


iOS Development with `BUCK`

Issarapong

Growth Session #11 - January 18-19 2018



- Generally, native iOS project will be created with Xcode
⇒ Use CocoaPods or Carthage as Dependency management.
- Project & Dependencies are in ``project_name.workspace``
⇒ ``project_name.xcodeproject`` & ``Pods.xcodeproject``
- ``project.pbxproj`` is properties file of ``xcodeproject`` which declared project settings, compiler settings, resources, targets, provisioning profile, certs, etc ...

Xcode Project Structure

```
21F360DD1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };  
21F360DE1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };  
21F360DF1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };
```

`PricePreviewViewController.swift` in 3 Targets

- AppStore
- Internal Staging
- Internal Production

Xcode Project Structure

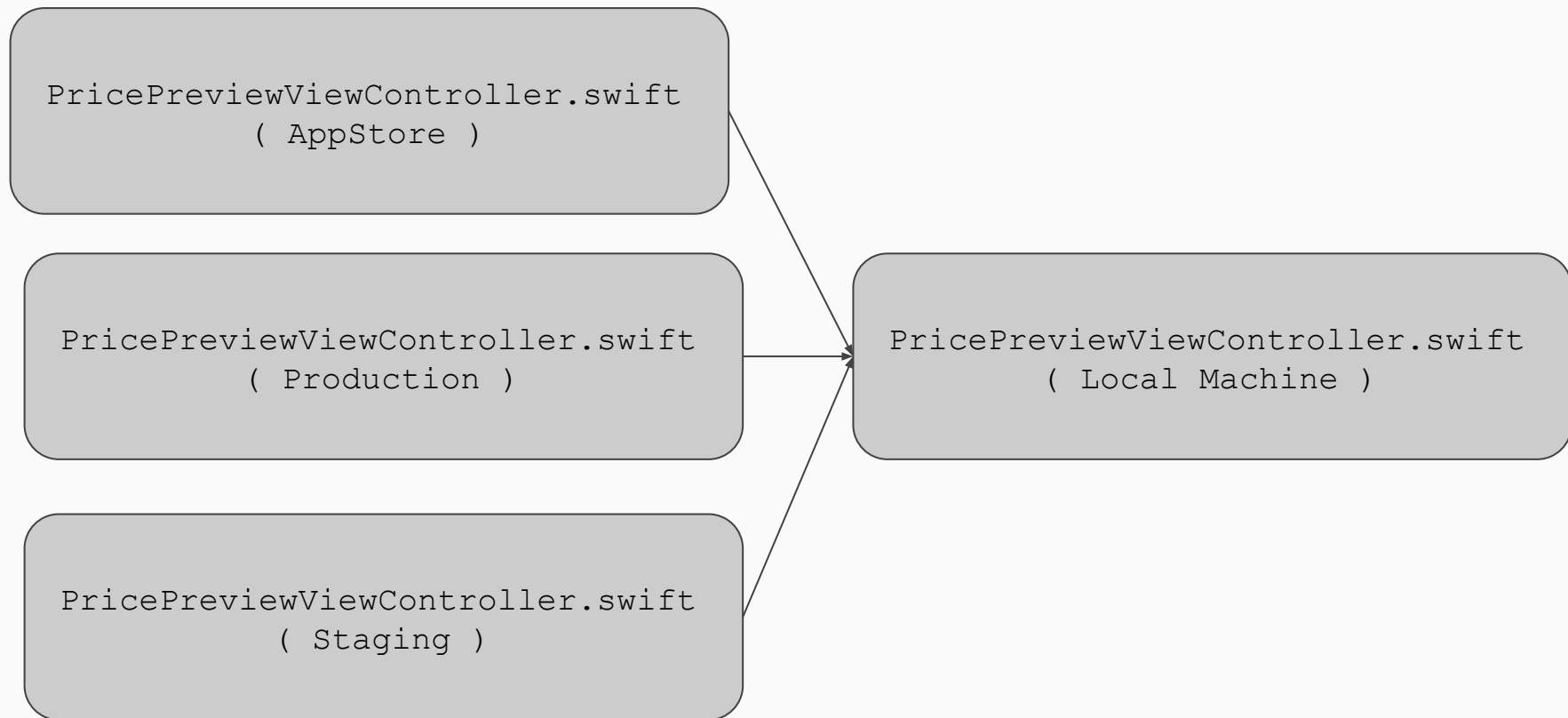
```
21F360DD1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewView 1FE908F7001B9B2E Aa Ab  
21F360DE1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };  
21F360DF1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };
```

The hex fileRef right is the reference of the file in the local machine.

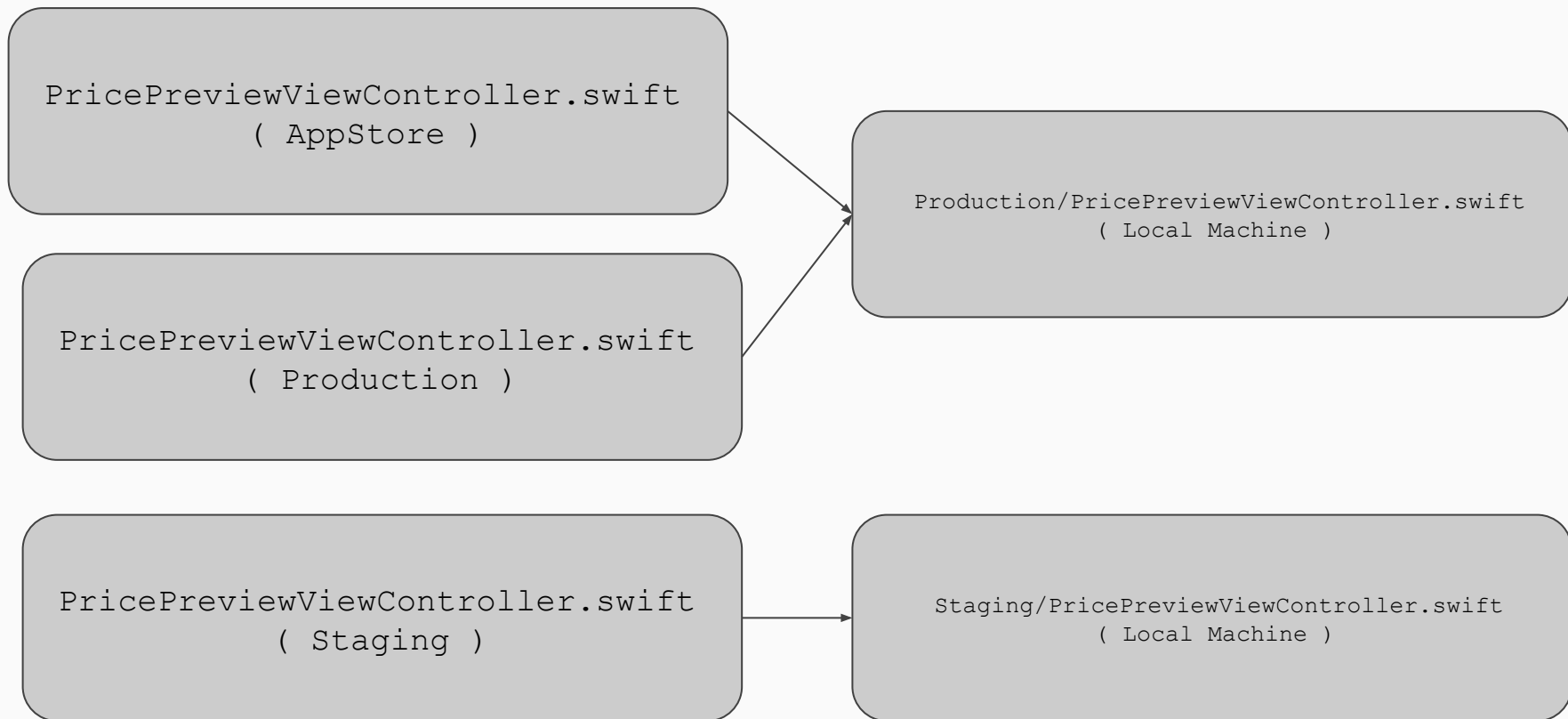
```
21F360DD1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewView 1FE908F7001B9B2E Aa Ab 1  
21F360DE1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };  
21F360DF1FE908F7001B9B2E /* PricePreviewViewController.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360DC1FE908F7001B9B2E /* PricePreviewViewController.swift */; };
```

The left fileRef is the actual reference of the file in the project (unique)

Xcode Project Structure

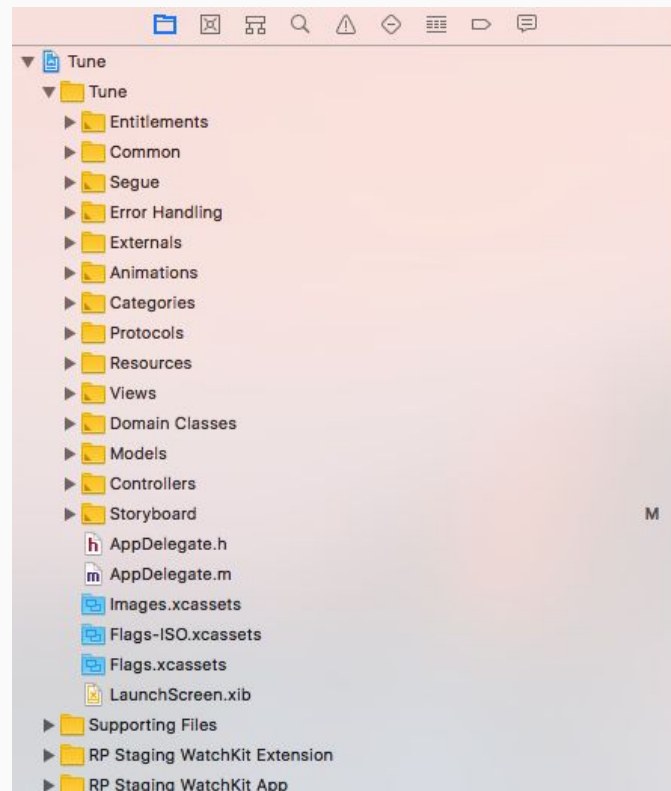
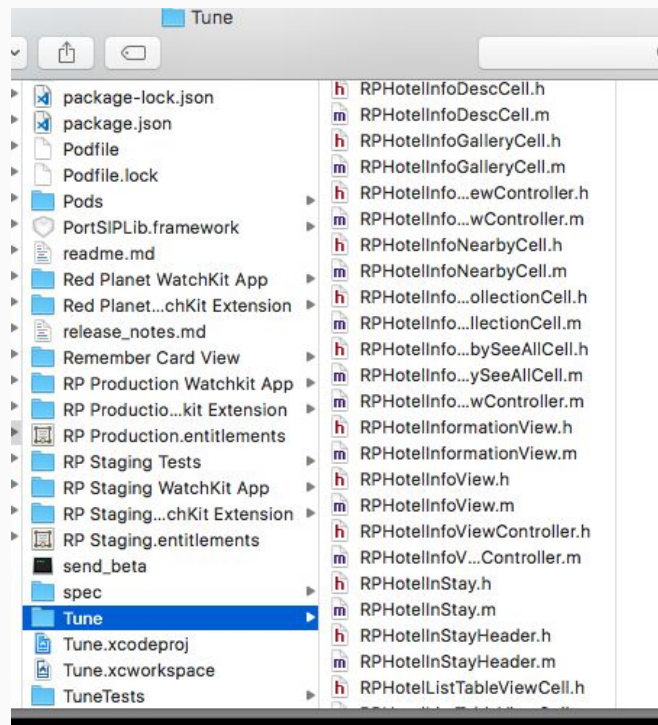


Xcode Project Structure



Xcode Project

XcodeProject use file references to create its own sources directory



What's the problem ?

Someone switches branches then move files within Xcode?

⇒ Project files will have conflicts 🤖 🤖 🤖

Xcode Project

Adding a file with the same name & directory in 2 different branches ?

⇒ Project files will have conflicts 🌀🌀🌀

69	69	213444B31FF0AEB300D9A562 /* RoomSelectionForm.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21C75
70	-	213444B71FF0AF0F00D9A562 /* Int+Unsigned.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360BC1F
71	-	213444B81FF0AF1A00D9A562 /* Date+AddingDay.swift in Sources */ = {isa = PBXBuildFile; fileRef = 2164C904
72	70	2135EA6D1FEB697F0096D9E8 /* PricePreviewForm.swift in Sources */ = {isa = PBXBuildFile; fileRef = 2135EA
73	71	2135EA6E1FEB697F0096D9E8 /* PricePreviewForm.swift in Sources */ = {isa = PBXBuildFile; fileRef = 2135EA
74	72	2135EA6F1FEB697F0096D9E8 /* PricePreviewForm.swift in Sources */ = {isa = PBXBuildFile; fileRef = 2135EA
🚩	@@ -1013,6 +1011,9 @@	
1013	1011	6B2EDC9F279D6FC95A18F474 /* RPSettingsHelper.m in Sources */ = {isa = PBXBuildFile; fileRef = 6B2ED33424
1014	1012	6B2EDDFAD1F472CFABFFE9A9 /* RPSplashscreenBuilder.m in Sources */ = {isa = PBXBuildFile; fileRef = 6B2ED
1015	1013	6B2EDFE0B84DBD952E5811ED /* RPSettingsHelper.m in Sources */ = {isa = PBXBuildFile; fileRef = 6B2ED33424
1014	+	7714FB3C1FEB02C500F81CFC /* CollectionViewModel.swift in Sources */ = {isa = PBXBuildFile; fileRef = 216
1015	+	7714FB3E1FEB034200F81CFC /* Date+AddingDay.swift in Sources */ = {isa = PBXBuildFile; fileRef = 2164C904
1016	+	7714FB3F1FEB039600F81CFC /* Int+Unsigned.swift in Sources */ = {isa = PBXBuildFile; fileRef = 21F360BC1F

Xcode Project

Someone in the team re-add files in the target ?

⇒ Project files will have conflicts 🤖🤖🤖

The screenshot shows the Xcode Source Control interface. The top bar includes buttons for 'Stash', 'Merge', 'Rebase', 'Git-Flow', and 'Refresh'. Below this, the 'project.pbxproj' file is selected, showing a conflict between two versions of the file. The conflict is highlighted in red, indicating a merge conflict. The interface shows the 'Staged' and 'Unstaged' tabs, and the 'Commit Subject' field. The 'Status' pane on the left shows the file 'project.pbxproj' with a conflict icon. The 'Target Membership' pane on the right shows the list of targets, including 'Tune', 'Red Planet WatchKit Extension', 'Red Planet WatchKit App', 'RP Internal - Staging', 'RP Staging WatchKit Extension', 'RP Staging WatchKit App', 'RP Internal - Production', 'RP Production WatchKit Extension', 'RP Production WatchKit App', and 'RP Staging Tests'. The 'Text Settings' pane on the right shows the 'Text Encoding' set to 'Unicode (UTF-8)', 'Line Endings' set to 'No Explicit Line Endings', 'Indent Using' set to 'Spaces', and 'Widths' set to '4'. The 'Wrap lines' checkbox is checked.

sample-bra... > No... project.pbxproj

Commit Subject

Stage All Commit

Status ^ Filename

Tune.xcodeproj

project.pbxproj

project.pbxproj

Staged Unstaged

Discard Chunk Stage Chunk

@@ -1499,15 +1499,14 @@

```
CFB346DD1B875DFD007EB6CF /* RPSplashScreenView.xib in Resources
*/ = {isa = PBXBuildFile; fileRef = CFB346D71B875DFD007EB6CF /*
RPSplashScreenView.xib */; };
CFB346E01B875E12007EB6CF /* RPADsManager.m in Sources */ = {isa
= PBXBuildFile; fileRef = CFB346DF1B875E12007EB6CF /* RPADsManager.m
*/; };
CFB346E11B875E12007EB6CF /* RPADsManager.m in Sources */ = {isa
= PBXBuildFile; fileRef = CFB346DF1B875E12007EB6CF /* RPADsManager.m
*/; };
CFB346E21B875E12007EB6CF /* RPADsManager.m in Sources */ = {isa
= PBXBuildFile; fileRef = CFB346DF1B875E12007EB6CF /* RPADsManager.m
*/; };
CFFC08991B875E1200F85874 /* RPWatchNetManager.m in Sources */ =
{isa = PBXBuildFile; fileRef = CFFC08981B875E1200F85874 /*
RPWatchNetManager.m */; };
CFFC089B1B875E1200F85874 /* RPWatchNetManager.m in Sources */ =
{isa = PBXBuildFile; fileRef = CFFC08981B875E1200F85874 /*
RPWatchNetManager.m */; };
```

Only resources are taggable

Target Membership

- ☒ Tune
- ☐ Red Planet WatchKit Extension
- ☐ Red Planet WatchKit App
- ☒ RP Internal - Staging
- ☐ RP Staging WatchKit Extension
- ☐ RP Staging WatchKit App
- ☐ RP Internal - Production
- ☐ RP Production WatchKit Extension
- ☐ RP Production WatchKit App
- ☐ RP Staging Tests

Text Settings

Text Encoding: Unicode (UTF-8)

Line Endings: No Explicit Line Endings

Indent Using: Spaces

Widths: 4

Tab

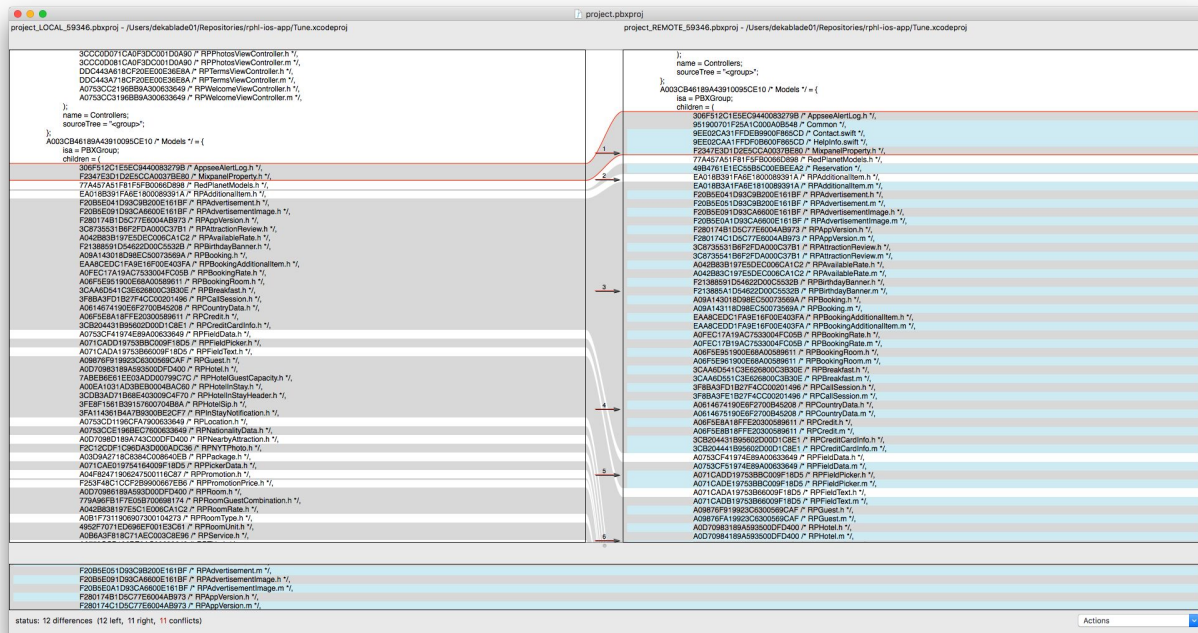
☒ Wrap lines



Xcode Project

Someone in the team re-add files in the target ?

⇒ Project files will have conflicts 🙄🙄🙄



Xcode Project



Solving this kind of conflicts requires to dive into the project file and find the valid file reference

Xcode Project

Git is not that cleaner

⇒ Sometime git breaks the braces, then the project can't be open 🤖🤖🤖

```
1BC1A8131F015C1200975424 /* RPBookingHeaderItem */ = {  
    isa = PBXGroup;  
    children = (  
        1BC1A80E1F014E4C00975424 /* RPBookingHeaderItem.h */,  
        1BC1A80F1F014E4C00975424 /* RPBookingHeaderItem.m */,  
    );  
    name = RPBookingHeaderItem;  
    1BC1A8141F015C2400975424 /* RPBookingDetailItem */ = {  
        isa = PBXGroup;  
        children = (  
            1BC1A8151F015C3800975424 /* RPBookingDetailItem.h */,  
            1BC1A8161F015C3800975424 /* RPBookingDetailItem.m */,  
        );  
        name = RPBookingDetailItem;  
        sourceTree = "<group>";  
    };  
};  
210E8B7A1ECEE16B009A5AAD /* Category Tests */ = {
```




Introducing 'BUCK'

- Buck is a build system developed and used by Facebook.
- Speed up building
 - Parallel build with multiple core of machine.
 - Tracking files, build only file with change(s).
 - Buck Query know what to build for the target.
- Integratable with IDE (Xcode, IntelliJ)

Build With BUCK

- Buck use its own rules in `./BUCK` to for the project structure and `./buckconfig` to configure project like cert, compiler versions, etc, ...
- Faster than `project.pbxproj`
- BUCK build with rules, not file references.
- BUCK build with ``$ buck build target_name``
- `.pbxproj` `.workspace` is not required for build.

./BUCK

- Contain build rules, targets
- Rules (iOS)
 - `apple_asset_catalog()`
 - `apple_binary()`
 - `apple_bundle()`
 - `apple_library()`
 - `apple_package()`
 - `apple_resource()`
 - `apple_test()`
 - `core_data_model()`
 - `prebuild_apple_framework()`

./BUCK

- `apple_resource()`
 - `name` // rule_name
 - `files` // files with name & extensions
 - `dirs` // application bundle directories

```
apple_resource(  
    name = 'BxTraderResources',  
    files = glob(['**/**/*.*png', '**/**/*.*storyboard', '**/**/*.*xib']),  
    dirs = [],  
)
```

./BUCK

- `apple_binary()`
 - `name` // rule name
 - `srcs` // file sources
 - `frameworks` // frameworks

```
14  apple_binary(  
15      name = 'BxTraderAppBinary',  
16      srcs = glob([  
17          '*.m', '*.swift', '**/*.swift', '**/**/*.swift',  
18      ]),  
19      frameworks = [  
20          '$SDKROOT/System/Library/Frameworks/UIKit.framework',  
21          '$SDKROOT/System/Library/Frameworks/Foundation.framework',  
22          '$SDKROOT/System/Library/Frameworks/SystemConfiguration.framework',  
23      ],  
24  )
```

BUCK > ./bugconfig

Project configurations

⇒ e.g.: Swift versions, pod lib swift versions, base sdk, bridge header, etc

The screenshot shows the 'Build Settings' tab for a project named 'Tune'. The settings are organized into sections: Architectures, Assets, Build Locations, and Build Options (iOS). The 'Architectures' section shows 'Standard architectures' as '\$(ARCHS_STANDARD)' and 'Base SDK' as 'Latest iOS (iOS 11.2)'. The 'Assets' section shows 'Asset Pack Manifest URL Prefix' as 'No' and 'Embed Asset Packs in Product Bundle' as 'No'. The 'Build Locations' section shows 'Build Products Path' as 'build' and 'Intermediate Build Files Path' as 'build'. The 'Build Options (iOS)' section shows 'Build Variants' as 'normal' and 'Compiler for C/C++/Objective-C' as 'Default compiler (Apple LLVM 9.0)'. The 'Debug Information Format' is set to 'DWARF with dSYM File'.

Section	Setting	Value
Architectures	Setting	Tune
	Additional SDKs	
	Architectures	Standard architectures - \$(ARCHS_STANDARD) ⌵
	Base SDK	Latest iOS (iOS 11.2) ⌵
	Build Active Architecture Only	<Multiple values> ⌵
Assets	Setting	Tune
	Asset Pack Manifest URL Prefix	No ⌵
	Embed Asset Packs in Product Bundle	No ⌵
	On Demand Resources Initial Install Tags	
Build Locations	Setting	Tune
	Build Products Path	build
	Intermediate Build Files Path	build
	Per-configuration Build Products Path	<Multiple values> ⌵
	Debug	build/Debug-iphones
	Release	build/Release-iphones
	Per-configuration Intermediate Build Files Path	<Multiple values> ⌵
Build Options (iOS)	Setting	Tune
	Build Variants	normal
	Compiler for C/C++/Objective-C	Default compiler (Apple LLVM 9.0) ⌵
	Debug Information Format	DWARF with dSYM File ⌵
	Enable Bitcode	Yes ⌵
	Enable Index-While-Building Functionality	Default ⌵



target_sdk_version

For each platform, you can specify the target SDK version to use. The format is {platform}_target_sdk_version.

```
[apple]
  iphonesimulator_target_sdk_version = 7.0
  iphoneos_target_sdk_version = 7.0
  macosx_target_sdk_version = 10.9
```

codesign

To override a default path to codesign, set this setting to either a file path or buck target.

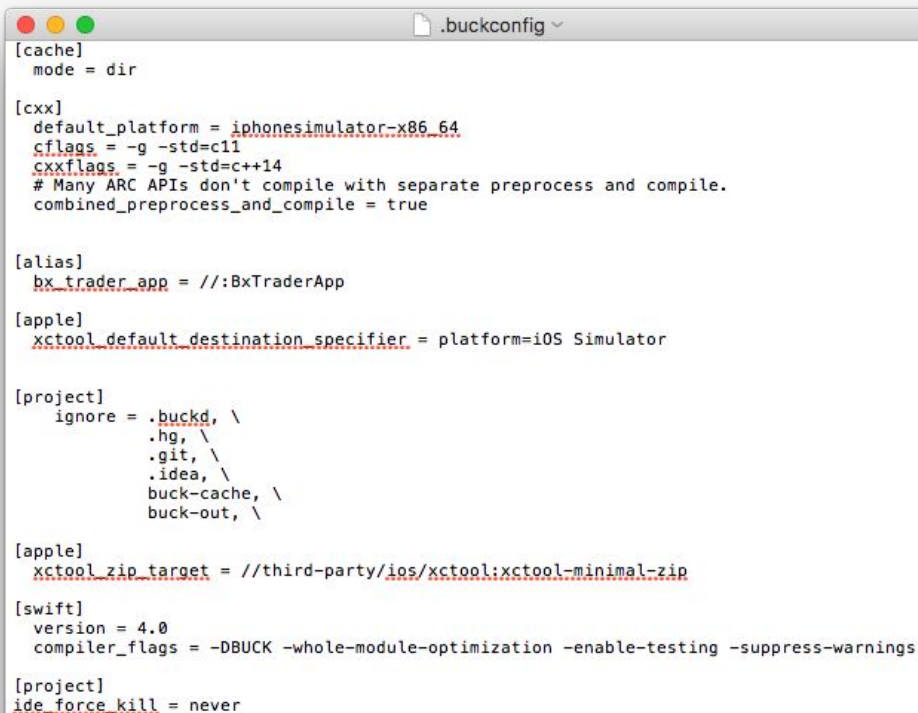
```
[apple]
  codesign = //path/to/target/that/creates:codesign
```


xctool_default_destination_specifier

This setting is passed directly to `xctool`, and then to `xcodebuild` as the `-destination` argument. See the [man page](#) for the proper syntax.

```
[apple]  
xctool_default_destination_specifier = platform=iOS simulator
```

BUCK > ./bugconfig



A screenshot of a macOS-style terminal window with a title bar containing three colored window control buttons (red, yellow, green) and a file icon labeled ".buckconfig". The terminal displays the configuration for a BUCK build system. The configuration is organized into sections: [cache], [cxx], [alias], [apple], [project], [apple], [swift], and [project]. The [cache] section sets mode to dir. The [cxx] section sets default_platform to iphonesimulator-x86_64, cflags to -g -std=c11, cxxflags to -g -std=c++14, and combined_preprocess_and_compile to true, with a comment about ARC APIs. The [alias] section defines bx_trader_app as //:BxTraderApp. The [apple] section sets xctool default_destination_specifier to platform=iOS Simulator. The [project] section lists ignore paths: .buckd, .hg, .git, .idea, buck-cache, and buck-out. Another [apple] section sets xctool_zip_target to //third-party/ios/xctool:xctool-minimal-zip. The [swift] section sets version to 4.0 and compiler_flags to -DBUCK -whole-module-optimization -enable-testing -suppress-warnings. The final [project] section sets ide_force_kill to never.

```
[cache]
  mode = dir

[cxx]
  default_platform = iphonesimulator-x86_64
  cflags = -g -std=c11
  cxxflags = -g -std=c++14
  # Many ARC APIs don't compile with separate preprocess and compile.
  combined_preprocess_and_compile = true

[alias]
  bx_trader_app = //:BxTraderApp

[apple]
  xctool default_destination_specifier = platform=iOS Simulator

[project]
  ignore = .buckd, \
           .hg, \
           .git, \
           .idea, \
           buck-cache, \
           buck-out, \

[apple]
  xctool_zip_target = //third-party/ios/xctool:xctool-minimal-zip

[swift]
  version = 4.0
  compiler_flags = -DBUCK -whole-module-optimization -enable-testing -suppress-warnings

[project]
  ide_force_kill = never
```

Pros & Cons

Pros

- Build faster up to 50% on CI [[AirBNB](#)]
- Smaller app size 30% [[AirBNB](#)]
- Buck still can generate `.workspace``, `.pbxproj`` if we want to open project to build and run with xcode
⇒ ``$ buck project target_name``
- `.pbxproj``, `.workspace`` can be added to `.gitignore`` to avoid conflicts

Cons

- Very complex to configure
- Requires extreme knowledge in iOS Project Structure. Because you need to Initialize a project with `./BUCK` & `./buckconfig` (so NOT with Xcode > File > New Project)
- Able to use CocoaPods but need to add every Pods headers manually in `./BUCK`

DEMO

Thanks!

Contact Nimbl3

hello@nimbl3.com

399 Sukhumvit Road, Interchange 21
Klongtoey nua, Wattana
Bangkok 10110

20th Floor, Central Tower
28 Queen's Road
Central, Hong Kong

nimbl3.com

