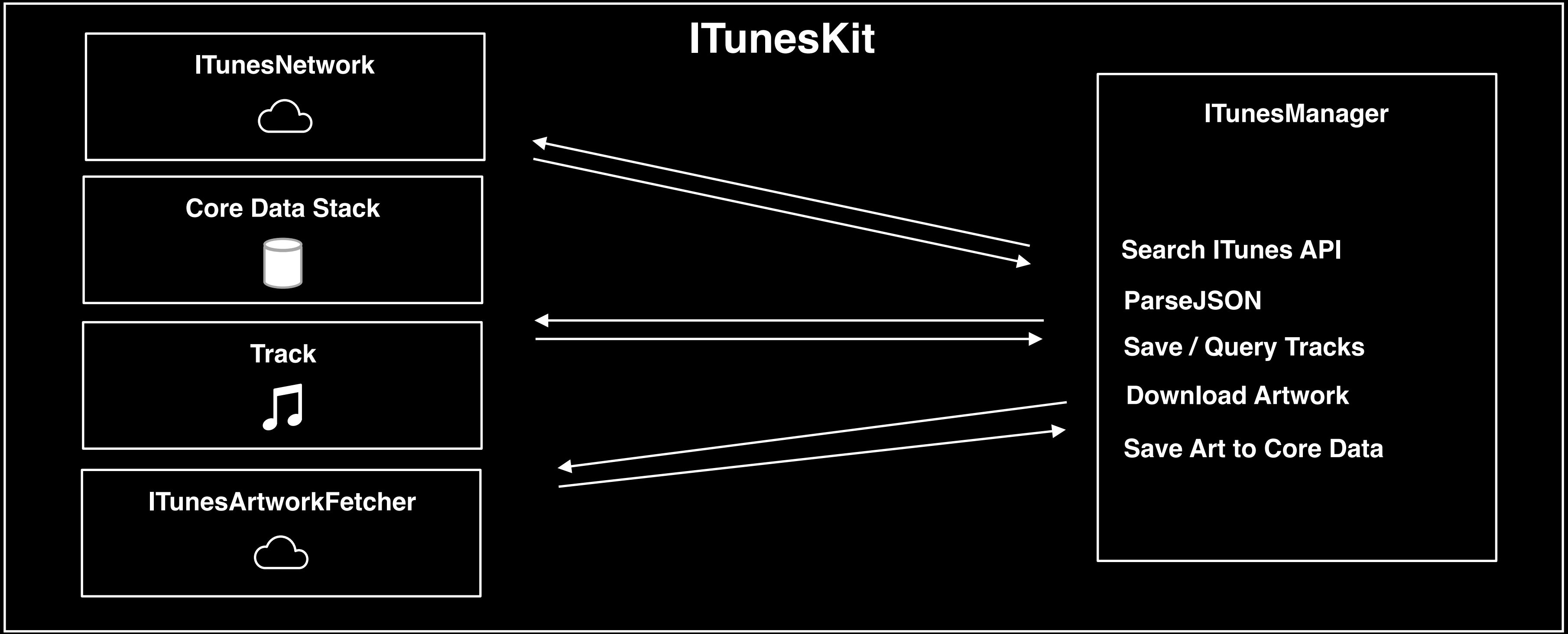
Hmmmm…

Refactor! 😇

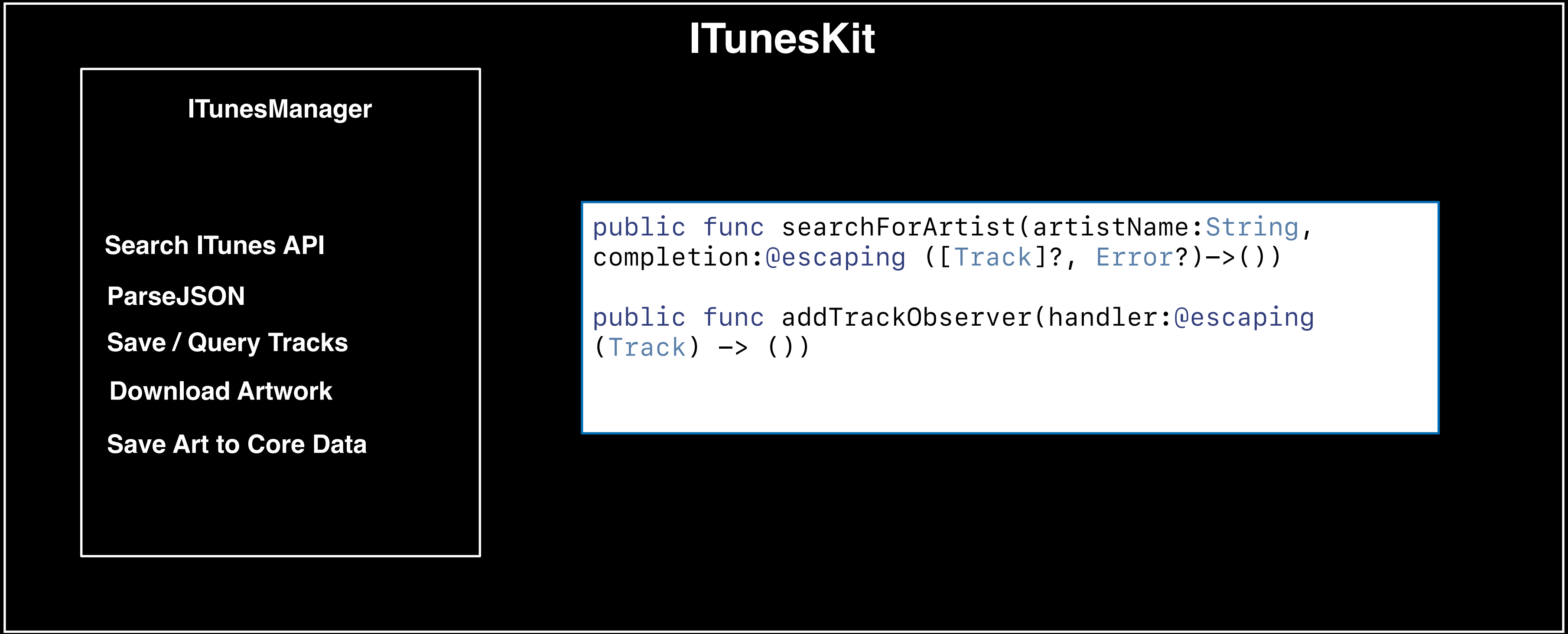
👩‍💻

Good enough isn’t

Refactor to a framework

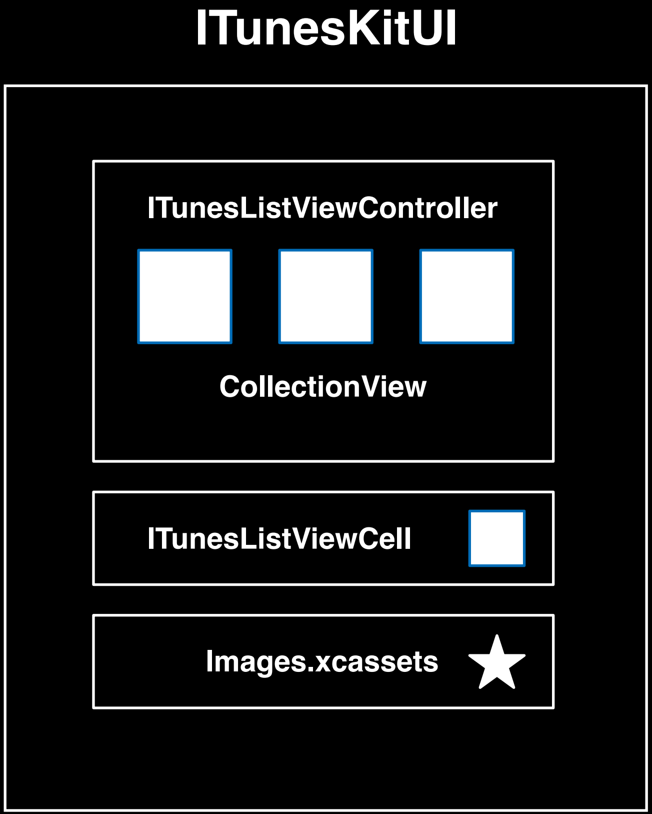


Refactor to a framework

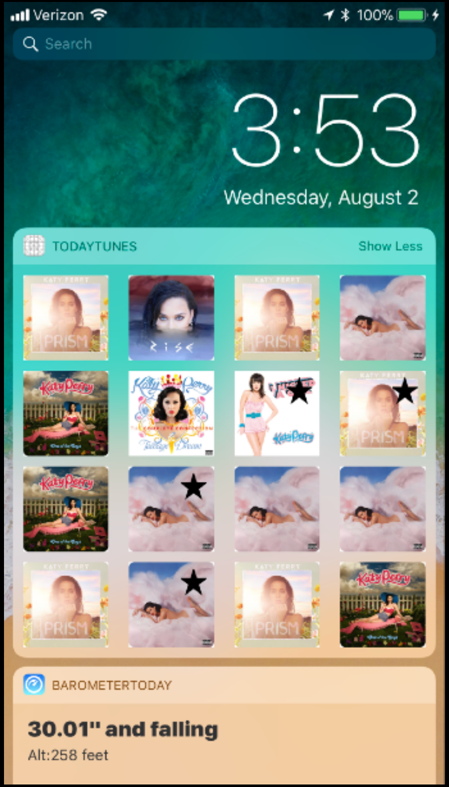


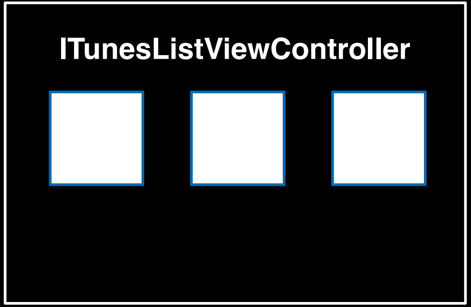
```swift
public func searchForArtist(artistName:String,
completion:@escaping ([Track]?, Error?)->())

public func addTrackObserver(handler:@escaping
(Track) -> ())
```

Refactor to a framework



Let’s do this!


Verizon
100%
Search
3:53
Wednesday, August 2
TODAYTUNES
Show Less
BAROMETERTODAY
30.01" and falling
Alt:258 feet


ITunesListViewController

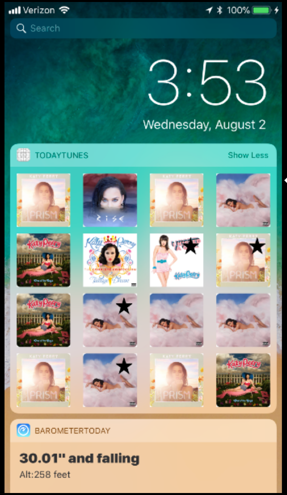
Demo - Adding a Today Extension

Sharing Data

Extension Sandbox

Documents

Caches



App Group

Shared Container

Core Data

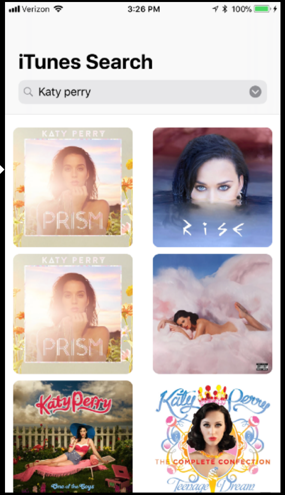
Shared Keychain

Shared UserDefaults

Sandbox

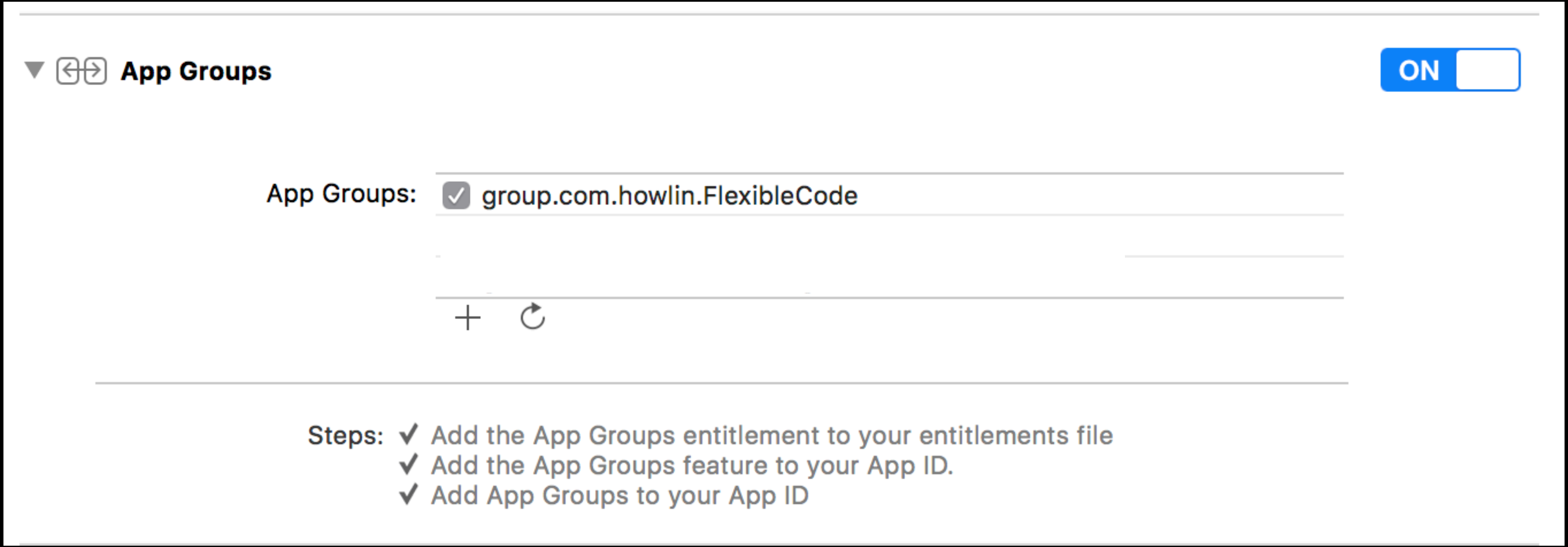
Documents

Caches



Foot note

Enabling App Groups



App Groups: ✓ group.com.howlin.FlexibleCode

Steps: ✓ Add the App Groups entitlement to your entitlements file
✓ Add the App Groups feature to your App ID.
✓ Add App Groups to your App ID

App Groups

Keychain is a separate entitlement

Not available on watchOS

You’ll need to migrate existing data

Shared Container

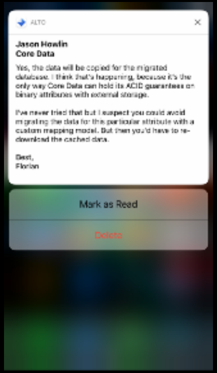
```
let appGroup = “com.howlin.iTunesSearch”
let url = FileManager.default.containerURL(forSecurityApplicationGroupIdentifier: appGroup)
try file.write(to: url, options: [.atomic])
```

Shared User Defaults

```
let appGroup = “group.com.howlin.iTunesSearch"
let defaults: UserDefaults = {
    let userDefaults = UserDefaults(suiteName: appGroup)
    return userDefaults!
}()
```

Alto App

Notification Content

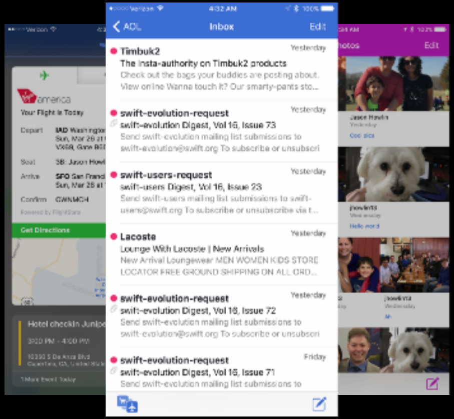

ALTO

Jason Howlin
Core Data

Yes, the data will be copied for the migrated database. I think that's happening, because it's the only way Core Data can hold its ACID guarantees on binary attributes with external storage.

I've never tried that but I suspect you could avoid migrating the data for this particular attribute with a custom mapping model. But then you'd have to re-download the cached data.

Best,
Florian



Timbuk2 — Yesterday
The Insta-authority on Timbuk2 products
Check out the bags your buddies are posting about. View online Wanna touch it? Our smarty-pants sto...

swift-evolution-request — Yesterday
swift-evolution Digest, Vol 16, Issue 73
Send swift-evolution mailing list submissions to swift-evolution@swift.org To subscribe or unsubscri

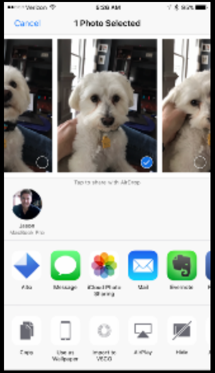
swift-users-request — Yesterday
swift-users Digest, Vol 16, Issue 23
Send swift-users mailing list submissions to swift-users@swift.org To subscribe or unsubscribe via t...

Lacoste — Yesterday
Lounge With Lacoste | New Arrivals
New Arrival Loungewear MEN WOMEN KIDS STORE LOCATOR FREE GROUND SHIPPING ON ALL ORD...

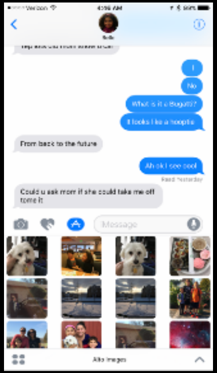
swift-evolution-request — Yesterday
swift-evolution Digest, Vol 16, Issue 72
Send swift-evolution mailing list submissions to swift-evolution@swift.org To subscribe or unsubscri

swift-evolution-request — Friday
swift-evolution Digest, Vol 16, Issue 71
Send swift-evolution mailing list submissions to

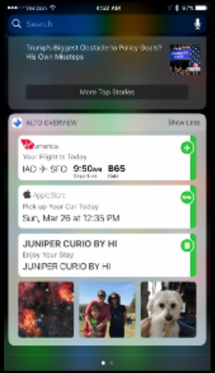
Share



iMessage



Today

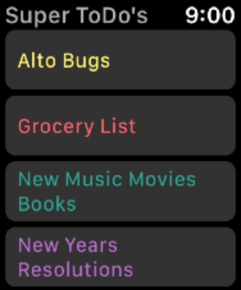


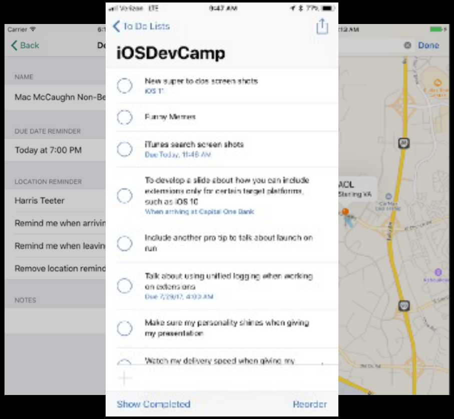
MailKit

Core Data | Networking | Logic

Super ToDo's

Watch App



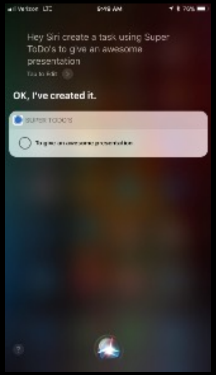


iOSDevCamp

- New super to dos screen shots
  iOS 11
- Funny Memes
- iTunes search screen shots
  Due Today, 11:48 AM
- To develop a slide about how you can include extensions only for certain target platforms, such as iOS 10
  When arriving at Capital One Bank
- Include another pro tip to talk about launch on run
- Talk about using unified logging when working on extensions
  Due 7/29/17, 4:03 AM
- Make sure my personality shines when giving my presentation
- Watch my delivery speed when giving my

Show Completed Reorder

Siri Intent



Hey Siri create a task using Super ToDo's to give an awesome presentation

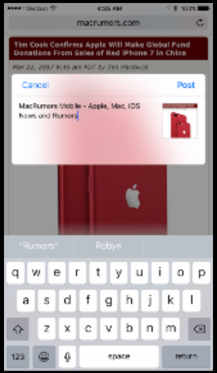
Tap to Edit

OK, I've created it.

SUPER TODO'S

- To give an awesome presentation

Share Extension



macrumors.com

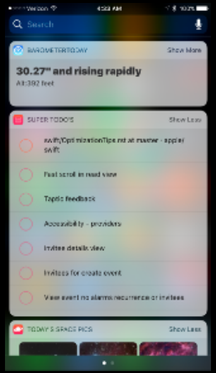
Tim Cook Confirms Apple Will Make Global Fund Donations From Sales of Red iPhone 7 in China

Mar 22, 2017 9:45 am PDT by Tim Hardwick

Cancel Post

MacRumors Mobile - Apple, Mac, iOS News and Rumors

Today Extension



30.27" and rising rapidly
Alt:392 feet

- swift/OptimizationTips.rst at master · apple/swift
- Fast scroll in read view
- Taptic feedback
- Accessibility - providers
- Invitee details view
- Invitees for create event
- View event no alarms recurrence or invitees

ToDoKit

Core Data | CloudKit | Logic

Tips

Harsh Environments for Extensions

Extension Constraints

Limited amount of time

Aggressive memory limits

Unable to handle authentication issues, no accounts

Migrations

Synchronizing with your model

Issues when extension and app running simultaneously

Look at Core Data, SQLite, and FileCoordinators

Core Data added NSPersistentHistory in iOS 11

Background Tasks* in Extensions

No UIApplicationBackgroundTask

Use ProcessInfo.performExpiringActivity

Foot note

Logging

Avoid adding a logging framework to your framework

Use a logging delegate pattern instead

Look at the new Unified Logging framework

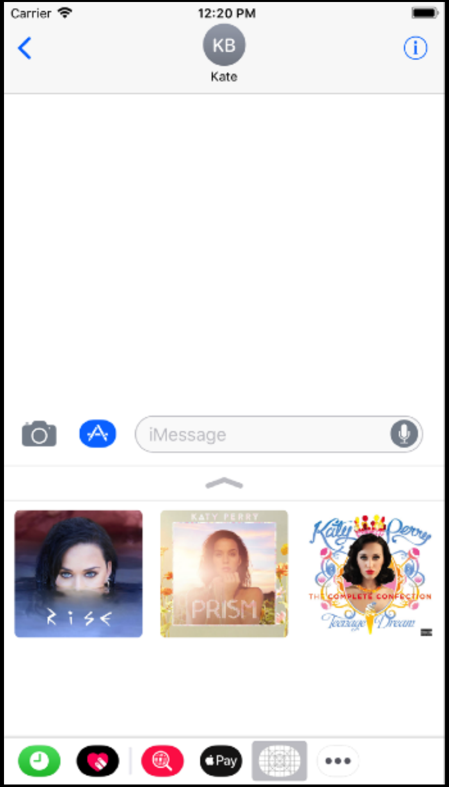
Helpful for cross-process output

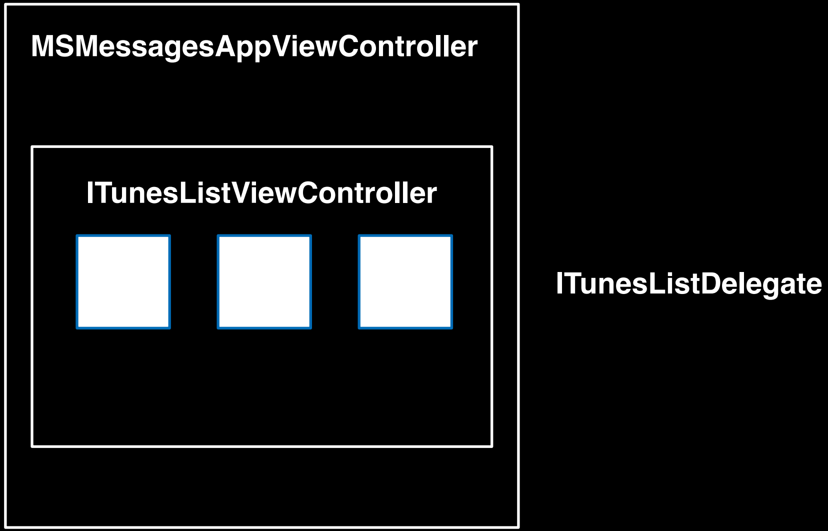
Nano Mode

Option to start your framework to start in a minimalist mode

iTunes Search 3.0

Let’s do this!


Carrier
12:20 PM
KB
Kate
iMessage
PRISM


MSMessagesAppViewController
ITunesListViewController
ITunesListDelegate

Demo - Adding an iMessage Extension

Summary

Use frameworks to create reusable code

Let extension help guide your architecture

Thank you!

Jason Howlin

@jlarock1200