

Ruthlessly Simple Dependency Management with Carthage

What



Why



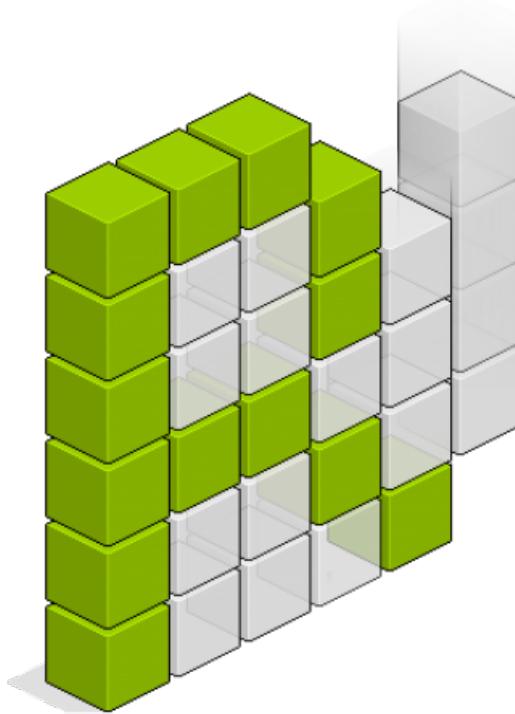
How to use it



How it works

Justin Spahr-Summers

@jspahrsummers



The Problem

Dependencies in Cocoa (historically)

1. Copied source files
2. Zipped binaries
3. SVN externals, Git submodules
4. Git subtrees

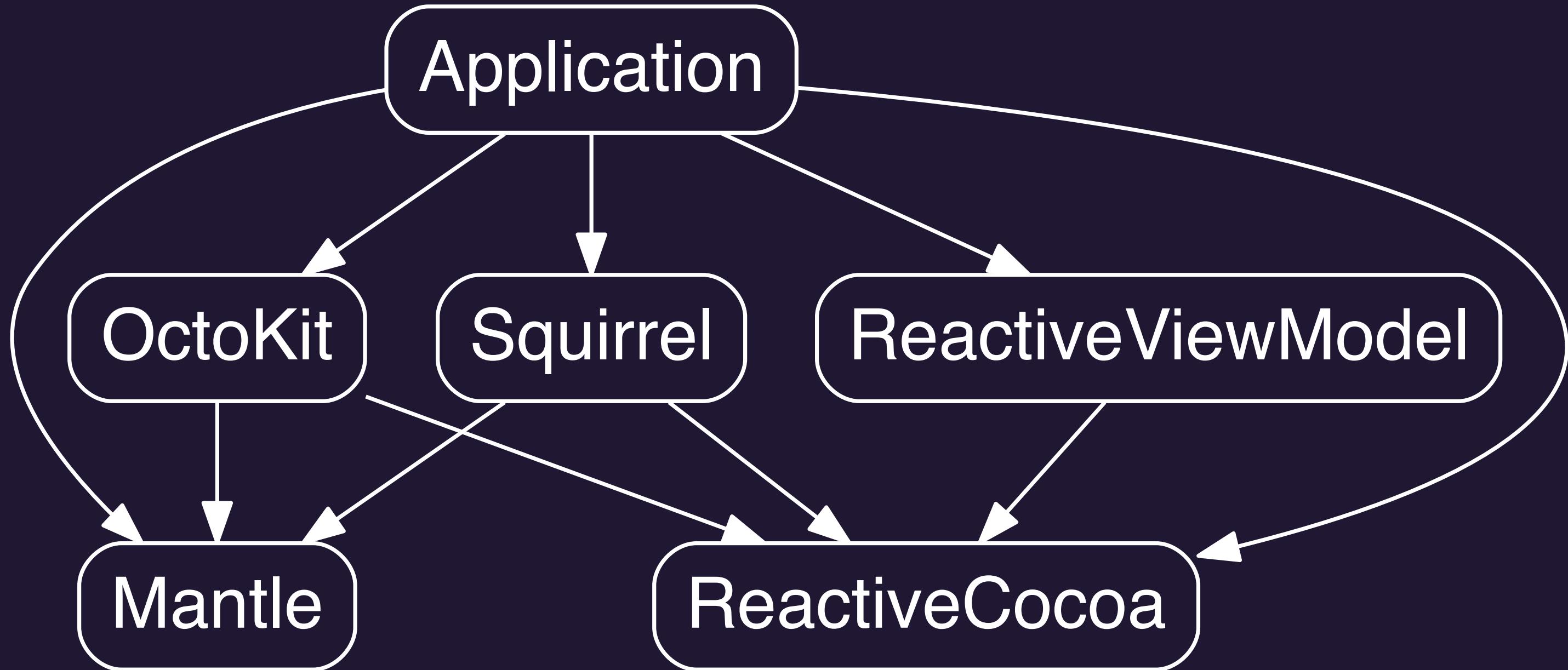
Dependencies on other platforms

I. Dependency managers

Our Problem

GitHub for Mac has what
could be called “excessively
nested submodules.”

Me, late 2014



Why not use
cocoapods?

Podspecs

Less control

Centralized



@robrix

@mdiep

@keithduncan

@alanjrogers

Our goals



1. Pick compatible versions for all dependencies
2. Check out dependencies with Git
3. Build frameworks with Xcode

Using Carthage

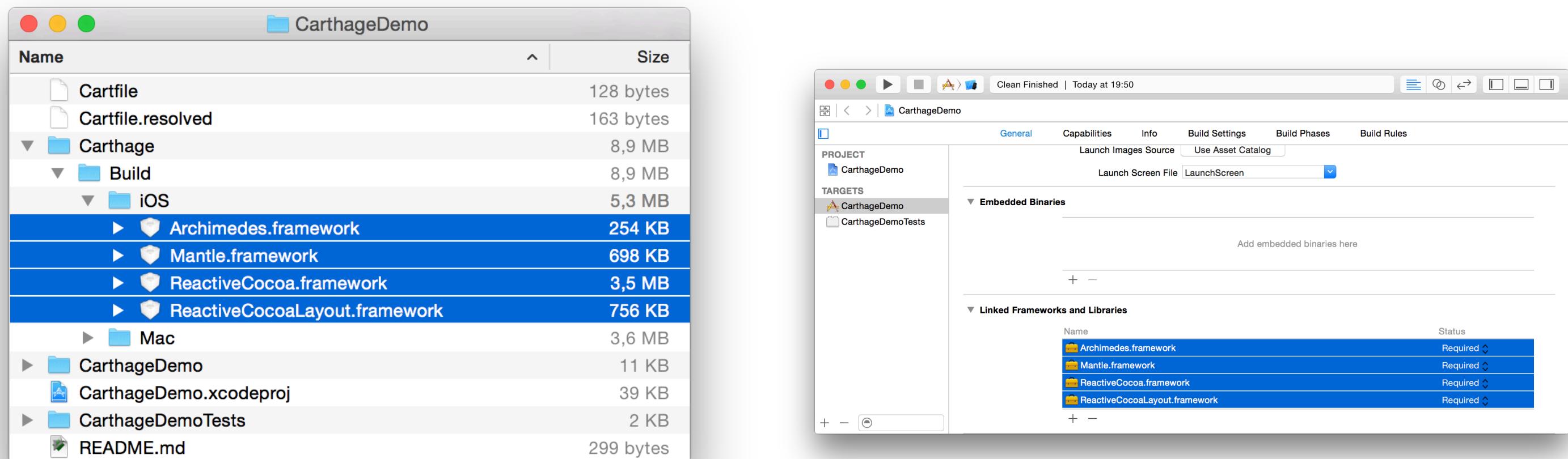
Step 1: Create a Cartfile

```
github "Mantle/Mantle" ~> 1.5
github "ReactiveCocoa/ReactiveCocoa" >= 2.4.7
github "ReactiveCocoa/ReactiveCocoaLayout" == 0.5.2
```

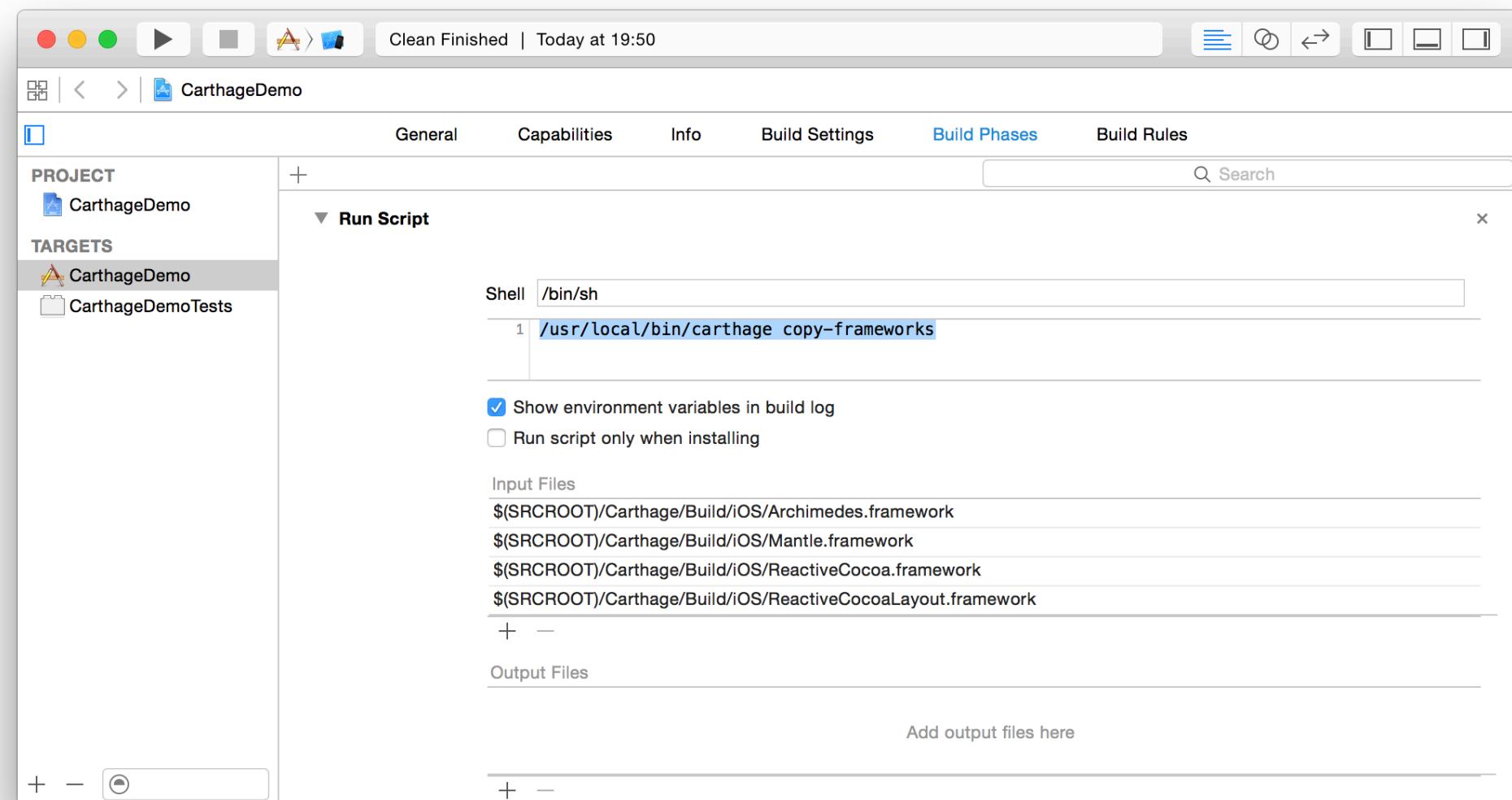
Step 2: Run Carthage

```
$ carthage update
*** Fetching Mantle
*** Fetching ReactiveCocoa
*** Fetching ReactiveCocoaLayout
*** Fetching Archimedes
*** Downloading Archimedes at "1.1.4"
*** Downloading Mantle at "1.5.4"
*** Downloading ReactiveCocoa at "v2.4.7"
*** Downloading ReactiveCocoaLayout at "0.5.2"
```

Step 3: Link Frameworks



Step 4: Strip architectures (iOS only)



That's it!

“Ruthlessly Simple”

Easy: familiar or approachable

Simple: fewer concepts and concerns¹

¹ See Rich Hickey's talk, [Simple Made Easy](#)

CocoaPods is easy



Carthage is simple

Simpler tools are...

Easier to maintain

Easier to understand

Easier to contribute to

More flexible

More composable

Enhanced when other tools improve

Behind the Scenes

Parse the Cartfile



Resolve the dependency graph



Download all dependencies



Build each framework



Parsing

Parse OGDL into a list of dependencies

```
github "ReactiveCocoa/ReactiveCocoa" >= 2.4.7
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Determine the type of each dependency

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Parsing

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github "ReactiveCocoa/ReactiveCocoa" >= 2.4.7
```

Determine the type of each dependency

```
github "ReactiveCocoa/ReactiveCocoa"
```

Parse any Semantic Version

```
>= 2.4.7
```

 Resolving

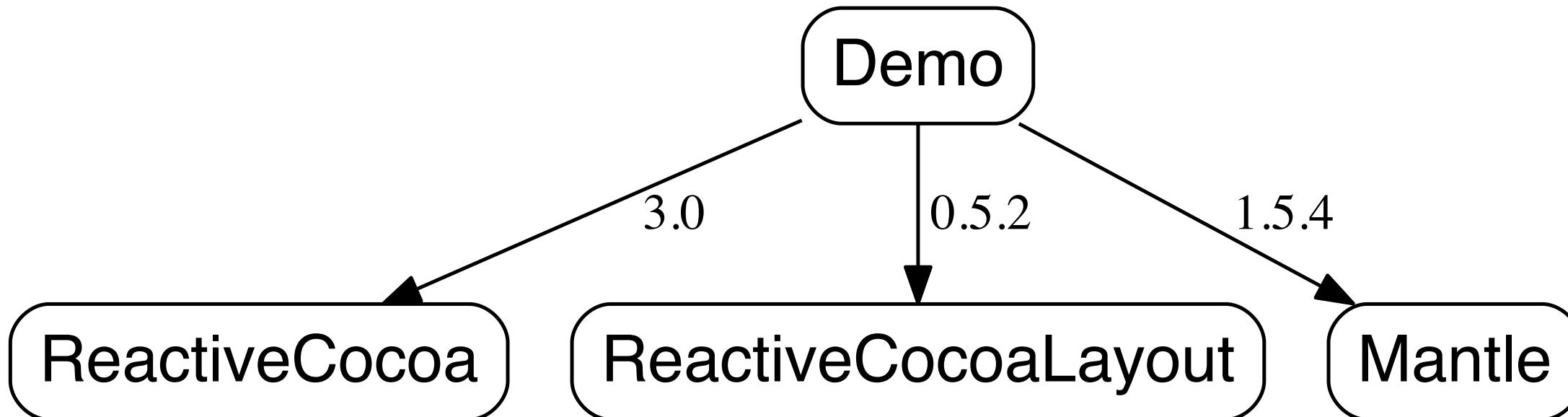
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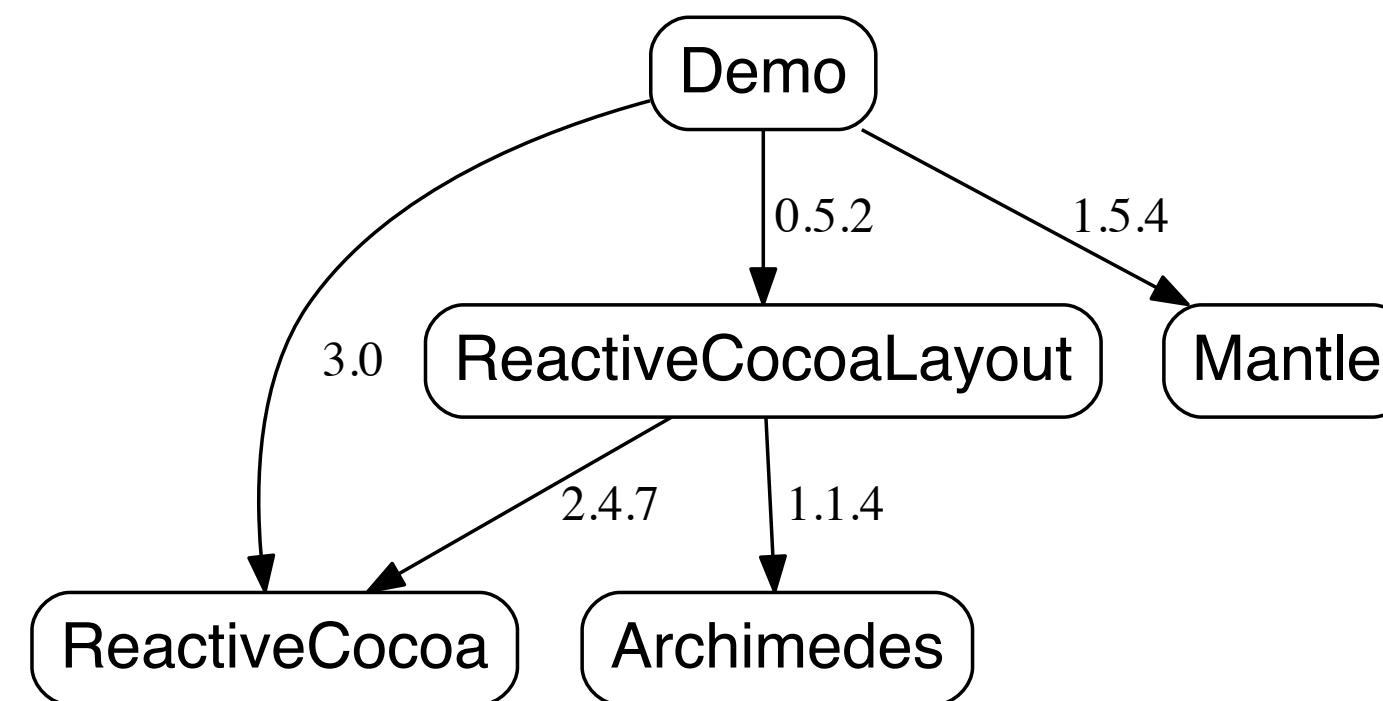
Resolving

Create a graph of the latest dependency versions



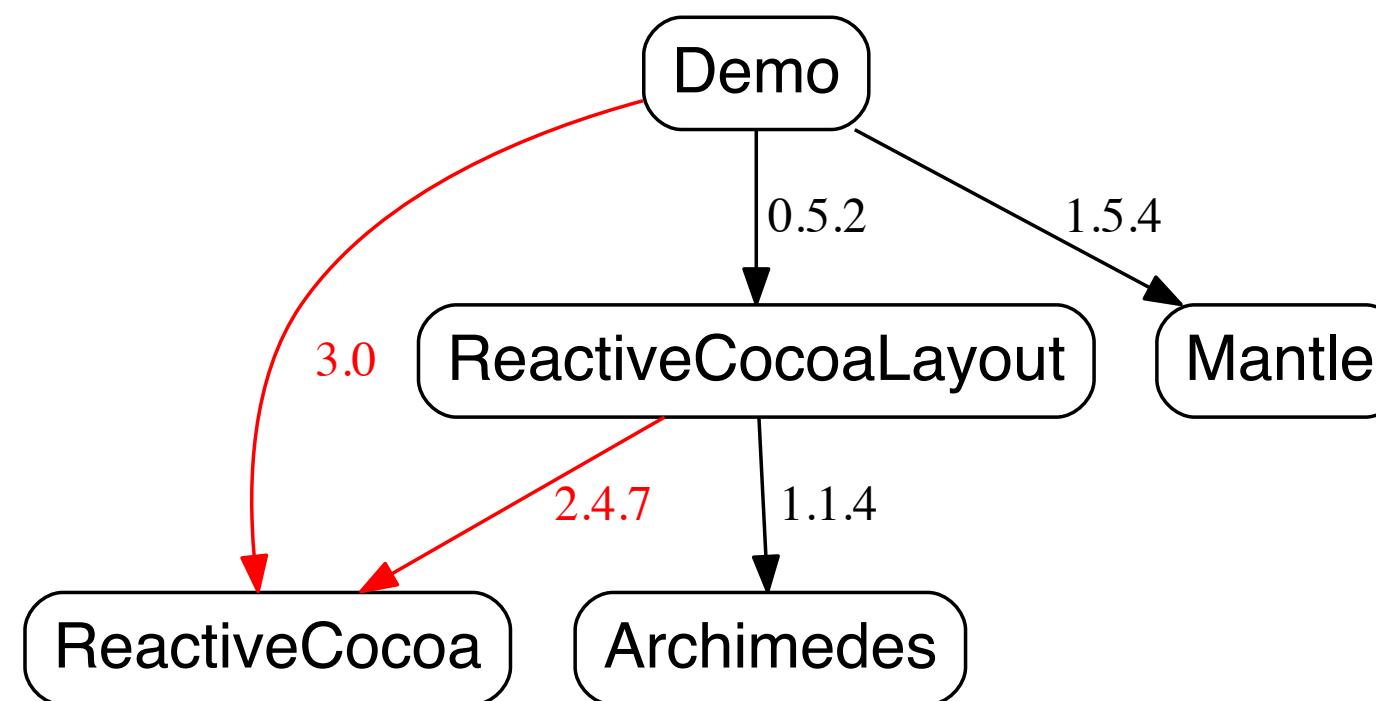
♻️ Resolving

Insert dependency Cartfiles into the graph



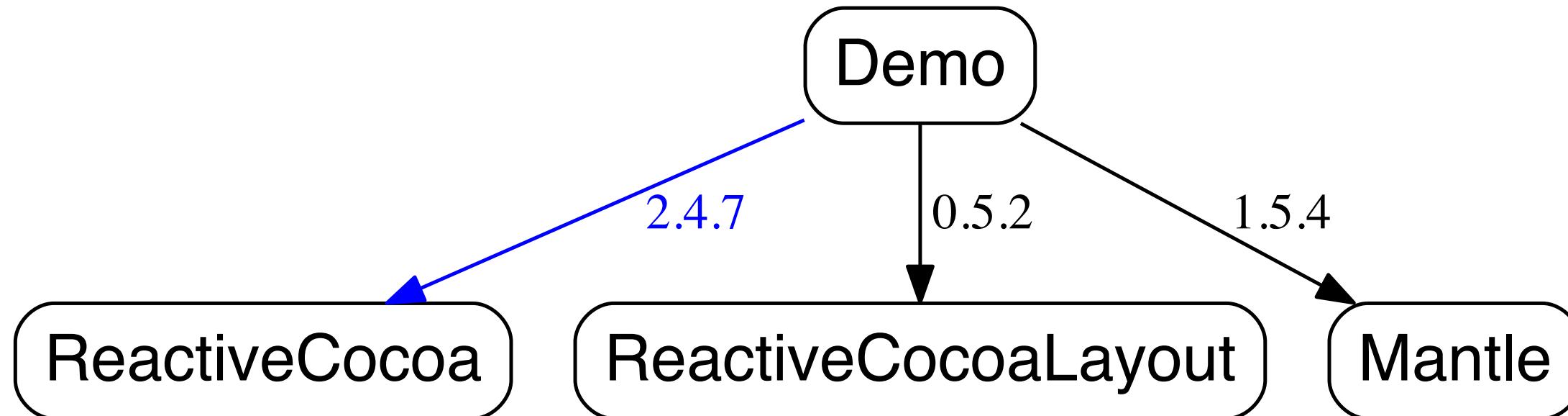
Resolving

If requirements conflict, throw out the graph



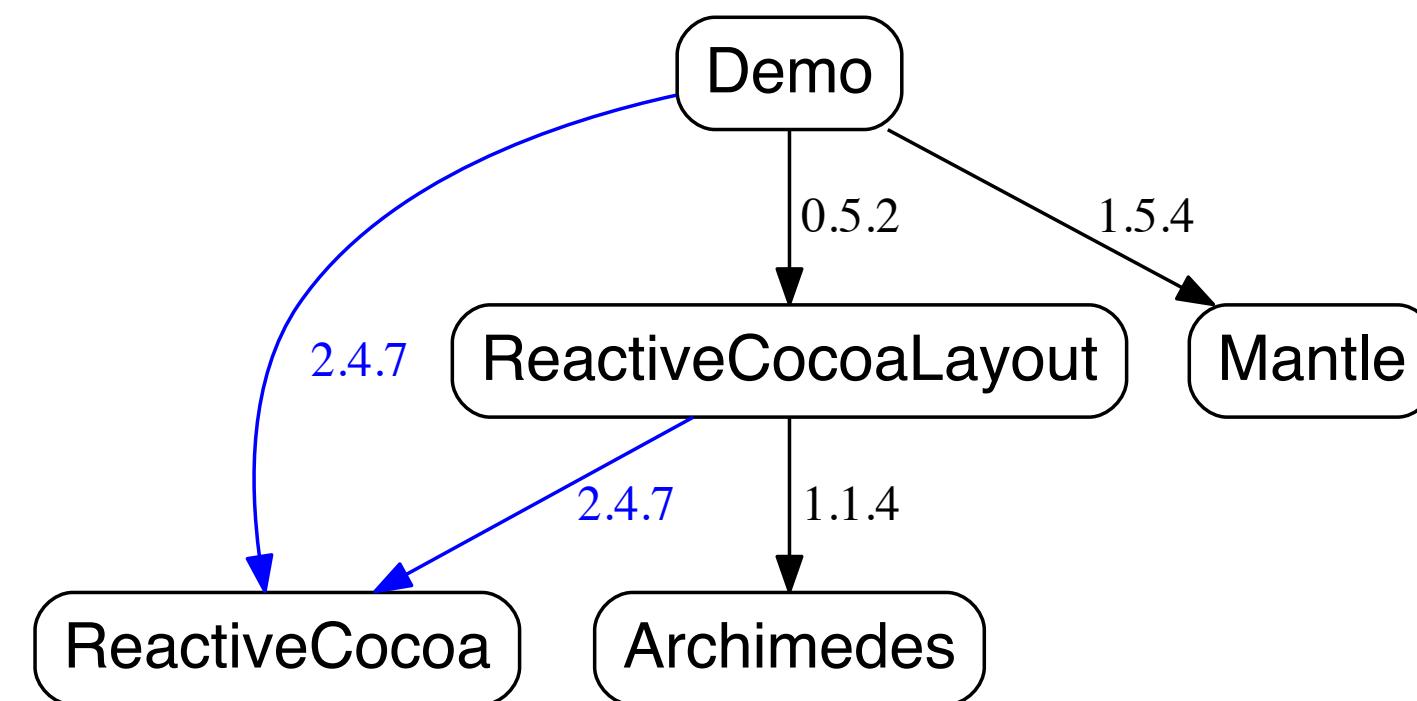
♻️ Resolving

Try a new graph with the next possible version



Resolving

Repeat until a valid graph is found





Downloading

I. Fetch the repository into Carthage's cache



Downloading

1. Fetch the repository into Carthage's cache
2. Copy the right version into Carthage/Checkouts



Building

I. Symlink Carthage/Build into the dependency folder



Building

1. Symlink Carthage/Build into the dependency folder
2. List framework schemes from the .xcodeproj



Building

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3. Build each scheme for all supported architectures



Building

1. Symlink Carthage/Build into the dependency folder
2. List framework schemes from the .xcodeproj
3. Build each scheme for all supported architectures
4. Combine multiple architectures with lipo

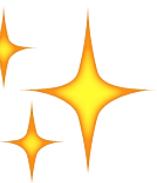


Building

1. Symlink Carthage/Build into the dependency folder
2. List framework schemes from the .xcodeproj
3. Build each scheme for all supported architectures
4. Combine multiple architectures with lipo
5. Copy the built frameworks into Carthage/Build



BONUS: Prebuilt binaries!



The screenshot shows the GitHub release page for the `ReactiveCocoa / ReactiveCocoa` repository. At the top, there are buttons for `Unwatch` (506), `Unstar` (7,339), and `Fork` (1,038). Below that, tabs for `Releases` (selected) and `Tags` are visible. A sidebar on the right contains icons for issues, pull requests, commits, and releases.

Latest release: **v2.4.7** (released by **jspahrsummers** on Feb 11 with 16 commits to master)

Includes minor fixes [#1707](#), [#1734](#), and [#1741](#).

Downloads:

- [ReactiveCocoa.framework.zip](#) (1.86 MB)
- [Source code \(zip\)](#)
- [Source code \(tar.gz\)](#)

*** Downloading ReactiveCocoa at "v2.4.7"

CarthageKit

Technical choices

Dynamic frameworks vs. static libraries

- iOS 8+ only
- Can include resources
- Self-contained and ready-to-use
- Avoid duplicate symbol errors
- Required for Swift

Swift vs. Objective-C

- Type safety
- Value types (especially enums)
- Much faster to write
- Better modularization
- The Next Big Thing™

ReactiveCocoa

- Simplifies networking (with the GitHub API)
- Simplifies the dependency resolver
- Simplifies shelling out, via ReactiveTask
- Carthage helps test RAC 3.0 in the real world



Per-project settings

Review CarthageKit API

Review command line flags

Profit!!!



What



Why



How to use it



How it works

Questions? Comments?

Slides and notes, plus my demo project, are available at:

<https://github.com/jspahrsummers/carthage-talk>

Thanks to everyone who reviewed this presentation,
and to Realm for inviting me to speak!²

² ❤ Matt Diephouse, Rob Rix, Alan Rogers, Keith Duncan, Nacho Soto, Tom Brow, James Lawton, Arwa Jumkawala, JP Simard, Tim Anglade, Brendan Forster, Benjamin Encz, Robert Böhnke, and you!