

Advanced Testing and Continuous Integration

Session 409

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Eric Dudiak Xcode Engineer









Agenda

Agenda

Testing Concepts

Agenda

Testing Concepts

Xcode

- Crash Log Gathering

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Testing Concepts

Xcode

- Crash Log Gathering

Xcode Server

- Advanced Triggers
- Issue Tracking and Blame
- Configurable Integration User

Agenda

Testing Concepts

Xcode

- Crash Log Gathering

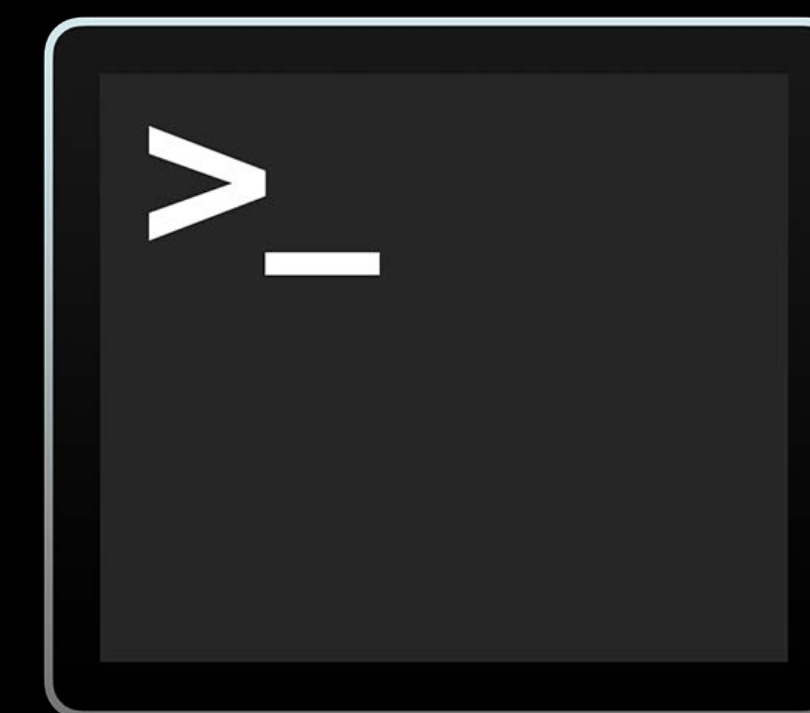
Xcode Server

- Advanced Triggers
- Issue Tracking and Blame
- Configurable Integration User

xcodebuild

Overview

Overview





XCTest

Testing framework

XCTest

Testing framework

Sources



TestClassA.m



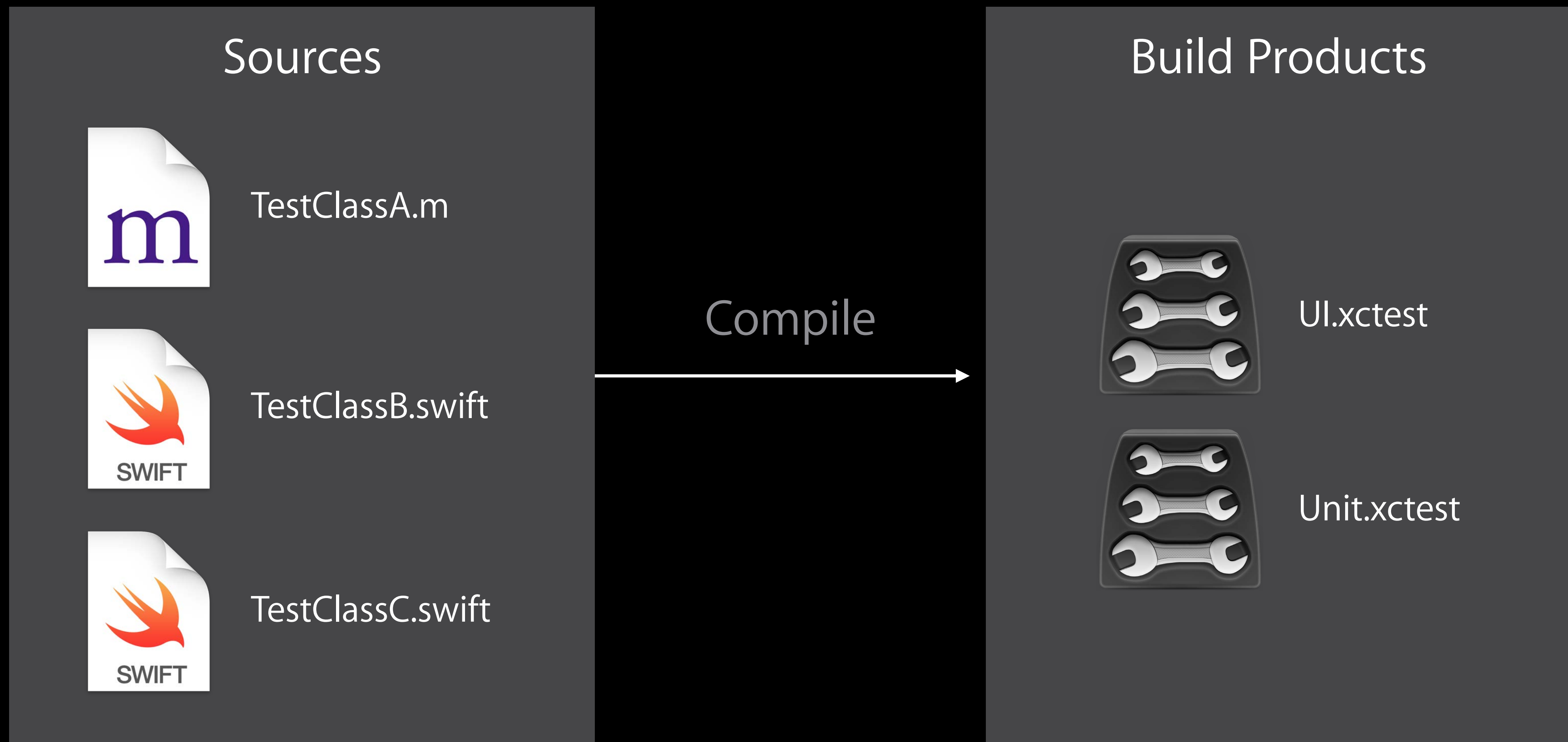
TestClassB.swift



TestClassC.swift

XCTest

Testing framework





Xcode

Test harness

The screenshot shows the Xcode IDE interface. The top status bar indicates "Finished running Example on iPad Air". The left sidebar shows a project structure with two test suites: "ExampleTests" and "ExampleUITests". The "ExampleUITests" suite is expanded, showing a test case "testExample()" with a green checkmark. The right pane shows the source code for "ExampleUITests.swift", which includes a class definition for "ExampleUITests" inheriting from "XCTestCase". The bottom pane displays the test session log, showing the execution of the "testExample()" test case, which passed successfully.

```
1 //
2 // ExampleUITests.swift
3 // ExampleUITests
4 //
5 // Created by Zoltan Foley-Fisher on 5/13/16.
6 // Copyright © 2016 Zoltan Foley-Fisher. All rights reserved.
7 //
8
9 import XCTest
10
11 class ExampleUITests: XCTestCase {
```

16:37:58.907 XCTRunner[4471:10115779] _XCT_testBundleReadyWithProtocolVe
16:37:58.939 XCTRunner[4471:10115782] _IDE_startExecutingTestPlanWithPro
2016-05-13 16:37:59.102597 XCTRunner[4471:10115505] [ContextKit] Context
2016-05-13 16:37:59.428755 XCTRunner[4471:10115505] Continuing to run te
Test Suite 'Selected tests' started at 2016-05-13 16:37:59.984
Test Suite 'ExampleUITests' started at 2016-05-13 16:37:59.985
Test Case '-[ExampleUITests.ExampleUITests testExample]' started.
t = 0.00s Start Test at 2016-05-13 16:37:59.986
t = 0.00s Set Up
t = 0.01s Launch com.toolsQA.Example
t = 0.11s Terminate <XCUIApplicationProcess: 0x7ff62
t = 1.55s Waiting for accessibility to load
t = 4.93s Wait for app to idle
t = 6.32s Tear Down
Test Case '-[ExampleUITests.ExampleUITests testExample]' passed (6.322 s
Test Suite 'ExampleUITests' passed at 2016-05-13 16:38:06.308.
Executed 1 test, with 0 failures (0 unexpected) in 6.322 (6.323) se
Test Suite 'Selected tests' passed at 2016-05-13 16:38:06.310.
Executed 1 test, with 0 failures (0 unexpected) in 6.322 (6.326) se

Test session log:

Xcode

Test harness

Author tests

The screenshot shows the Xcode IDE interface. The top status bar indicates the test run is finished on an iPad Air. The project navigator on the left shows a test suite named 'ExampleUITests' with a single test case 'testExample()' that has passed, indicated by a green checkmark. The source editor in the center shows the Swift code for 'ExampleUITests.swift', which is a subclass of 'XCTestCase'. The console window at the bottom displays the test session log, including the start time, the test case name, and the duration of the test.

```
1 //
2 // ExampleUITests.swift
3 // ExampleUITests
4 //
5 // Created by Zoltan Foley-Fisher on 5/13/16.
6 // Copyright © 2016 Zoltan Foley-Fisher. All rights reserved.
7 //
8
9 import XCTest
10
11 class ExampleUITests: XCTestCase {
```

16:37:58.907 XCTRunner[4471:10115779] _XCT_testBundleReadyWithProtocolVe
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Executed 1 test, with 0 failures (0 unexpected) in 6.322 (6.326) se

Test session log:

Xcode

Test harness

Author tests

Execute tests

The screenshot shows the Xcode IDE interface. At the top, a status bar indicates "Finished running Example on iPad Air". The project navigator on the left shows a hierarchy of test suites: "ExampleTests" (1 test) and "ExampleUITests" (2 tests). The "ExampleUITests" suite is selected, showing two tests: "testExample()" and "testPerformanceExample()". The code editor in the center displays the source code for "ExampleUITests.swift", which includes a class definition for "ExampleUITests" inheriting from "XCTestCase". The console at the bottom shows the test session log, including the following details:

```
16:37:58.907 XCTRunner[4471:10115779] _XCT_testBundleReadyWithProtocolVe
16:37:58.939 XCTRunner[4471:10115782] _IDE_startExecutingTestPlanWithPro
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```


Xcode

Test harness

Author tests

Execute tests

Review reports

The screenshot shows the Xcode IDE interface. At the top, the title bar indicates the project is 'Example' on an 'iPad Air' simulator. The status bar shows 'Finished running Example on iPad Air' with a warning icon and the number '31'. The left sidebar displays a test hierarchy:

- ExampleTests 1 test
 - ExampleTests
 - testExample()
- ExampleUITests 2 tests
 - ExampleUITests
 - testExample() ✓
 - testPerformanceExample()

The code editor shows the content of 'ExampleUITests.swift':

```
1 //  
2 // ExampleUITests.swift  
3 // ExampleUITests  
4 //  
5 // Created by Zoltan Foley-Fisher on 5/13/16.  
6 // Copyright © 2016 Zoltan Foley-Fisher. All rights reserved.  
7 //  
8  
9 import XCTest  
10  
11 class ExampleUITests: XCTestCase {
```

The console window at the bottom displays the test execution log:

```
16:37:58.907 XCTRunner[4471:10115779] _XCT_testBundleReadyWithProtocolVe  
16:37:58.939 XCTRunner[4471:10115782] _IDE_startExecutingTestPlanWithPro  
2016-05-13 16:37:59.102597 XCTRunner[4471:10115505] [ContextKit] Context  
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Executed 1 test, with 0 failures (0 unexpected) in 6.322 (6.326) se
```

The log concludes with 'Test session log:'.



Xcode Server

Continuous Integration

The screenshot displays the Xcode Server interface for a project named "Harmony". The top status bar indicates "Harmony | Build **Succeeded** | Yesterday at 2:05 PM". The main view is split into two panels. The left panel, titled "By Group", shows a list of build groups. The right panel, titled "Harmony Bot", displays statistics for the latest build, including the status "Failed tests", average duration, and a commit count of 2. Below this, a "Build History" bar chart shows a series of successful builds (yellow bars) and a failed build (green bar with a red 'x') at the 8th position.

Harmony Bot
Latest Status: Failed tests
Average Duration: 1 minute, 49 seconds
Show Statistics For: Past 24 hours

2
COMMITTS

Build History

| Build Number | Status |
|--------------|---------|
| 1 | Success |
| 2 | Success |
| 3 | Success |
| 4 | Success |
| 5 | Success |
| 6 | Success |
| 7 | Success |
| 8 | Failed |
| 9 | Success |
| 10 | Success |

Xcode Server

Continuous Integration

Schedules bot runs

The screenshot displays the Xcode Server interface for a bot named 'Harmony Bot'. The top navigation bar shows the project name 'Harmony', the device 'Apple TV 1080p', and the build status 'Build Succeeded' from 'Yesterday at 2:05 PM'. The left sidebar lists build groups, with 'Harmony Bot bots.example.com' expanded to show a list of 'Integrate' builds. The main content area shows the 'Harmony Bot' details, including the latest status 'Failed tests', average duration of '1 minute, 49 seconds', and a 'Show Statistics For' dropdown set to 'Past 24 hours'. A large circular gauge displays '2' under the label 'COMMITTS'. Below this is a 'Build History' bar chart showing 10 builds, with the first 7 being yellow (failed) and the last 3 being green (succeeded).

Harmony Bot

Latest Status: Failed tests

Average Duration: 1 minute, 49 seconds

Show Statistics For: Past 24 hours

2

COMMITTS

Build History

| Build Number | Status |
|--------------|-----------|
| 1 | Failed |
| 2 | Failed |
| 3 | Failed |
| 4 | Failed |
| 5 | Failed |
| 6 | Failed |
| 7 | Failed |
| 8 | Succeeded |
| 9 | Succeeded |
| 10 | Succeeded |

Xcode Server

Continuous Integration

Schedules bot runs

Generates reports

The screenshot displays the Xcode Server interface for a project named "Harmony". The top navigation bar shows the project name, a play button, a stop button, and the device "Apple TV 1080p". The status bar indicates "Harmony | Build Succeeded | Yesterday at 2:05 PM".

The main interface is divided into two panels. The left panel, titled "By Group" and "By Time", shows a list of build groups:

- Harmony 6/6/16, 6:40 PM
- Harmony (no locat... Yesterday, 2:05 PM
- Project Today, 3:29 PM
- Harmony Bot bots.example.com
 - Integrate (13) Today, 3:00 PM (with a red 'x' icon)
 - Integrate (12) Yesterday, 3:00 PM
 - Integrate (11) 6/13/16, 3:00 PM
 - Integrate (10) 6/12/16, 3:00 PM
 - Integrate (9) 6/12/16, 9:41 AM
 - Integrate (8) 6/11/16, 3:00 PM
 - Integrate (7) 6/10/16, 3:00 PM (with a yellow warning icon and a red 'x' icon)
 - Integrate (6) 6/9/16, 3:00 PM (with a yellow warning icon and a red 'x' icon)
 - Integrate (5) 6/8/16, 3:00 PM (with a yellow warning icon and a red 'x' icon)
 - Integrate (4) 6/8/16, 10:23 AM (with a yellow warning icon and a red 'x' icon)
 - Integrate (3) 6/7/16, 3:00 PM (with a yellow warning icon and a red 'x' icon)
 - Integrate (2) 6/6/16, 3:00 PM (with a yellow warning icon and a red 'x' icon)

The right panel, titled "Harmony Bot", shows the latest status: "Failed tests". The average duration is "1 minute, 49 seconds". A dropdown menu shows "Show Statistics For: Past 24 hours". A large circular gauge displays the number "2" under the label "COMMITTS".

Below the gauge is a "Build History" chart. The chart shows a series of yellow vertical bars representing successful builds. The x-axis is labeled with numbers 1 through 10. The y-axis is labeled with numbers 1 and 2. A green arrow points to the right, indicating the current build is the 8th in the history.

Xcode Server

Continuous Integration

Schedules bot runs

Generates reports

Sends notifications

The screenshot displays the Xcode Server interface for a project named 'Harmony'. The top navigation bar shows 'Harmony | Build Succeeded | Yesterday at 2:05 PM'. The main content area is divided into two panels. The left panel, titled 'By Group', shows a list of build groups: 'Harmony 6/6/16, 6:40 PM', 'Harmony (no locat... Yesterday, 2:05 PM', 'Project Today, 3:29 PM', and 'Harmony Bot bots.example.com'. The 'Harmony Bot' group is expanded, showing a list of 'Integrate' builds from 6/6/16 to 6/13/16. The right panel, titled 'Harmony Bot', shows the latest status as 'Failed tests' and an average duration of '1 minute, 49 seconds'. A large circular gauge displays '2' under the label 'COMMITTS'. Below this, a 'Build History' bar chart shows a series of yellow bars representing successful builds and a green bar representing a failed build.

Harmony | Build **Succeeded** | Yesterday at 2:05 PM

Harmony Bot

By Group By Time

- ▶ Harmony 6/6/16, 6:40 PM
- ▶ Harmony (no locat... Yesterday, 2:05 PM
- ▶ Project Today, 3:29 PM
- ▼ Harmony Bot bots.example.com
 - ↑ Integrate (13) Today, 3:00 PM ❌
 - ↑ Integrate (12) Yesterday, 3:00 PM
 - ↑ Integrate (11) 6/13/16, 3:00 PM
 - ↑ Integrate (10) 6/12/16, 3:00 PM
 - ↑ Integrate (9) 6/12/16, 9:41 AM
 - ↑ Integrate (8) 6/11/16, 3:00 PM
 - ↑ Integrate (7) 6/10/16, 3:00 PM ⚠️ ❌
 - ↑ Integrate (6) 6/9/16, 3:00 PM ⚠️ ❌
 - ↑ Integrate (5) 6/8/16, 3:00 PM ⚠️ ❌
 - ↑ Integrate (4) 6/8/16, 10:23 AM ⚠️ ❌
 - ↑ Integrate (3) 6/7/16, 3:00 PM ⚠️ ❌
 - ↑ Integrate (2) 6/6/16, 3:00 PM ⚠️ ❌

Load More...

Harmony Bot

Latest Status: Failed tests

Average Duration: 1 minute, 49 seconds

Show Statistics For: Past 24 hours

2

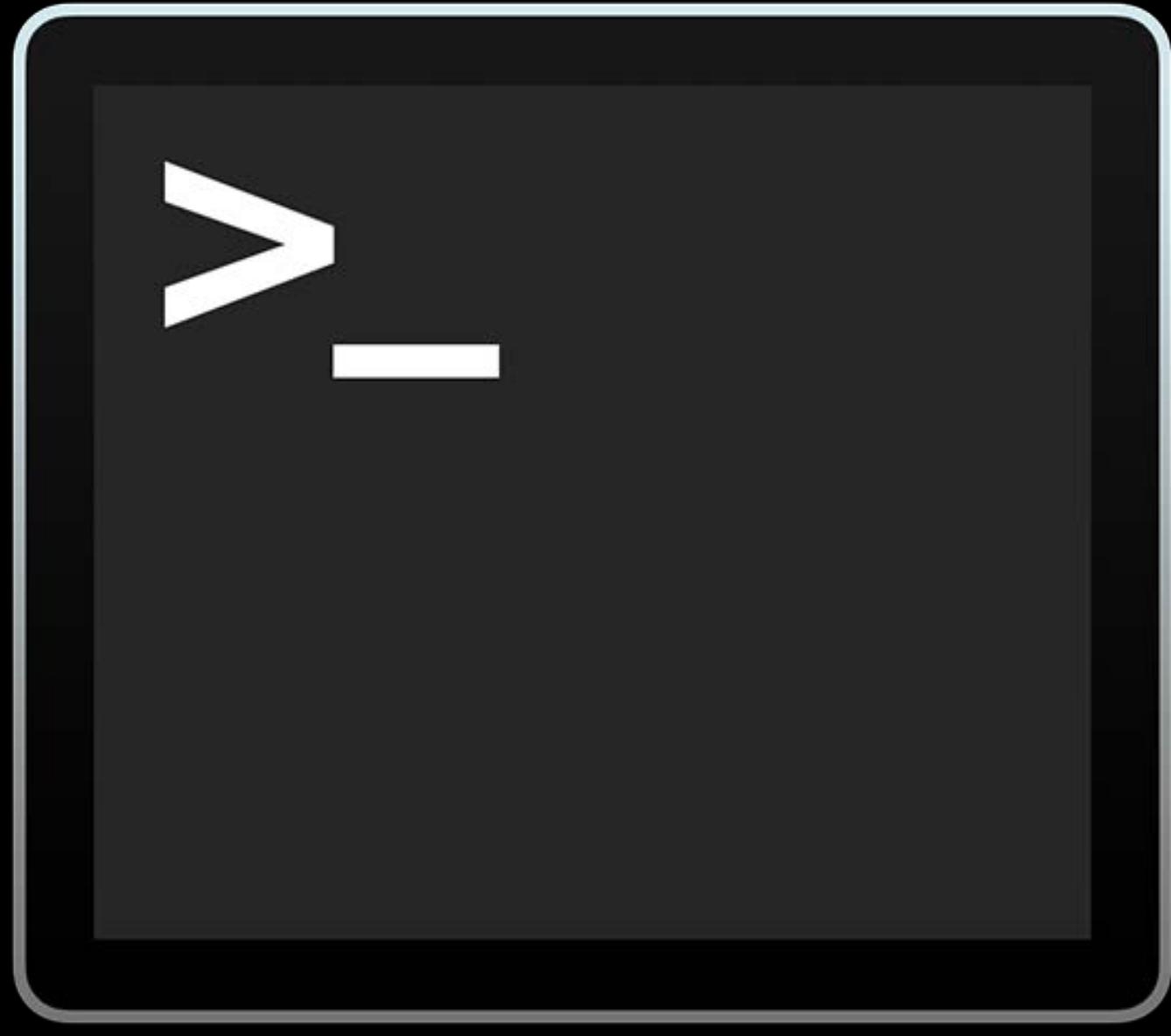
COMMITTS

Build History

2

1

1 2 3 4 5 6 7 8 9 10



xcodebuild

Command line tool

```
Example — -bash — 110x25
Test Suite 'Selected tests' started at 2016-05-13 16:52:30.048
Test Suite 'ExampleUITests' started at 2016-05-13 16:52:30.049
Test Case '-[ExampleUITests.ExampleUITests testExample]' started.
  t = 0.00s Start Test at 2016-05-13 16:52:30.050
  t = 0.00s Set Up
  t = 0.00s Launch com.toolsQA.Example
  t = 1.32s Waiting for accessibility to load
  t = 1.73s Wait for app to idle
  t = 3.05s Tear Down
Test Case '-[ExampleUITests.ExampleUITests testExample]' passed (3.055 seconds).
Test Suite 'ExampleUITests' passed at 2016-05-13 16:52:33.106.
    Executed 1 test, with 0 failures (0 unexpected) in 3.055 (3.057) seconds
Test Suite 'Selected tests' passed at 2016-05-13 16:52:33.106.
    Executed 1 test, with 0 failures (0 unexpected) in 3.055 (3.058) seconds
** TEST SUCCEEDED **

Zoltans-MacBook:Example zoltan$
```


xcodebuild

Command line tool

Used by Xcode Server

```
Example — -bash — 110x25
Test Suite 'Selected tests' started at 2016-05-13 16:52:30.048
Test Suite 'ExampleUITests' started at 2016-05-13 16:52:30.049
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    Executed 1 test, with 0 failures (0 unexpected) in 3.055 (3.058) seconds
** TEST SUCCEEDED **

Zoltans-MacBook:Example zoltan$
```


xcodebuild

Command line tool

Used by Xcode Server

Build and execute tests

```
Example — -bash — 110x25
Test Suite 'Selected tests' started at 2016-05-13 16:52:30.048
Test Suite 'ExampleUITests' started at 2016-05-13 16:52:30.049
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    Executed 1 test, with 0 failures (0 unexpected) in 3.055 (3.058) seconds
** TEST SUCCEEDED **

Zoltans-MacBook:Example zoltan$
```


xcodebuild

Command line tool

Used by Xcode Server

Build and execute tests

For custom CI systems

```
Example — -bash — 110x25
Test Suite 'Selected tests' started at 2016-05-13 16:52:30.048
Test Suite 'ExampleUITests' started at 2016-05-13 16:52:30.049
Test Case '-[ExampleUITests.ExampleUITests testExample]' started.
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** TEST SUCCEEDED **

Zoltans-MacBook:Example zoltan$
```

Previous Years' Sessions

Testing with Xcode 6

WWDC 2014

Continuous Integration with Xcode 6

WWDC 2014

UI Testing in Xcode

WWDC 2015

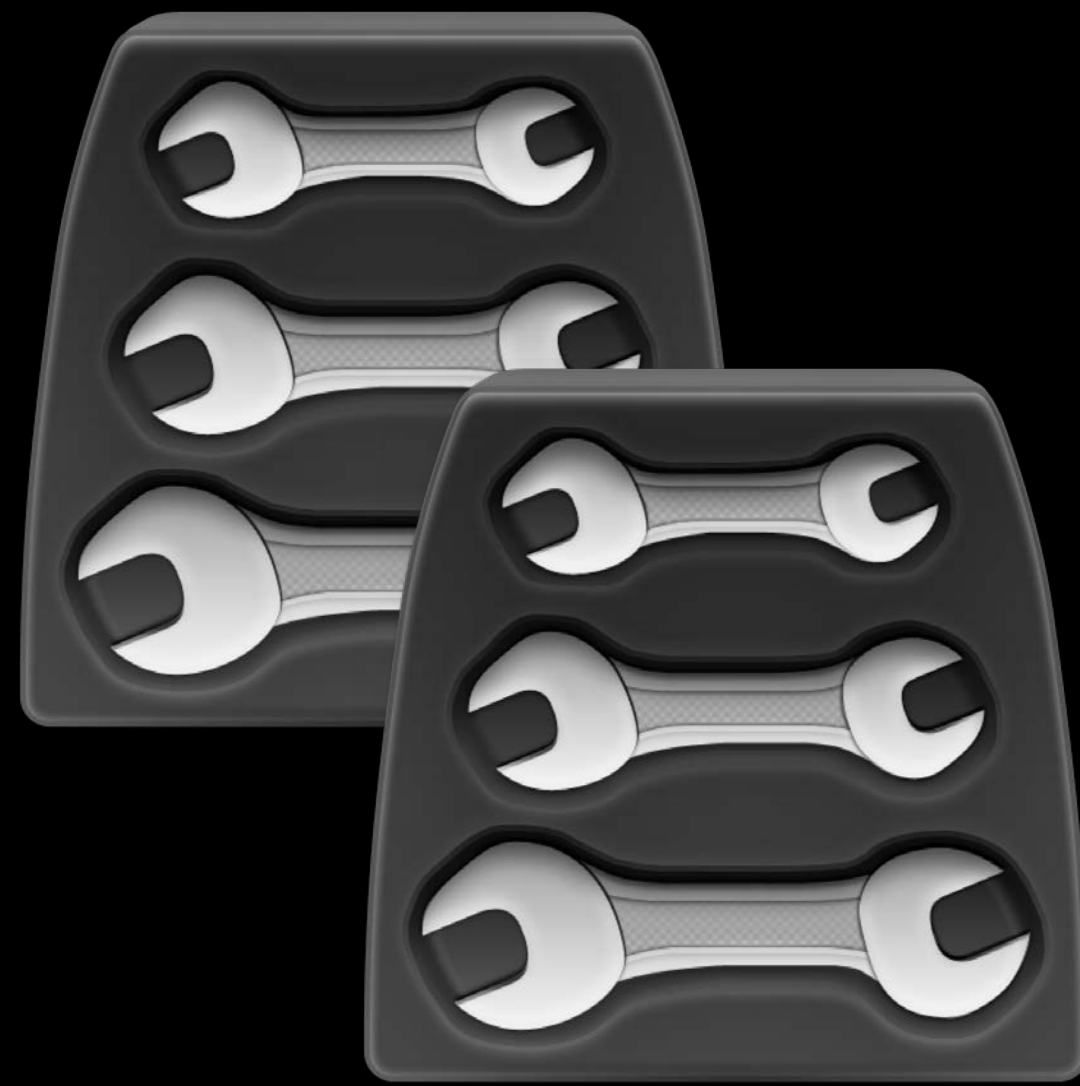
CI and Code Coverage in Xcode

WWDC 2015

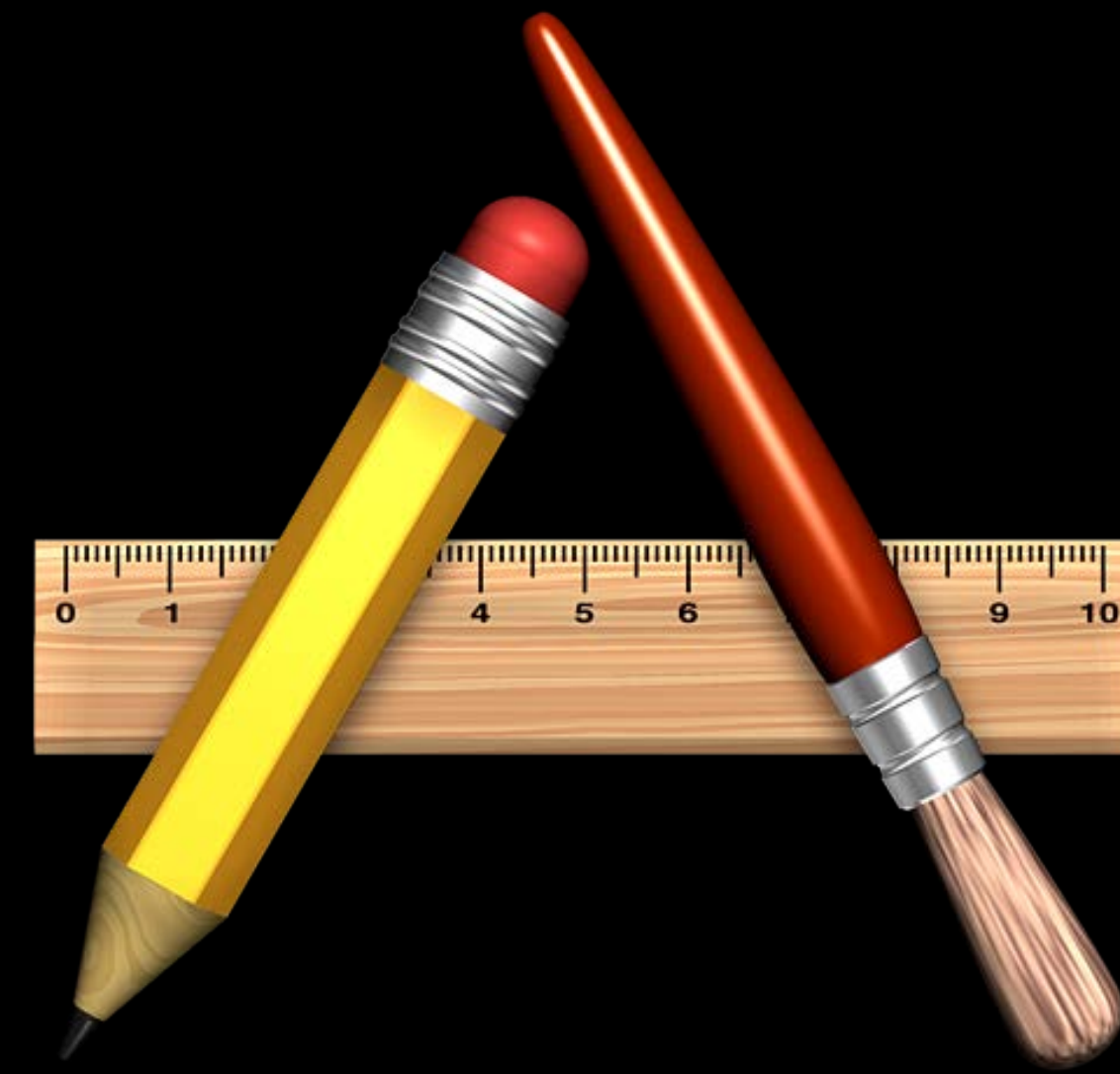
Testing Concepts

How Testing Works

Behind the scenes



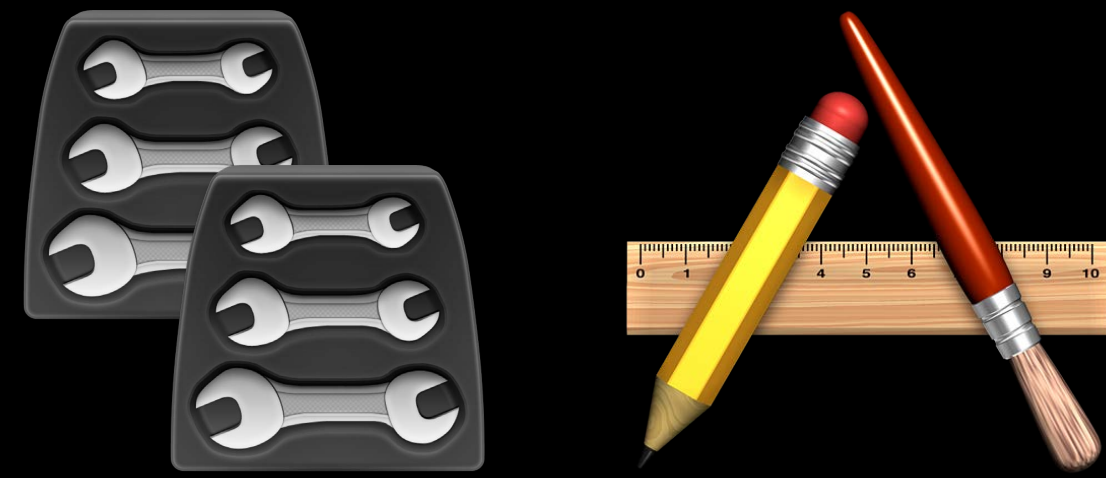
MyTests.xctest



MyApp.app

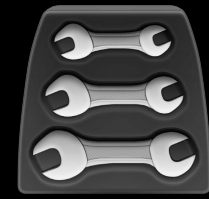
Testing Timeline

Fundamental concepts

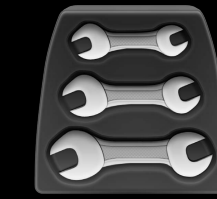


Test Hosting

How testing starts



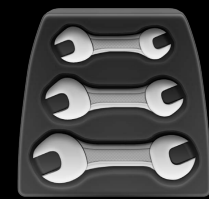
Unit Tests



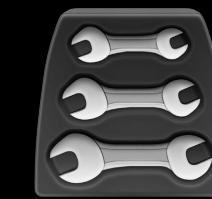
UI Tests

Test Hosting

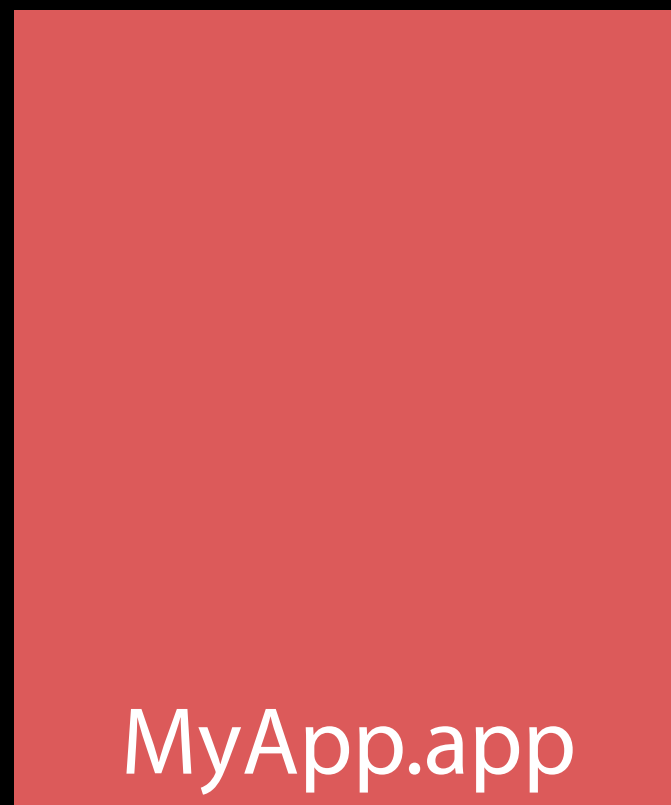
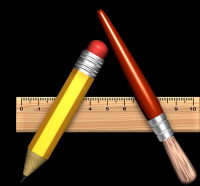
How testing starts



Unit Tests



UI Tests

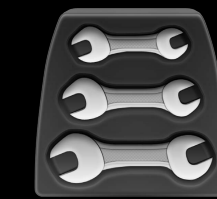


MyApp.app

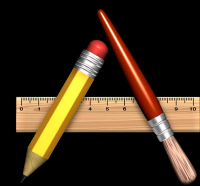
Test Hosting

How testing starts

Unit Tests



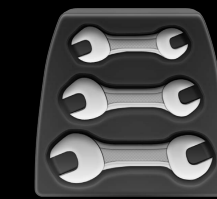
UI Tests



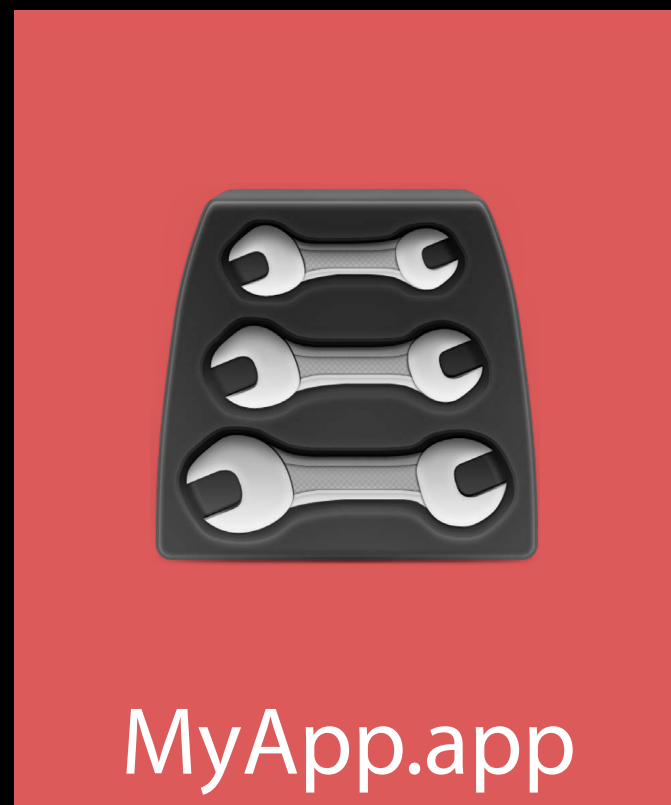
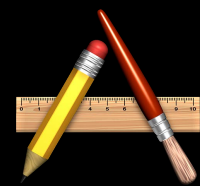
Test Hosting

How testing starts

Unit Tests



UI Tests

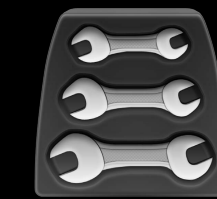


Host Application

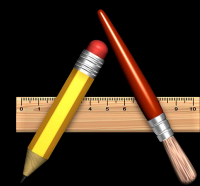
Test Hosting

How testing starts

Unit Tests



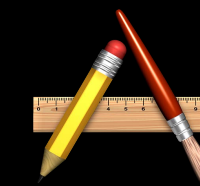
UI Tests

A grey icon representing a set of wrenches, centered on a red square background.

MyApp.app

A solid blue square background.

UI Test Runner

A solid red square background.

MyApp.app

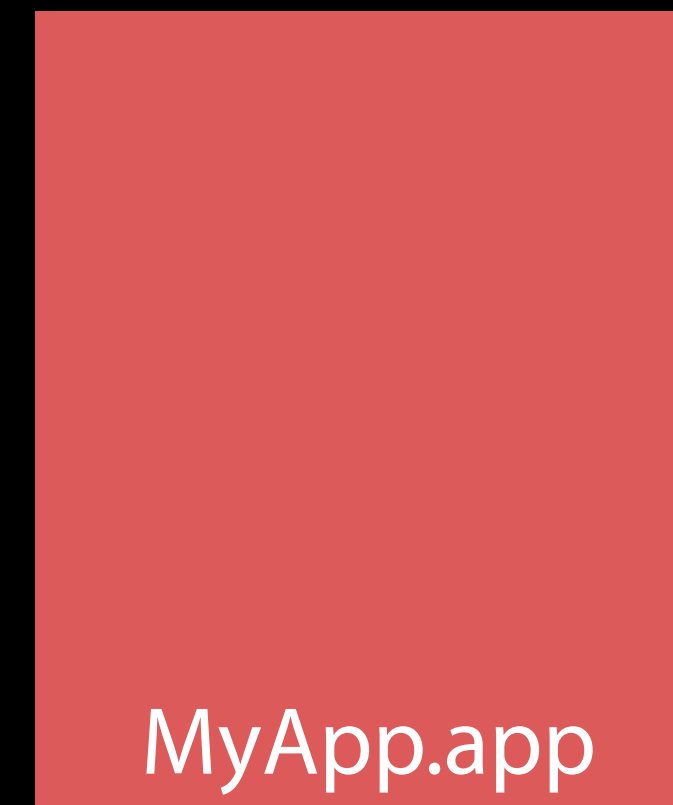
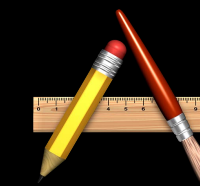
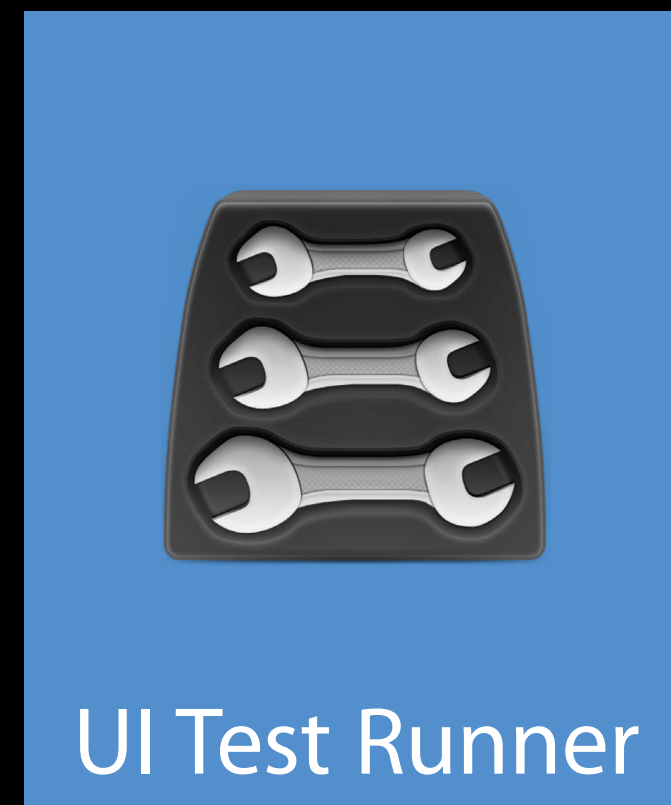
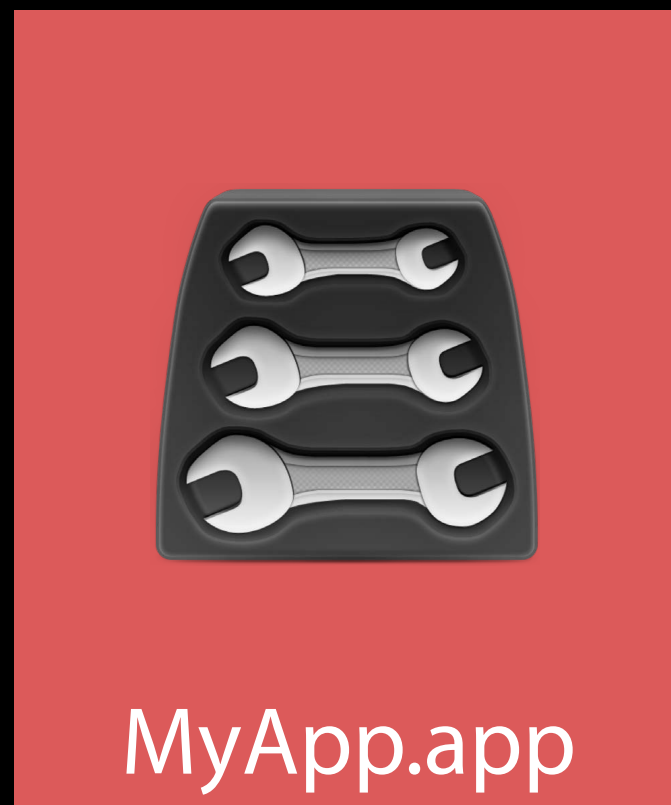
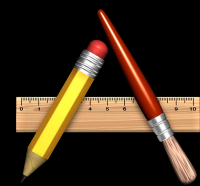
Host Application

Test Hosting

How testing starts

Unit Tests

UI Tests



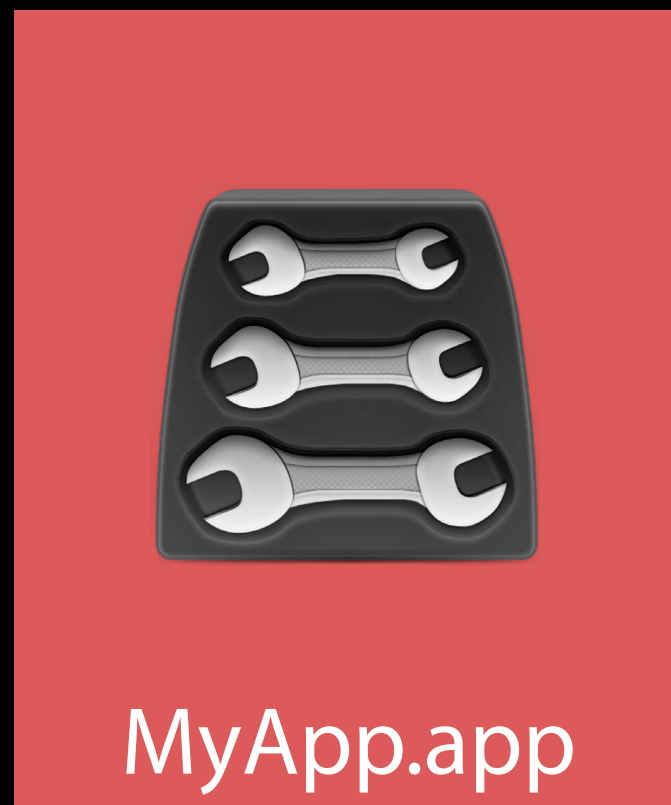
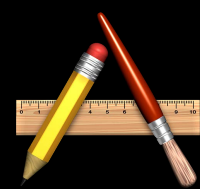
Host Application

Test Hosting

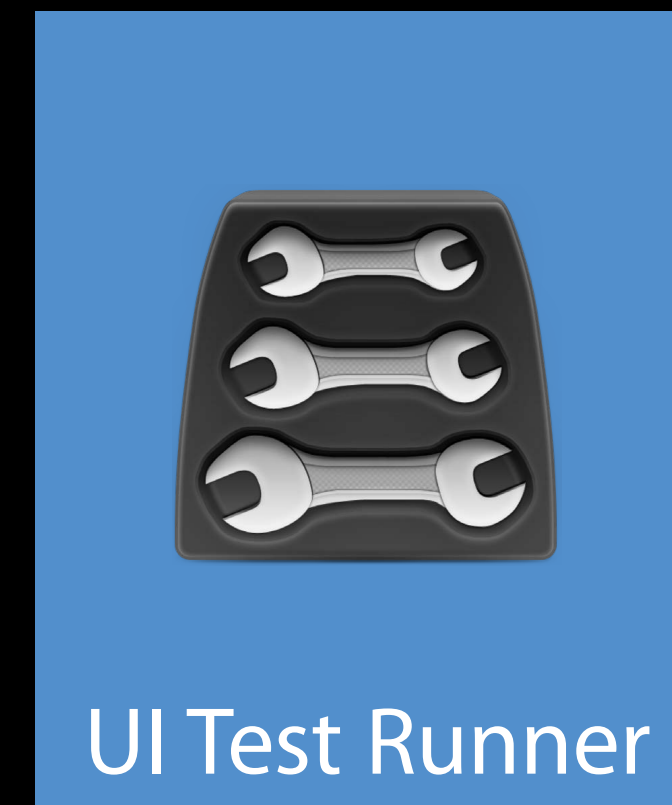
How testing starts

Unit Tests

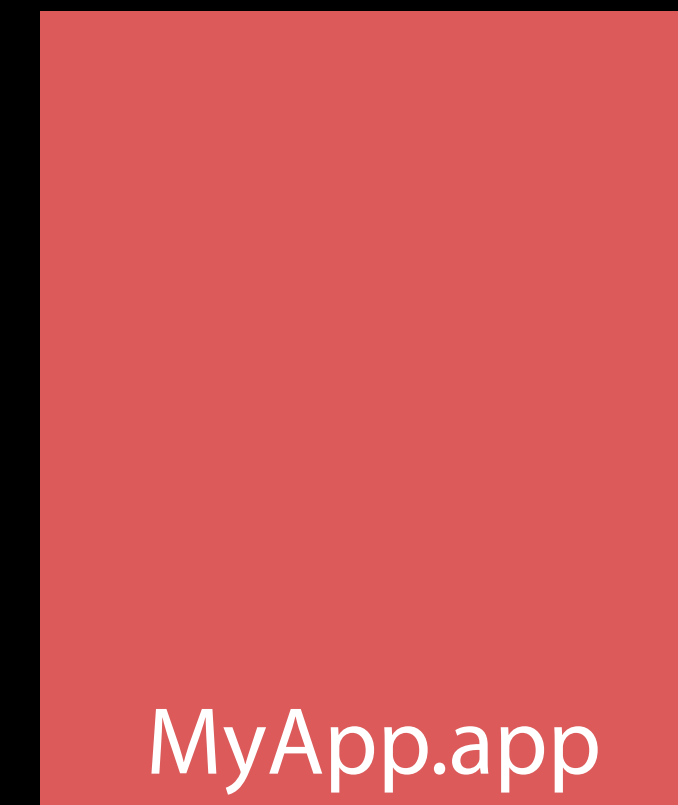
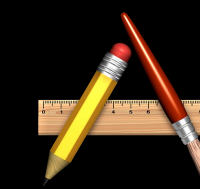
UI Tests



Host Application



Target Application



Test Hosting Comparison

Unit Tests

UI Tests

Direct access to host app data and APIs

Uses Accessibility to access target app

Test Hosting Comparison

Unit Tests

Direct access to host app data and APIs

All tests run in single app launch

UI Tests

Uses Accessibility to access target app

Tests launch app for every test case

Testing Timeline

Fundamental concepts



Testing Timeline

Fundamental concepts



Test Observation

Test case structure

Test Observation

Test case structure

Test Case 1

Test Case 2



Test Observation

Test case structure

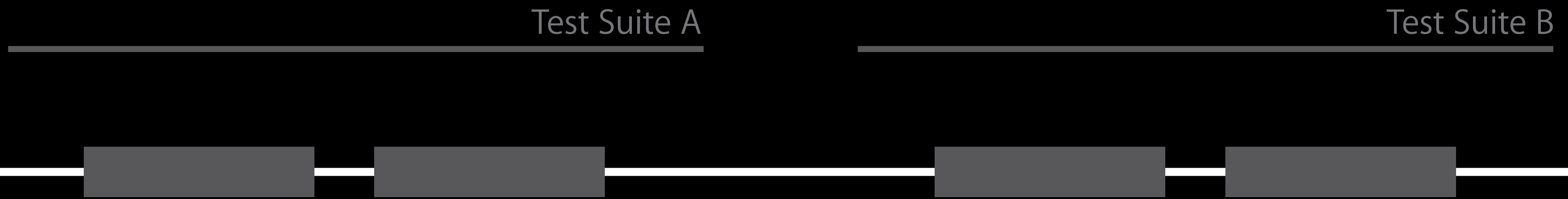
Test Suite A



The diagram illustrates a test suite structure. A horizontal line represents the test suite, labeled "Test Suite A". Below this line, two rectangular blocks represent individual test cases, connected by a small gap. The blocks are positioned below the main line, indicating they are part of the suite.

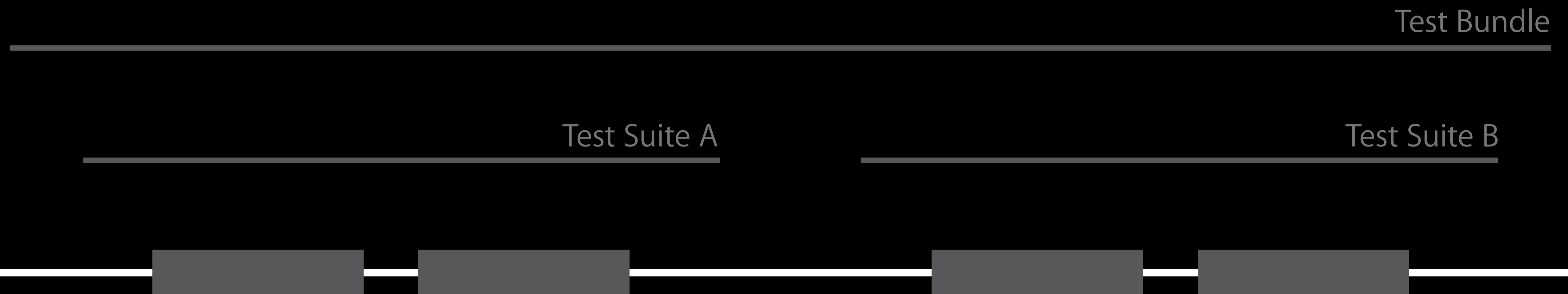
Test Observation

Test case structure



Test Observation

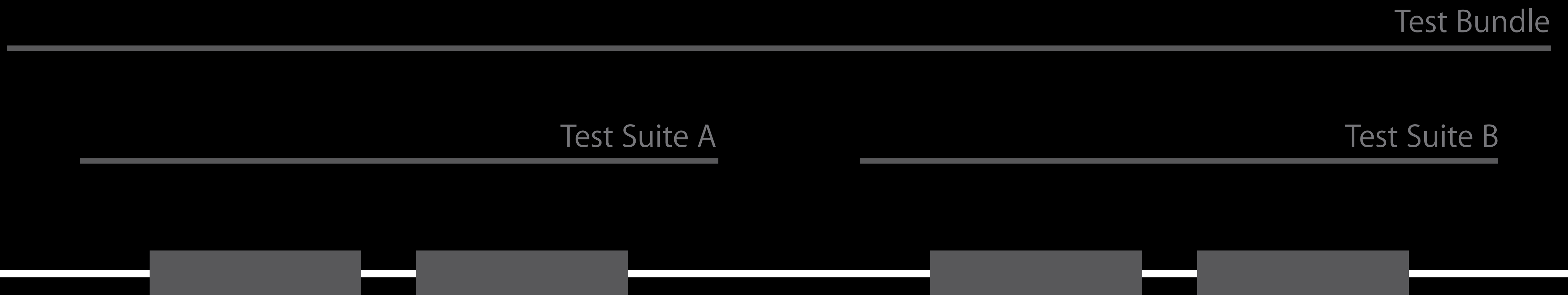
Test case structure



Test Observation

Test case structure

Setup or tear down work

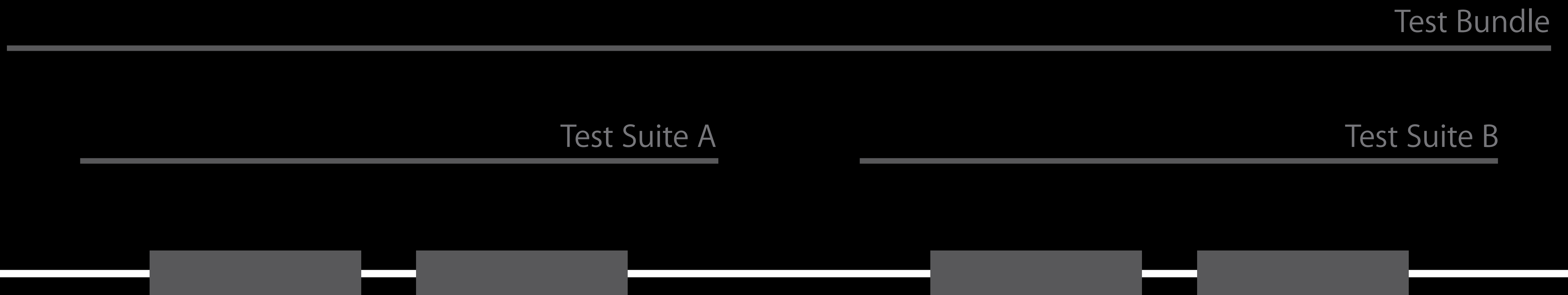


Test Observation

Test case structure

Setup or tear down work

Custom logging

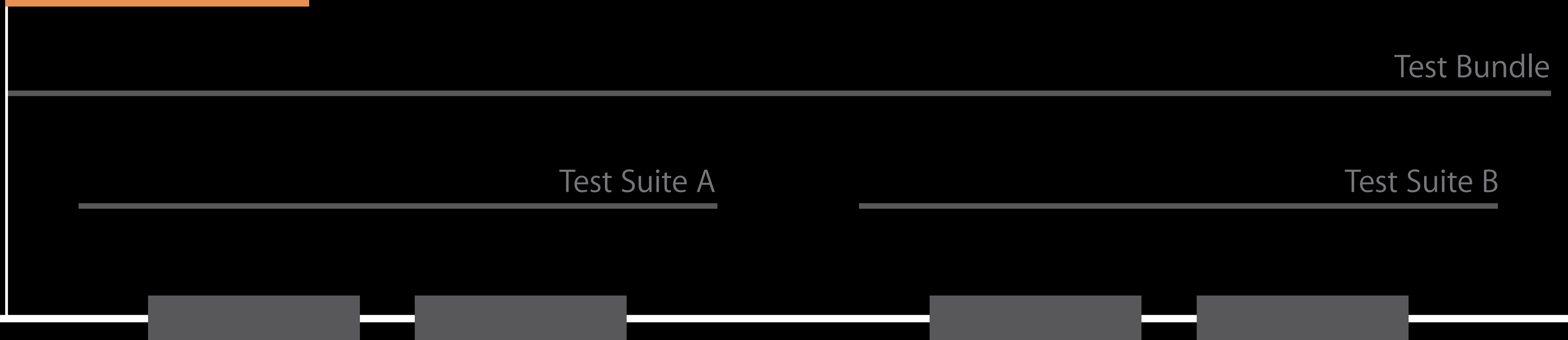


Test Observation

XCTestObservation Protocol

```
optional public func testBundleWillStart(_ testBundle: AnyObject!)
```

BUNDLE WILL START



Test Observation

XCTestObservation Protocol

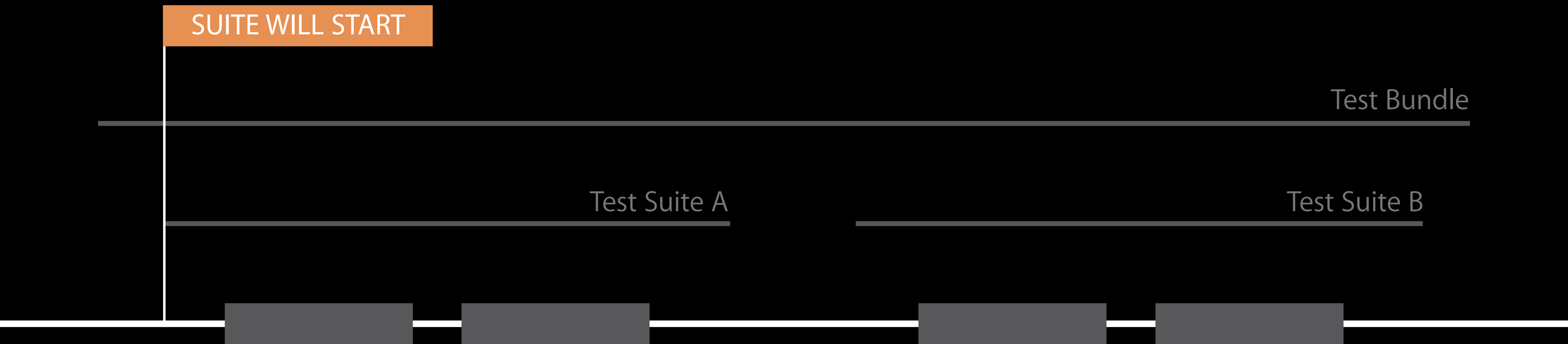
```
optional public func testSuiteWillStart(_ testSuite: AnyObject!)
```

SUITE WILL START

Test Bundle

Test Suite A

Test Suite B



Test Observation

XCTestObservation Protocol

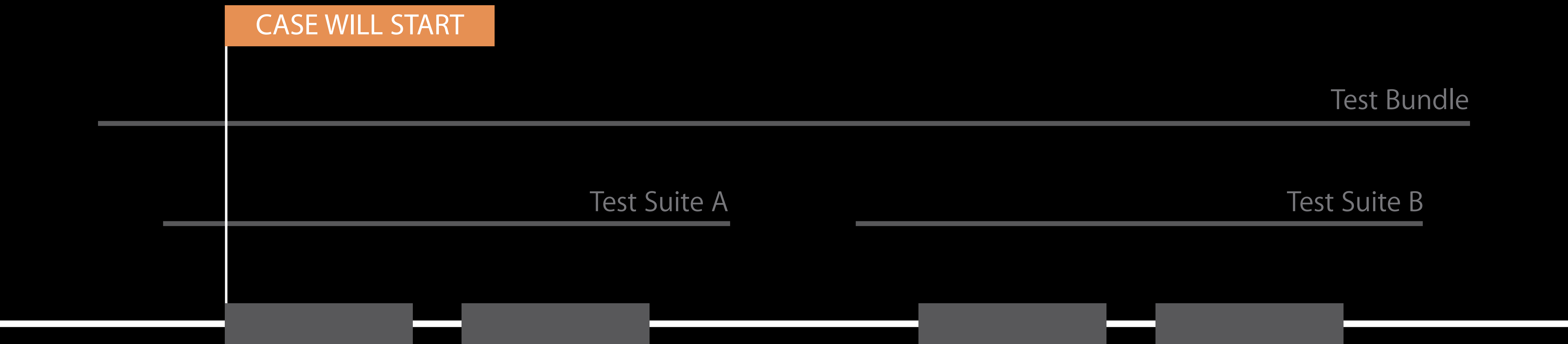
```
optional public func testCaseWillStart(_ testCase: AnyObject!)
```

CASE WILL START

Test Bundle

Test Suite A

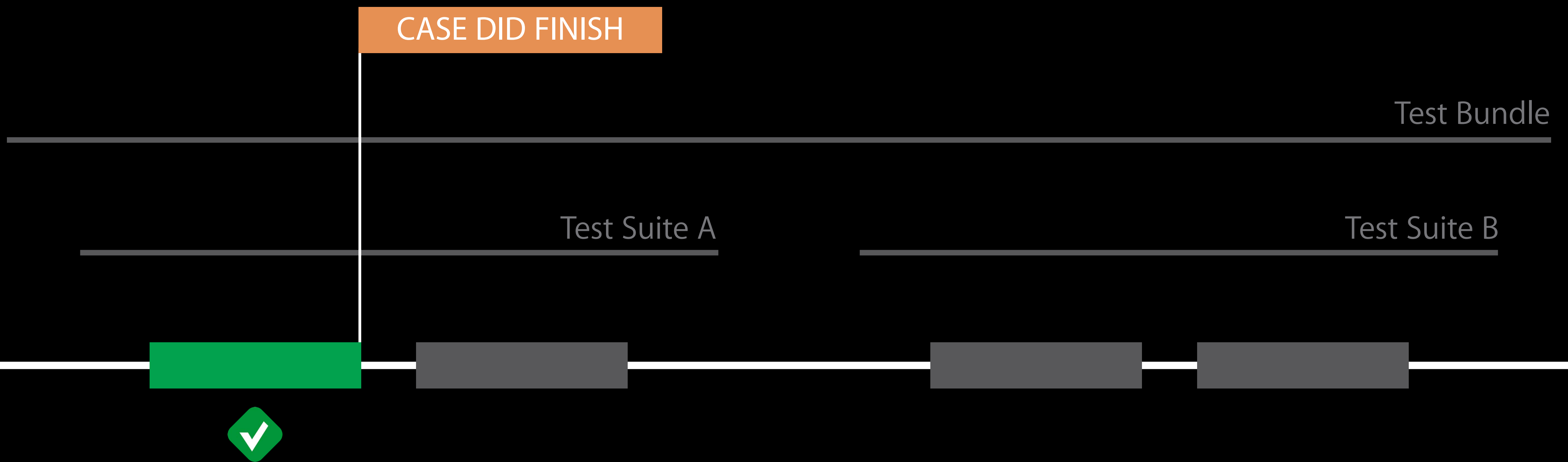
Test Suite B



Test Observation

XCTestObservation Protocol

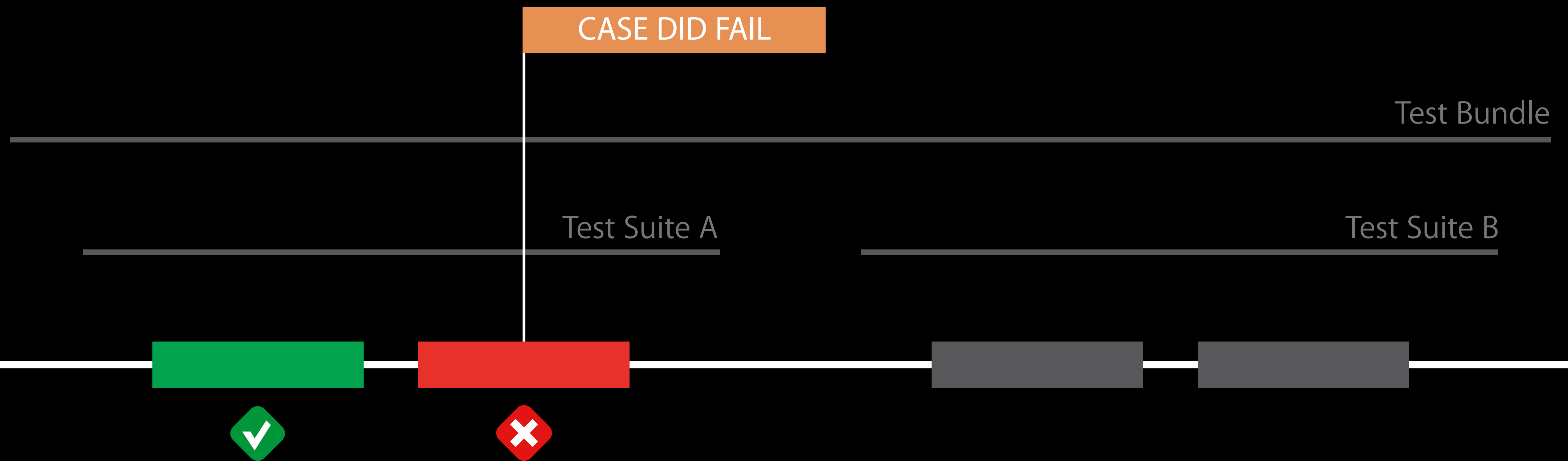
```
optional public func testCaseDidFinish(_ testCase: AnyObject!)
```



Test Observation

XCTestObservation Protocol

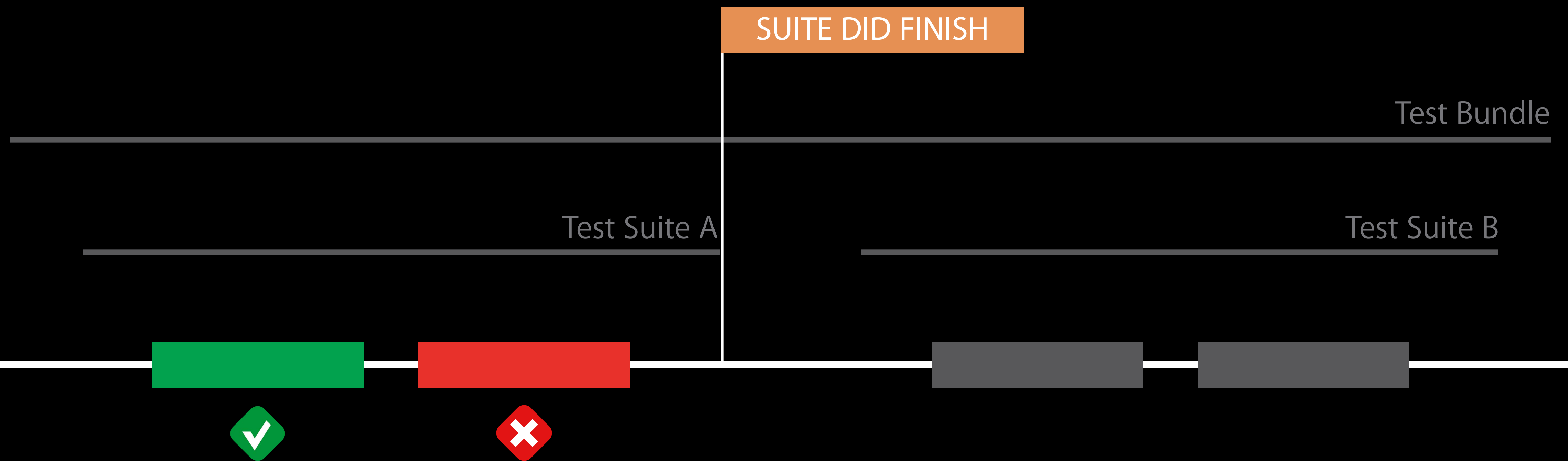
```
optional public func testCase(_ testCase: AnyObject!, didFailWithDescription  
    description: AnyObject!, inFile filePath: AnyObject!, atLine lineNumber: AnyObject!)
```



Test Observation

XCTestObservation Protocol

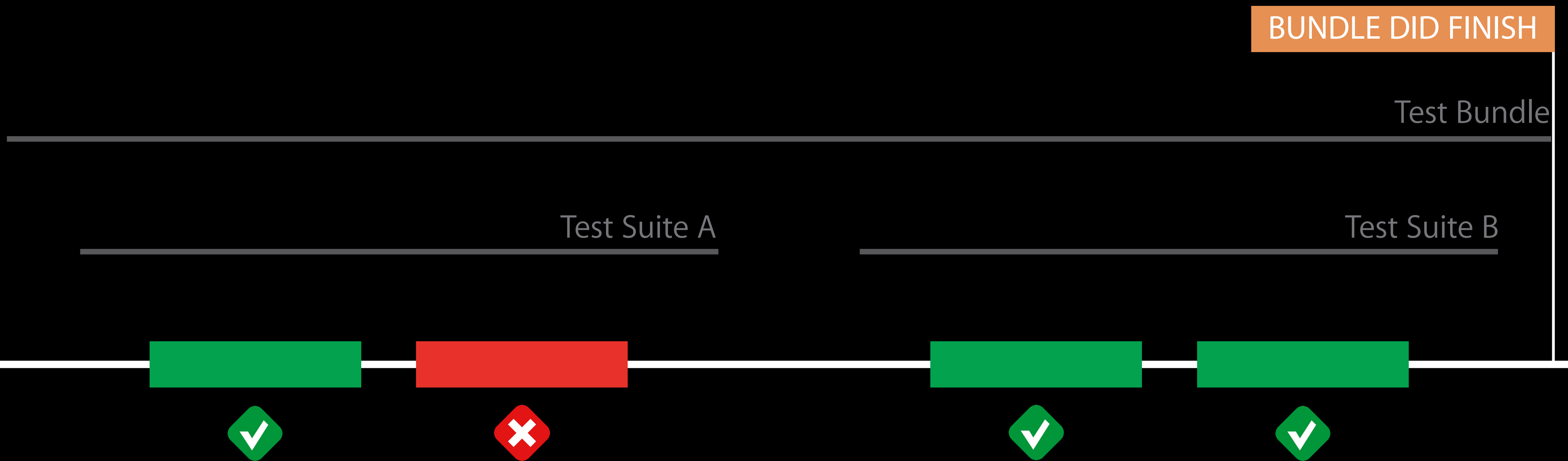
```
optional public func testSuiteDidFinish(_ testSuite: AnyObject!)
```



Test Observation

XCTestObservation Protocol

```
optional public func testBundleDidFinish(_ testBundle: AnyObject!)
```



```
// Test Observation  
// Example LoggingObserver
```

```
class LoggingObserver: NSObject, XCTestObservation {
```

```
}
```



```
// Test Observation
// Example LoggingObserver

class LoggingObserver: NSObject, XCTestObservation {

    override init() {
        super.init()
        let sharedCenter = XCTestObservationCenter.shared()
        sharedCenter.addTestObserver(self)
    }
}
```

```
}
```

```
// Test Observation
// Example LoggingObserver

class LoggingObserver: NSObject, XCTestObservation {

    override init() {
        super.init()
        let sharedCenter = XCTestObservationCenter.shared()
        sharedCenter.addTestObserver(self)
    }

    internal func testBundleWillStart(_ testBundle: Bundle) {
        print("Lights down, show is about to start")
    }

}
```

```
// Test Observation
// Example LoggingObserver

class LoggingObserver: NSObject, XCTestObservation {

    override init() {
        super.init()
        let sharedCenter = XCTestObservationCenter.shared()
        sharedCenter.addTestObserver(self)
    }

    internal func testBundleWillStart(_ testBundle: Bundle) {
        print("Lights down, show is about to start")
    }

    internal func testCase(_ testCase: AnyObject!, didFailWithDescription
        description: AnyObject!, inFile filePath: AnyObject!, atLine lineNumber: AnyObject!)
        print("That sounds off key...")
    }

}
```

```
// Test Observation
// Example LoggingObserver

class LoggingObserver: NSObject, XCTestObservation {

    override init() {
        super.init()
        let sharedCenter = XCTestObservationCenter.shared()
        sharedCenter.addTestObserver(self)
    }

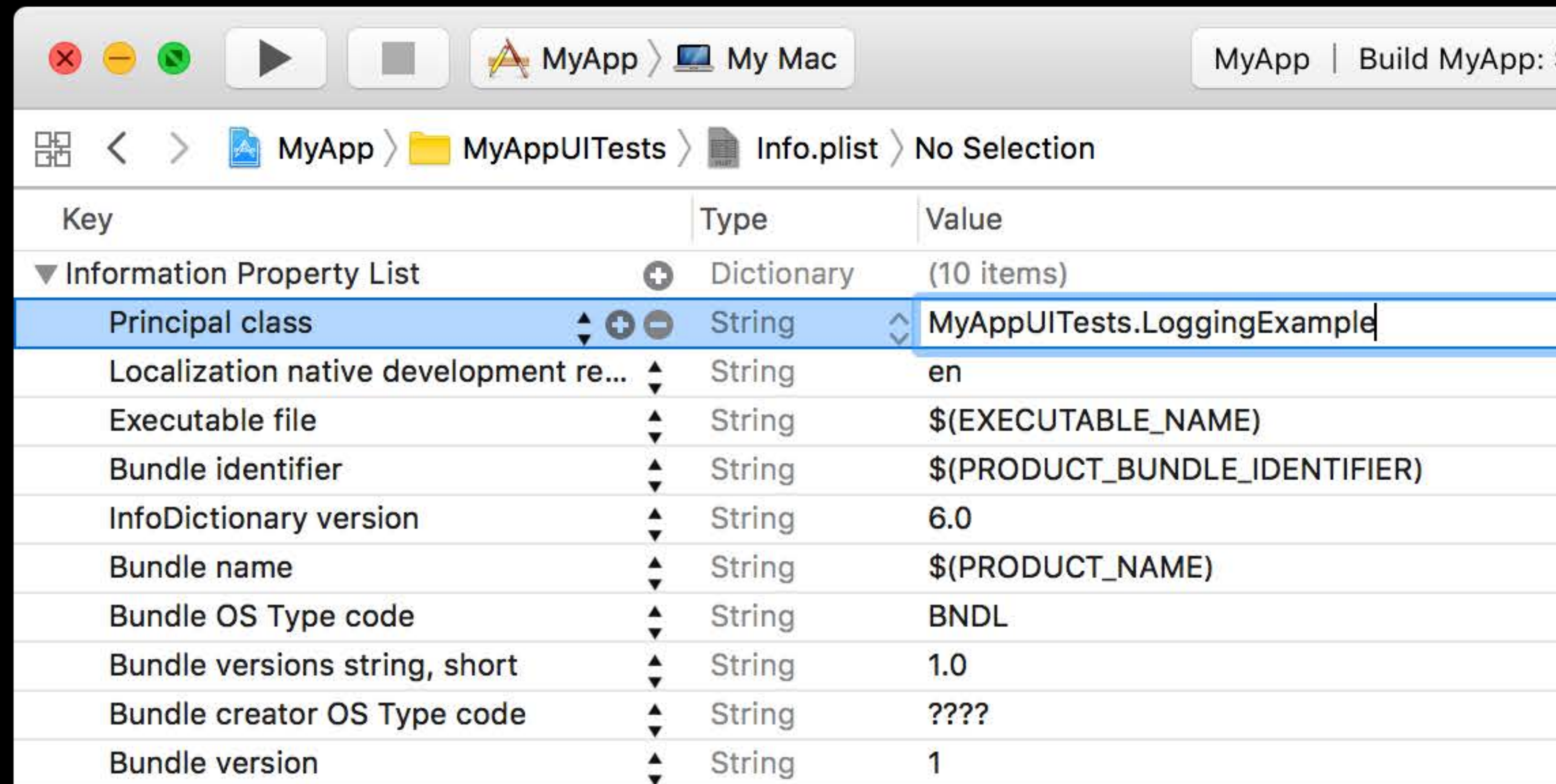
    internal func testBundleWillStart(_ testBundle: Bundle) {
        print("Lights down, show is about to start")
    }

    internal func testCase(_ testCase: AnyObject!, didFailWithDescription
        description: AnyObject!, inFile filePath: AnyObject!, atLine lineNumber: AnyObject!)
        print("That sounds off key...")
    }

    internal func testBundleDidFinish(_ testBundle: Bundle) {
        print("Lights up, don't forget your coat!")
    }
}
```


Test Observation

Use NSPrincipalClass



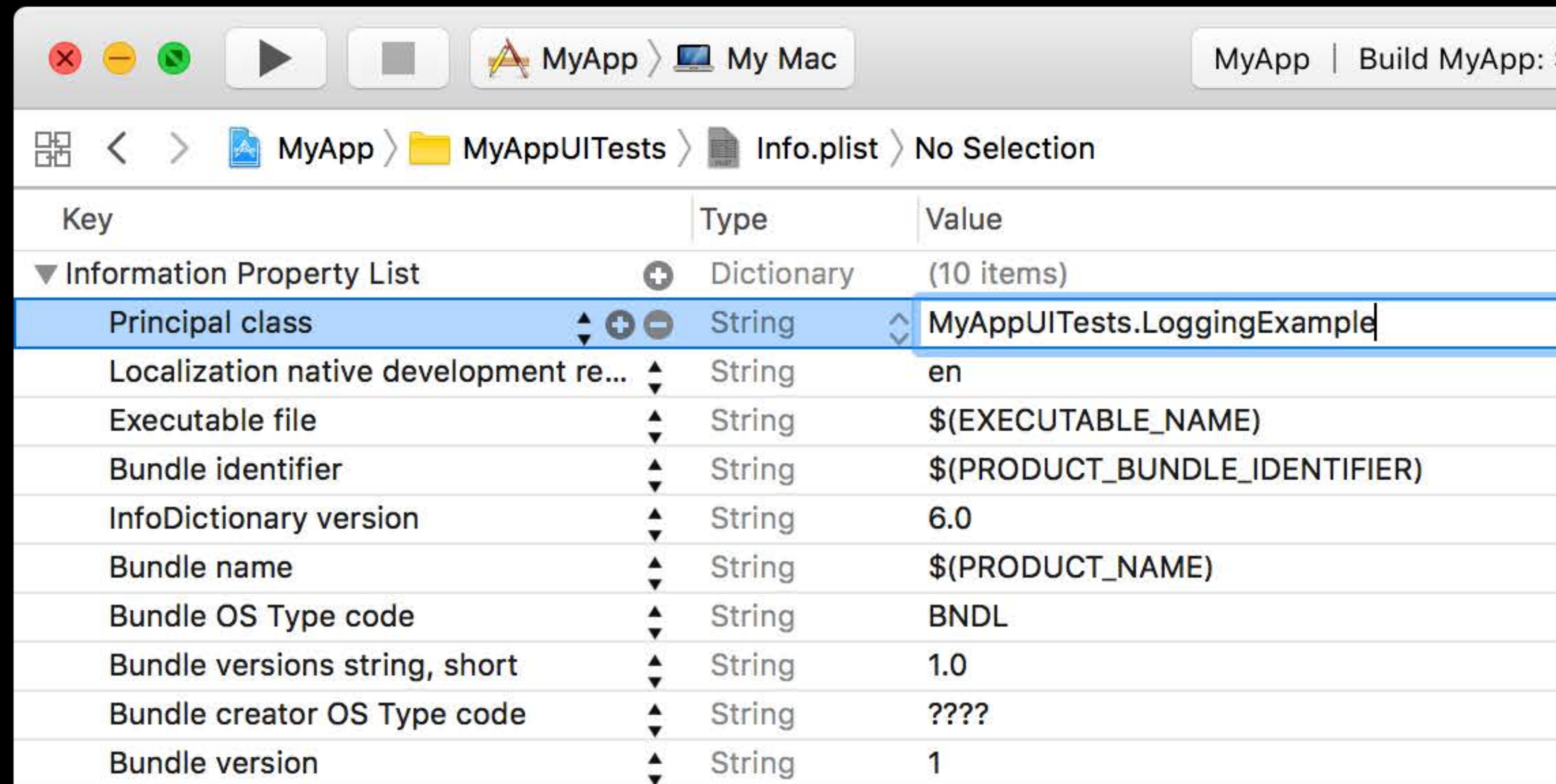
The screenshot shows the Xcode interface with the Info.plist file open in the 'MyAppUITests' folder. The 'Principal class' key is highlighted, and its value is 'MyAppUITests.LoggingExample'. The table below lists the contents of the InfoDictionary.

| Key | Type | Value |
|---------------------------------------|------------|-------------------------------|
| Information Property List | Dictionary | (10 items) |
| Principal class | String | MyAppUITests.LoggingExample |
| Localization native development re... | String | en |
| Executable file | String | \$(EXECUTABLE_NAME) |
| Bundle identifier | String | \$(PRODUCT_BUNDLE_IDENTIFIER) |
| InfoDictionary version | String | 6.0 |
| Bundle name | String | \$(PRODUCT_NAME) |
| Bundle OS Type code | String | BNDL |
| Bundle versions string, short | String | 1.0 |
| Bundle creator OS Type code | String | ???? |
| Bundle version | String | 1 |

Test Observation

Use NSPrincipalClass

Test Bundle Info.plist



The screenshot shows the Xcode interface with the Info.plist file open in the 'MyAppUITests' bundle. The 'Information Property List' is expanded, and the 'Principal class' property is selected. The value is set to 'MyAppUITests.LoggingExample'.

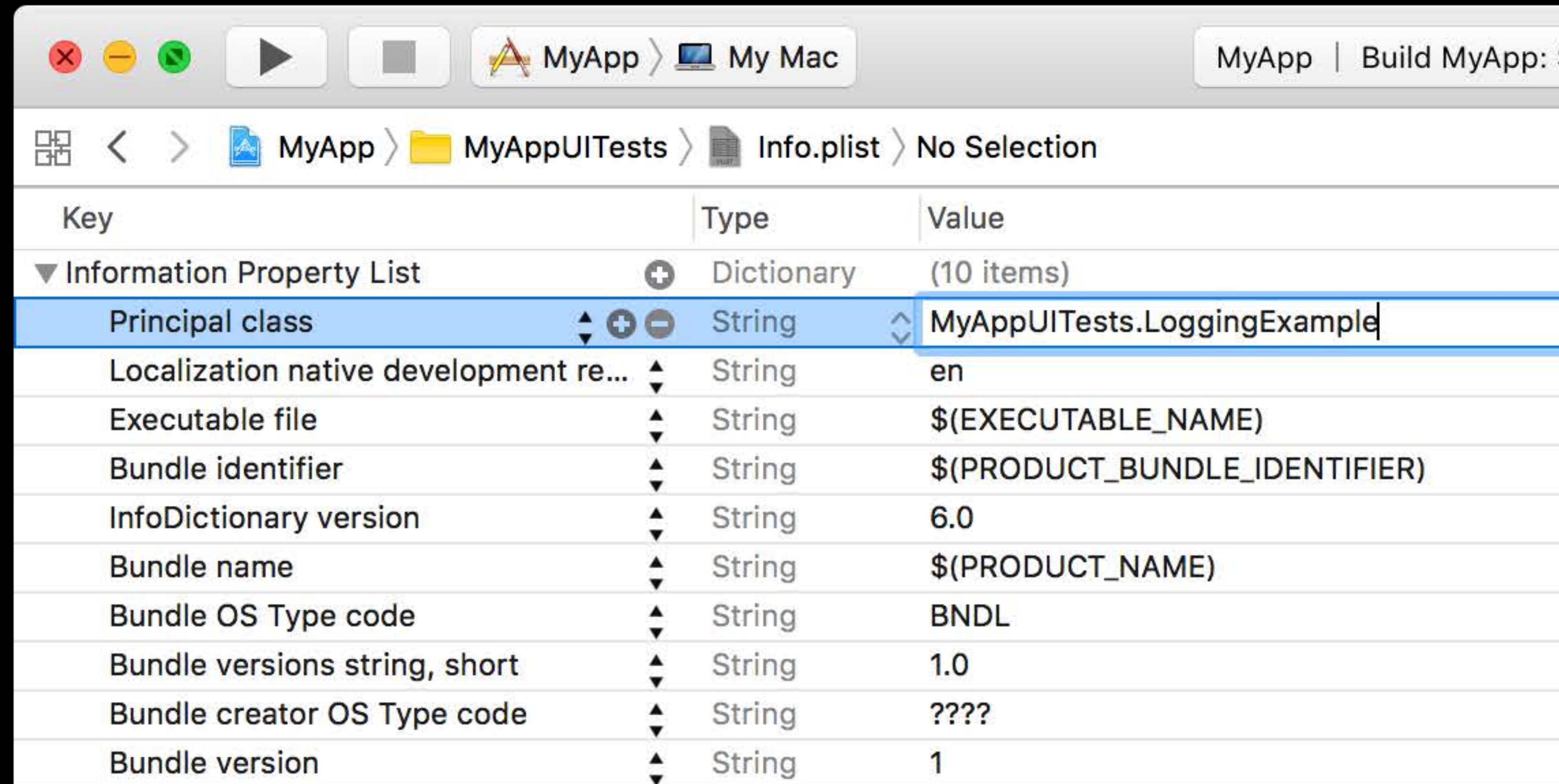
| Key | Type | Value |
|---------------------------------------|------------|-------------------------------|
| Information Property List | Dictionary | (10 items) |
| Principal class | String | MyAppUITests.LoggingExample |
| Localization native development re... | String | en |
| Executable file | String | \$(EXECUTABLE_NAME) |
| Bundle identifier | String | \$(PRODUCT_BUNDLE_IDENTIFIER) |
| InfoDictionary version | String | 6.0 |
| Bundle name | String | \$(PRODUCT_NAME) |
| Bundle OS Type code | String | BNDL |
| Bundle versions string, short | String | 1.0 |
| Bundle creator OS Type code | String | ???? |
| Bundle version | String | 1 |

Test Observation

Use NSPrincipalClass

Test Bundle Info.plist

Test specific instantiation



The screenshot shows the Xcode interface with the Info.plist file for the MyAppUITests target. The 'Principal class' key is highlighted, and its value is set to 'MyAppUITests.LoggingExample'. The table below represents the data shown in the screenshot.

| Key | Type | Value |
|---------------------------------------|------------|-------------------------------|
| Information Property List | Dictionary | (10 items) |
| Principal class | String | MyAppUITests.LoggingExample |
| Localization native development re... | String | en |
| Executable file | String | \$(EXECUTABLE_NAME) |
| Bundle identifier | String | \$(PRODUCT_BUNDLE_IDENTIFIER) |
| InfoDictionary version | String | 6.0 |
| Bundle name | String | \$(PRODUCT_NAME) |
| Bundle OS Type code | String | BNDL |
| Bundle versions string, short | String | 1.0 |
| Bundle creator OS Type code | String | ???? |
| Bundle version | String | 1 |

Testing Concepts

Summary



Crash Log Gathering

Crash Log Gathering

Crashes during testing

Crash Log Gathering

Crashes during testing



Crash Log Gathering

Crashes during testing

Test host or target application may crash



Crash Log Gathering

Crashes during testing

Test host or target application may crash

Xcode completes test suite



Crash Log Gathering

Crashes during testing

Test host or target application may crash

Xcode completes test suite

But how to resolve the crash?



Crash Log Gathering

Improved test reports

NEW



Crash Log Gathering

Improved test reports

NEW



Crash Log Gathering

Improved test reports

For Unit and UI tests

NEW



Crash Log Gathering

Improved test reports

For Unit and UI tests

Local and Xcode Server crash logs

NEW



Crash Log Gathering

Improved test reports

NEW

For Unit and UI tests

Local and Xcode Server crash logs

Logs included in test report



Crash Log Gathering

Improved test reports

NEW

For Unit and UI tests

Local and Xcode Server crash logs

Logs included in test report

View crashes in Xcode's Debug Navigator

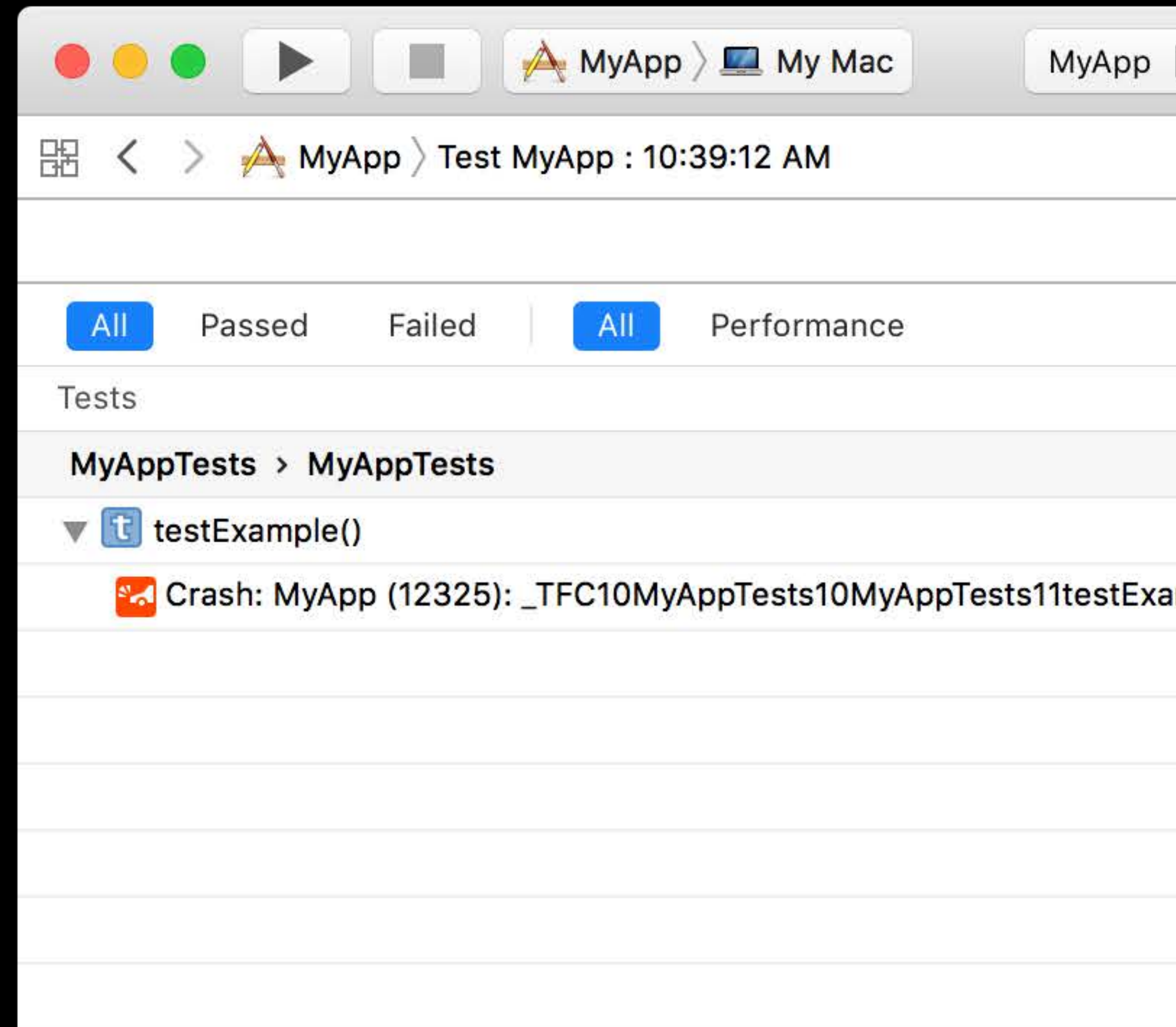


Demo

Crash Log Gathering

Crash Log Gathering

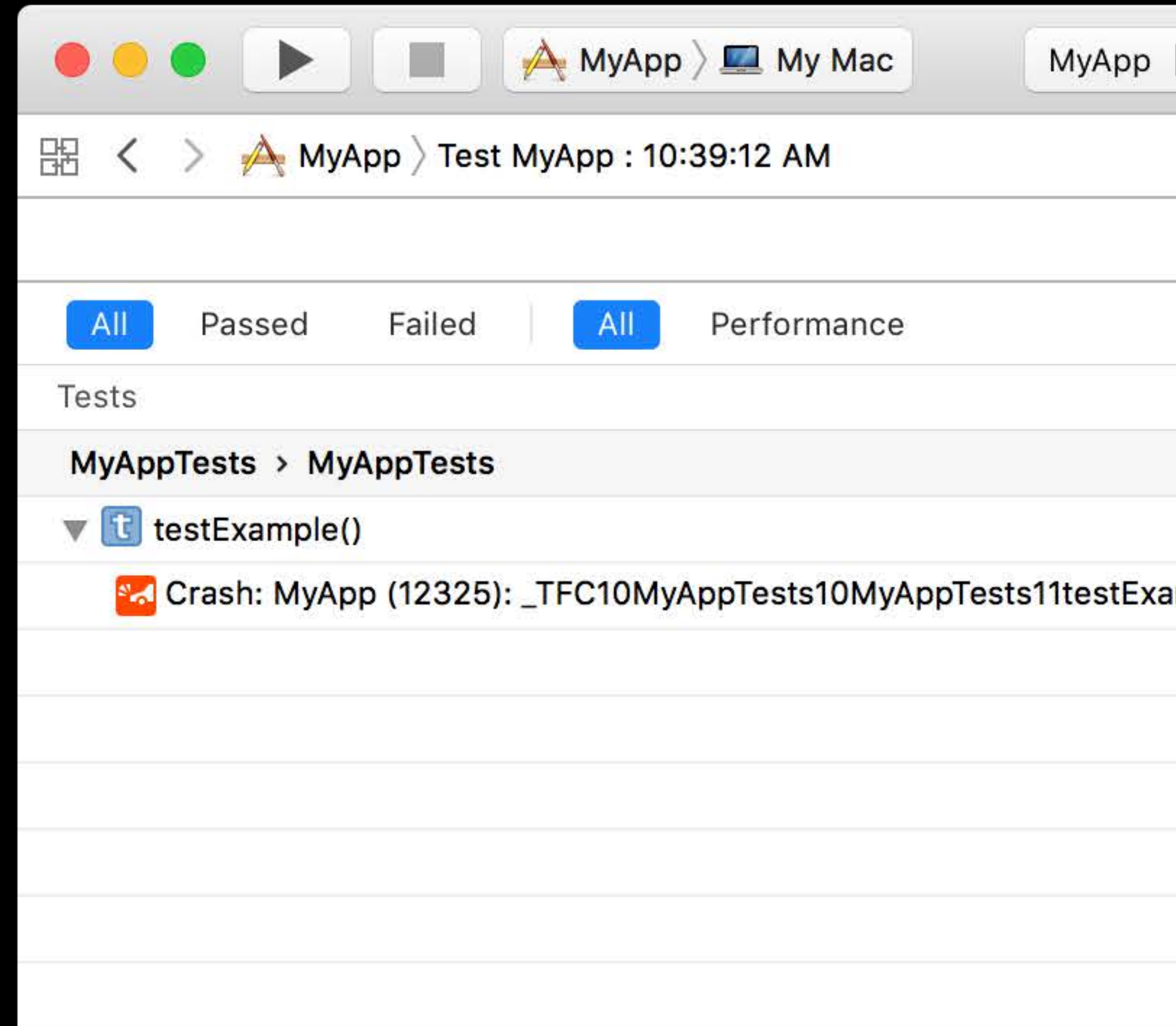
Improved test reports



Crash Log Gathering

Improved test reports

Crash logs gathered in test reports

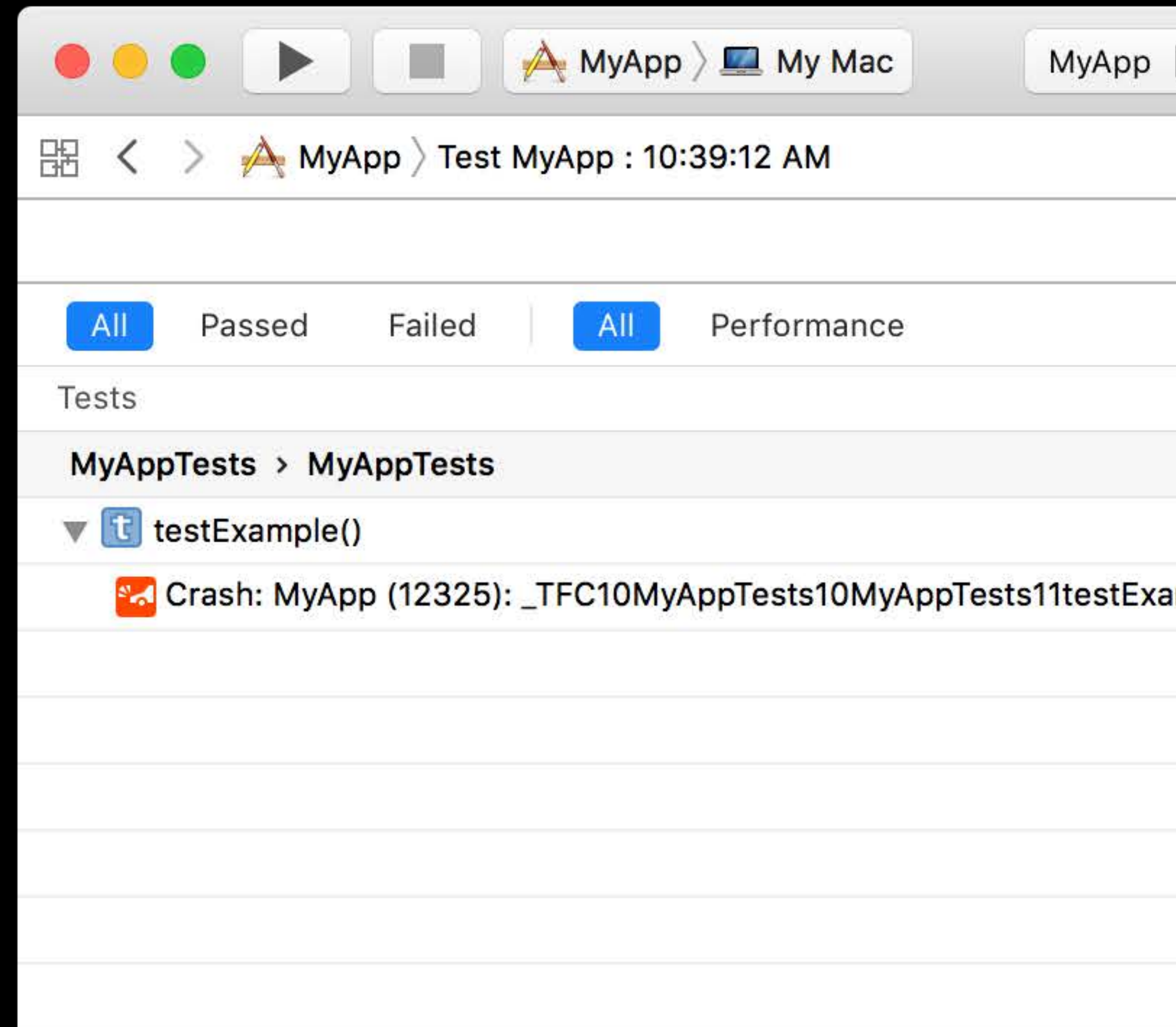


Crash Log Gathering

Improved test reports

Crash logs gathered in test reports

View crashes in Xcode's Debug Navigator



Xcode Server

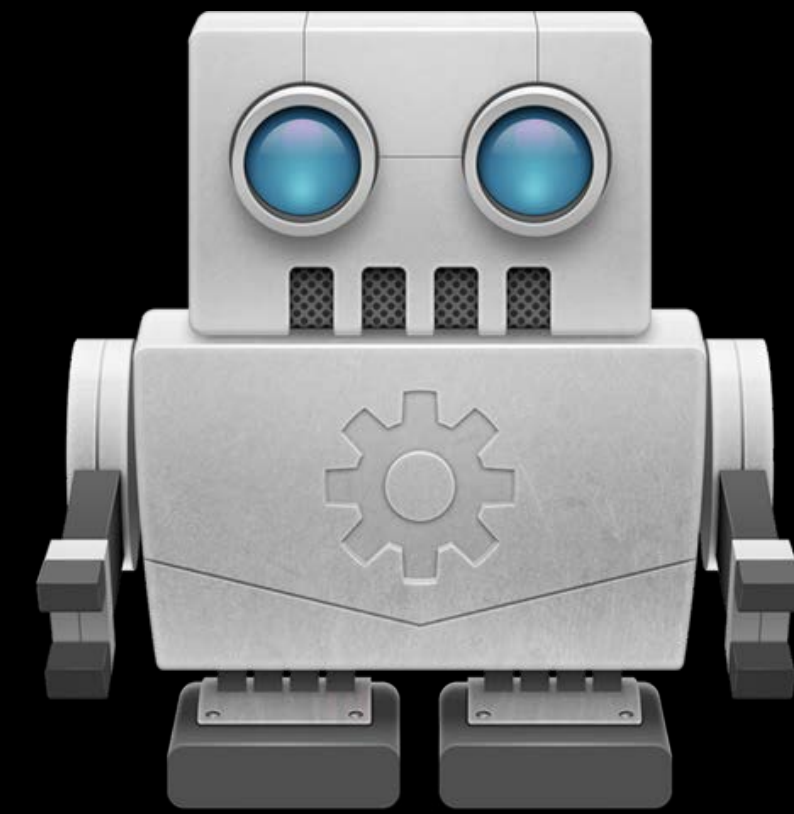
Continuous Integration in Xcode

Eric Dudiak

Xcode Engineer

Xcode Server

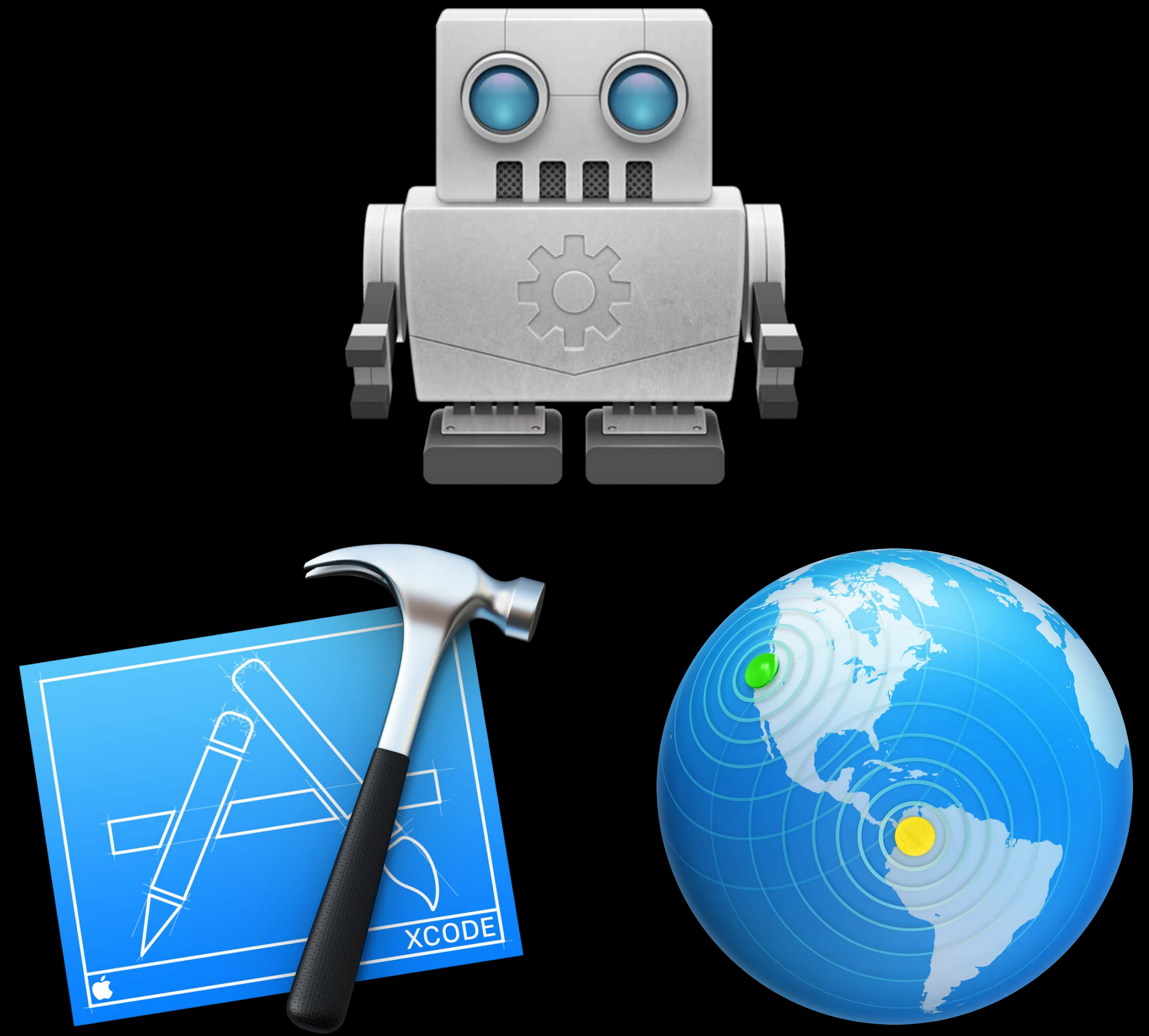
Overview



Xcode Server

Overview

Custom environment variables

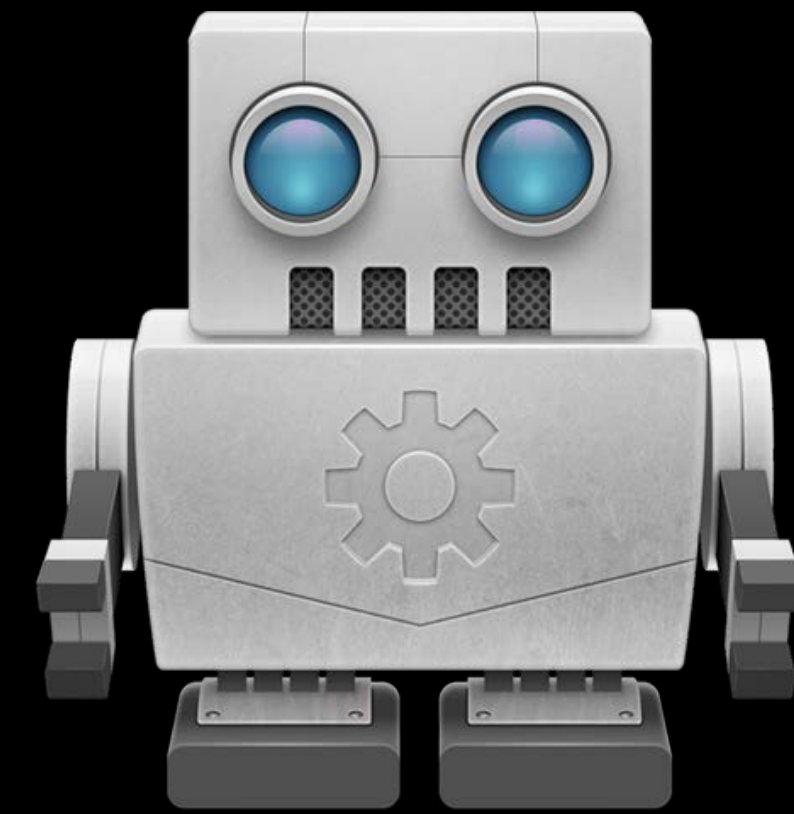


Xcode Server

Overview

Custom environment variables

Advanced trigger editing



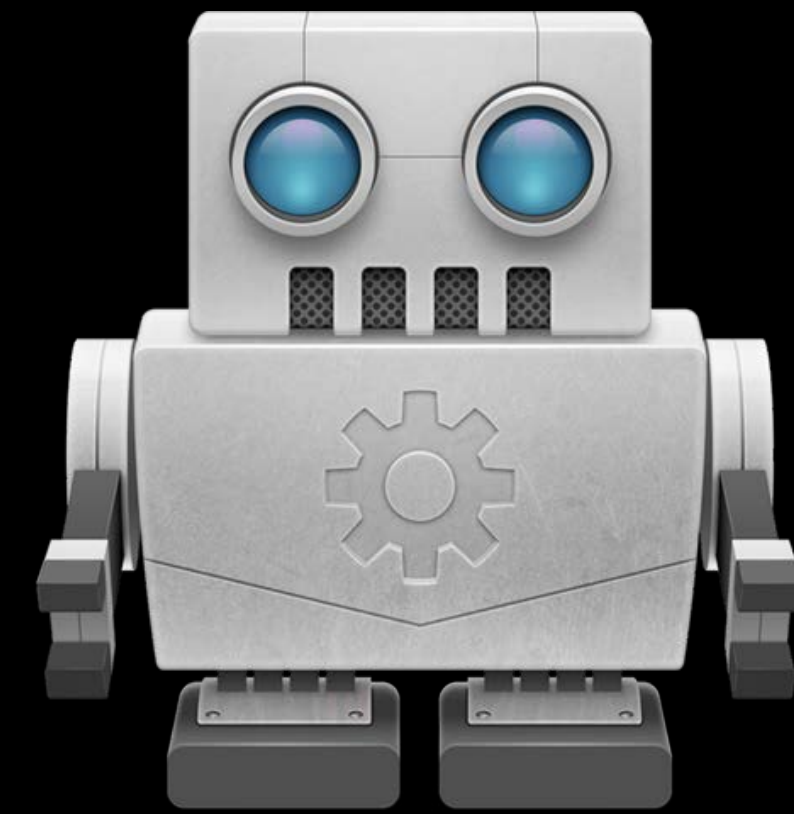
Xcode Server

Overview

Custom environment variables

Advanced trigger editing

Issue tracking and blame



Xcode Server

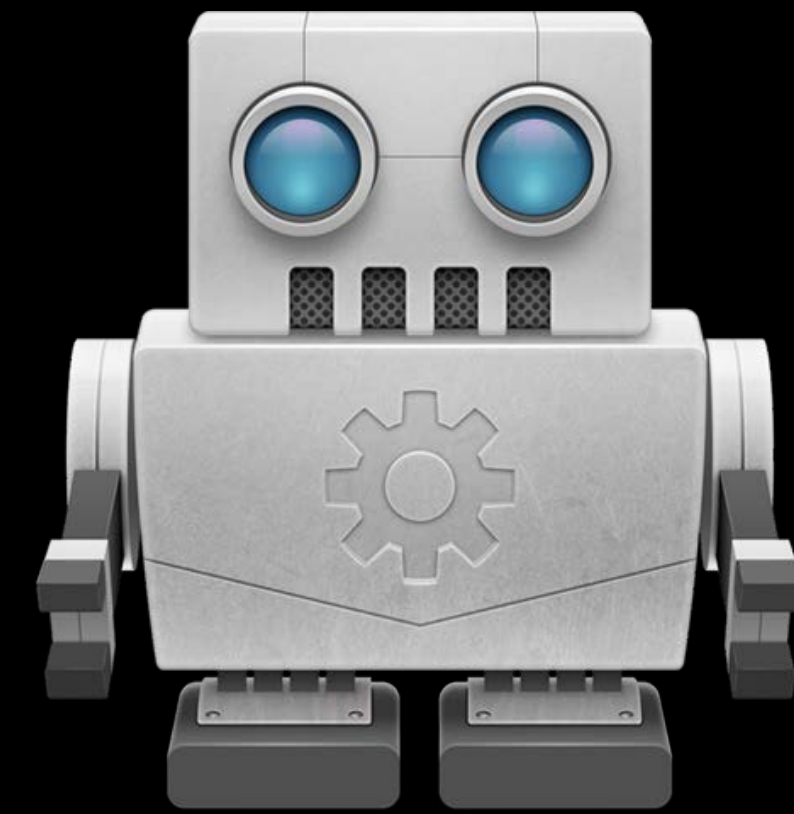
Overview

Custom environment variables

Advanced trigger editing

Issue tracking and blame

Upgrade integrations



Xcode Server

Overview

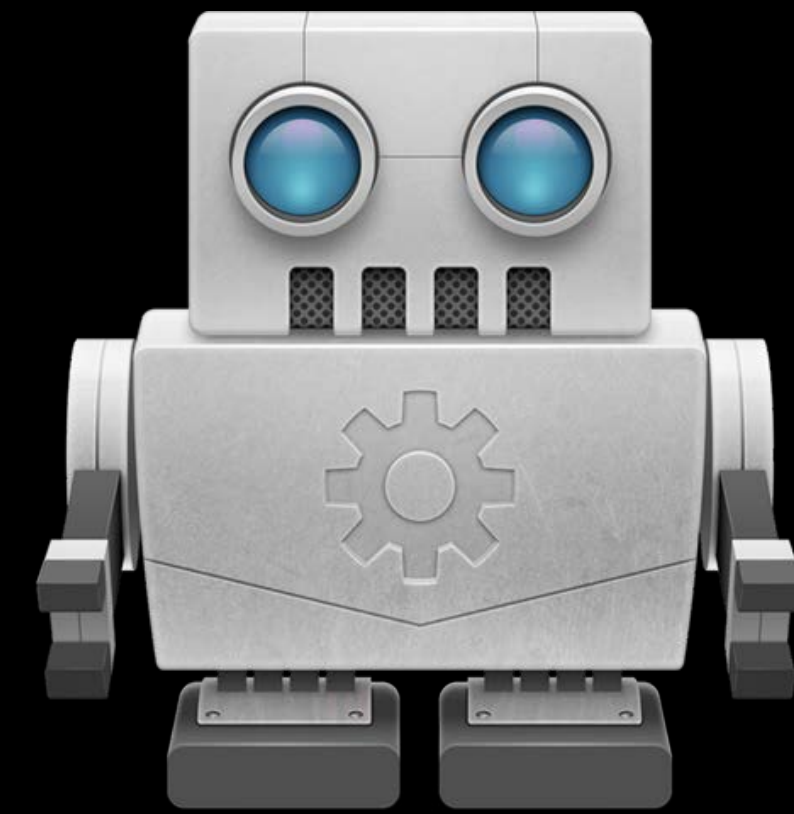
Custom environment variables

Advanced trigger editing

Issue tracking and blame

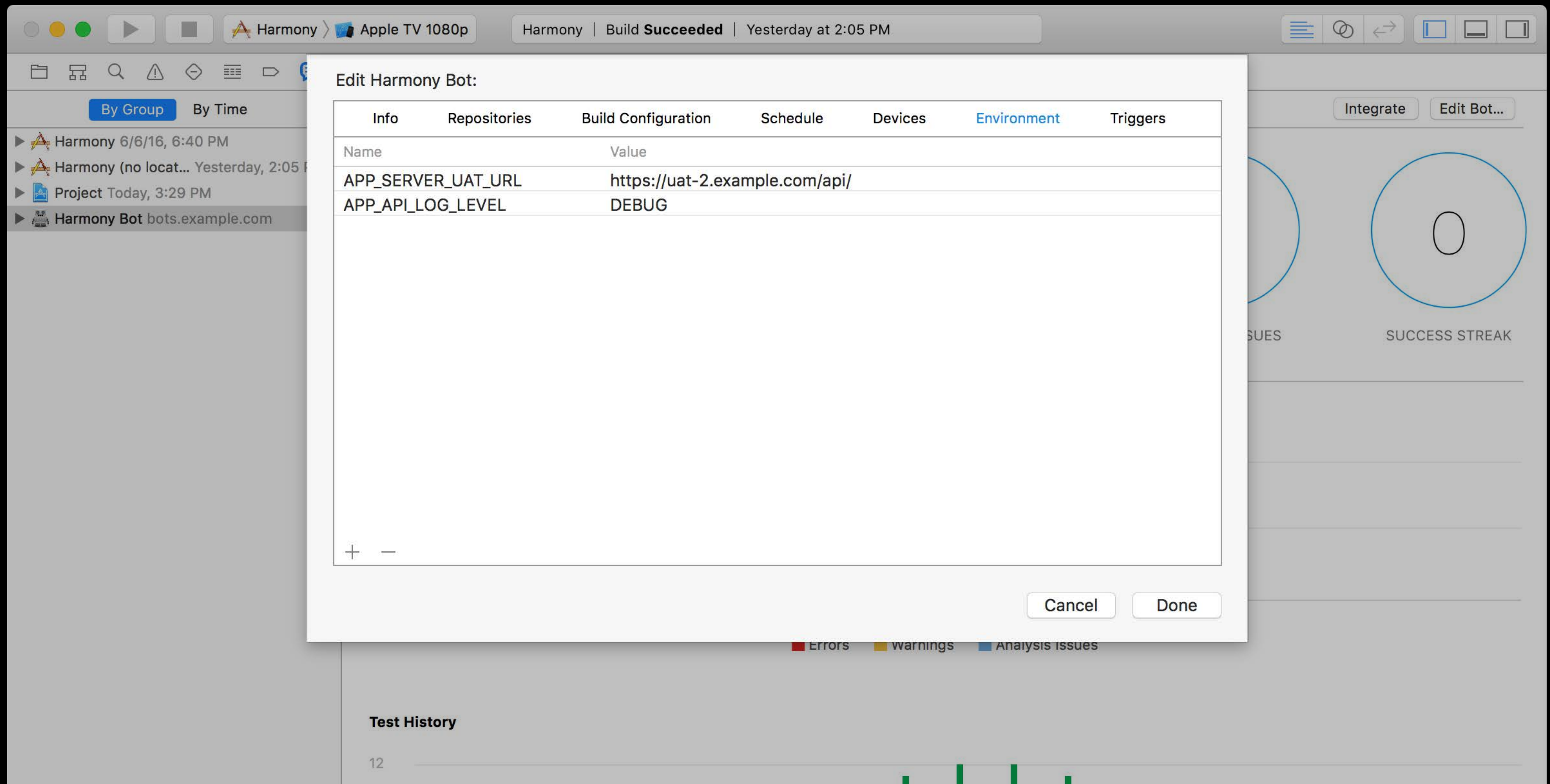
Upgrade integrations

Configurable integration user



Custom Environment Variables

New in Xcode 7.3



The screenshot shows the Xcode 7.3 interface with the 'Edit Harmony Bot' dialog open. The dialog has several tabs: Info, Repositories, Build Configuration, Schedule, Devices, Environment (selected), and Triggers. The Environment tab displays a table of custom environment variables.

| Name | Value |
|--------------------|--------------------------------|
| APP_SERVER_UAT_URL | https://uat-2.example.com/api/ |
| APP_API_LOG_LEVEL | DEBUG |

At the bottom of the dialog, there are '+', '-', 'Cancel', and 'Done' buttons. The background shows the 'Harmony Bot' configuration page with a 'SUCCESS STREAK' of 0 and a 'Test History' bar chart.

Advanced Triggers

Integration scripts

NEW

The screenshot shows the Harmony Bot configuration interface. The main window displays a list of bots on the left and a configuration panel on the right. The configuration panel has tabs for Info, Repositories, Build Configuration, Schedule, Devices, Environment, and Triggers. The 'Triggers' tab is active, showing a list of scripts:

- Pre-Integration Scripts**
 - Symlink framework
- Post-Integration Scripts**
 - Set beta icon
 - Post build result

The 'Build Configuration' tab is also visible, showing the following script:

```
1 #!/bin/sh
2
3 ditto "$XCS_PRODUCT" "/Volumes/WebDAV/Builds/$XCS_BOT_NAME-
  Build-$XCS_INTEGRATION_NUMBER"
```

The background interface includes a 'Test History' section with a bar chart showing 12 tests, and a 'SUCCESS STREAK' indicator showing 0. The top of the window shows the bot name 'Harmony Bot bots.example.com' and the status 'Build Succeeded'.

Advanced Triggers

Email notifications

NEW

The screenshot shows a web application interface with a modal dialog box titled "Edit Harmony Bot:". The dialog has several tabs: "Info", "Repositories", "Build Configuration", "Schedule", "Devices", "Environment", and "Triggers". The "Triggers" tab is active, showing the following configuration:

- Schedule:** Weekly on Friday at 17:00
- From:** server@bots.example.com
- Reply To:** myteam@example.com
- Cc:** managers@example.com
- To:** myteam@example.com
- Email committers (with a "Filter Recipients..." button)
- Include:**
 - Issues
 - Commits
 - Server information

The background interface shows a list of bots on the left, including "Harmony Bot bots.example.com". On the right, there are buttons for "Integrate" and "Edit Bot...", and a "SUCCESS STREAK" indicator. At the bottom, there is a "Test History" section with a bar chart and a legend for "Errors", "warnings", and "Analysis Issues".

Advanced Triggers

Email notifications

NEW

Harmony | Build **Succeeded** | Yesterday at 2:05 PM

Harmony Bot bots.example.com

By Group By Time

Harmony 6/6/16, 6:40 PM
Harmony (no locat... Yesterday, 2:05 PM
Project Today, 3:29 PM
Harmony Bot bots.example.com

Edit Harmony Bot:

- Info
- Repositories
- Build Configuration
- Schedule
- Devices
- Environment
- Triggers

Post-Integration Scripts

- Set beta icon

Email Notifications

- New issue email
- Weekly report**

Schedule: Weekly on Friday at 17:00

From: server@bots.example.com

Reply To: myteam@example.com

Cc: managers@example.com

To: myteam@example.com

Email committers Filter Recipients...

Include: Issues
 Commits
 Server information

Cancel Done

Errors warnings Analysis Issues

Test History

12

ISSUES SUCCESS STREAK

Advanced Triggers

Email notifications

NEW

The screenshot shows the 'Edit Harmony Bot' dialog box with the 'Triggers' tab selected. The 'Schedule' is set to 'Weekly' on 'Friday' at '17:00'. The 'Email Notifications' section is expanded, showing 'Weekly report' selected. A modal window is open for configuring the email notification, with the following fields:

- From: server@bots.example.com
- Reply To: myteam@example.com
- Cc: managers@example.com
- To: myteam@example.com

Below the modal, there are checkboxes for 'Email committers' (checked), 'Include: Issues' (checked), 'Commits' (checked), and 'Server information' (checked). A 'Filter Recipients...' button is also visible. The background shows the 'Harmony Bot' configuration interface with a 'Test History' chart at the bottom.

Advanced Triggers

Email notifications

NEW

The screenshot shows a web application interface with a modal dialog box titled "Edit Harmony Bot:". The dialog has several tabs: "Info", "Repositories", "Build Configuration", "Schedule", "Devices", "Environment", and "Triggers". The "Triggers" tab is active, showing the "Email Notifications" section. Under "Email Notifications", the "New issue email" trigger is selected. The configuration for this trigger includes:

- From:** server@bots.example.com
- Reply To:** myteam@bots.example.com
- Cc:** myteam@example.com, managers@example.com
- To:** Committers who have introduced issues (with a "Filter Recipients..." button)
- Include:** Server information, Logs
- Notify On:** Build errors, Build warnings, Static analysis issues

At the bottom of the dialog are "Cancel" and "Done" buttons. Below the dialog, a "Test History" section is partially visible, showing a bar chart with a legend for "Errors" (red), "warnings" (yellow), and "Analysis Issues" (blue). The number "12" is visible in the Test History section.

Advanced Triggers

Email notifications

NEW

The screenshot displays the 'Edit Harmony Bot' configuration interface. The 'Email Notifications' section is active, showing options for 'New issue email' and 'Weekly report'. The 'Include' section has checkboxes for 'Server information', 'Logs', 'Build errors', 'Build warnings', and 'Static analysis issues', all of which are checked. The 'Notify On' section also has checkboxes for 'Build errors', 'Build warnings', and 'Static analysis issues', all checked. A circular callout highlights a dropdown menu with the text 'Filter Recipients...' and a selection of 'myteam@example.com'. The background shows a 'Build Succeeded' notification for 'Harmony' at 'Yesterday at 2:05 PM' and a 'Test History' chart with a value of 12.

Advanced Triggers

Email notifications

NEW

Harmony | Build **Succeeded** | Yesterday at 2:05 PM

By Group By Time

- Harmony 6/6/16, 6:40 PM
- Harmony (no locat... Yesterday, 2:05 PM
- Project Today, 3:29 PM
- Harmony Bot bots.example.com

Edit Harmony Bot

Triggers

Integrate Edit Bot...

Choose repositories for which emails will be sent:

- https://gitbucket.example.com/scm/Harmony.git
- https://gitbucket.example.com/scm/EXFramework.git

Enter domain names for which emails will be sent:

groups.example.com

Cancel OK

Notify On:

- Build errors
- Build warnings
- Static analysis issues

Cancel Done

Errors warnings Analysis Issues

Test History

12

SUCCESS STREAK

Issue Tracking and Blame

We all have issues

Issue Tracking and Blame

We all have issues

Nobody is perfect



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up
- Xcode will blame you



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up
- Xcode will blame you

Even if you are perfect



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up
- Xcode will blame you

Even if you are perfect

- SDKs change



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up
- Xcode will blame you

Even if you are perfect

- SDKs change
- Language improvements



Issue Tracking and Blame

We all have issues

Nobody is perfect

- Tests will fail
- Errors will come up
- Xcode will blame you

Even if you are perfect

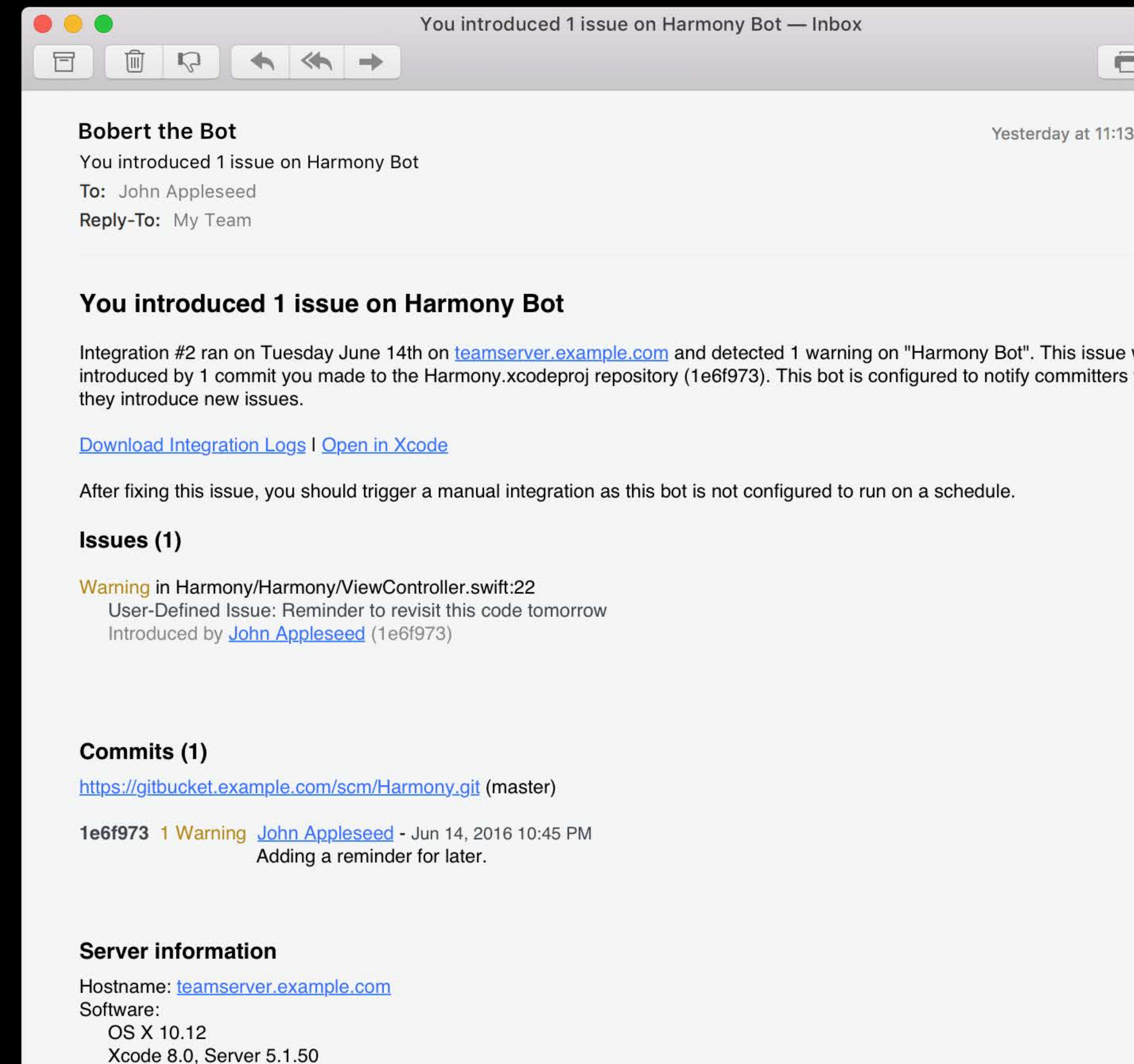
- SDKs change
- Language improvements
- Smarter tools



Issue Tracking and Blame

Identifying issue owners

NEW



The screenshot shows an email notification window titled "You introduced 1 issue on Harmony Bot — Inbox". The sender is "Bobert the Bot" and the recipient is "John Appleseed". The email content includes a summary of the issue, a list of integration logs, a section for the specific warning, a list of commits, and server information.

Bobert the Bot Yesterday at 11:13
You introduced 1 issue on Harmony Bot
To: John Appleseed
Reply-To: My Team

You introduced 1 issue on Harmony Bot

Integration #2 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". This issue was introduced by 1 commit you made to the Harmony.xcodeproj repository (1e6f973). This bot is configured to notify committers when they introduce new issues.

[Download Integration Logs](#) | [Open in Xcode](#)

After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.

Issues (1)

Warning in Harmony/Harmony/ViewController.swift:22
User-Defined Issue: Reminder to revisit this code tomorrow
Introduced by [John Appleseed](#) (1e6f973)

Commits (1)

<https://gitbucket.example.com/scm/Harmony.git> (master)

1e6f973 **1 Warning** [John Appleseed](#) - Jun 14, 2016 10:45 PM
Adding a reminder for later.

Server information

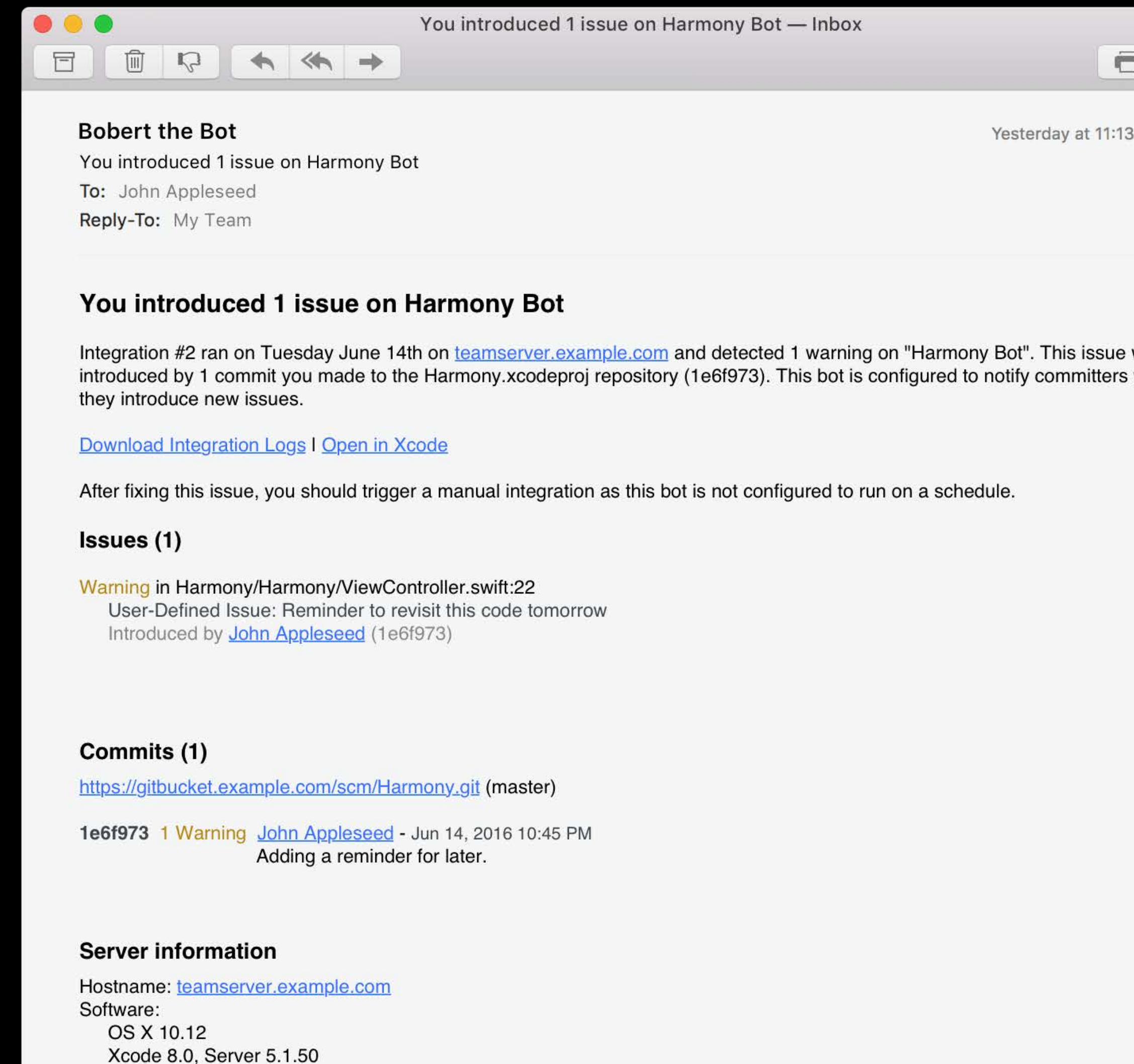
Hostname: teamserver.example.com
Software:
OS X 10.12
Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

Identifying issue owners

Lets you know when it's time to act

NEW



The screenshot shows an email interface with a title bar that reads "You introduced 1 issue on Harmony Bot — Inbox". The email content is as follows:

Robert the Bot Yesterday at 11:13
You introduced 1 issue on Harmony Bot
To: John Appleseed
Reply-To: My Team

You introduced 1 issue on Harmony Bot

Integration #2 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". This issue was introduced by 1 commit you made to the Harmony.xcodeproj repository (1e6f973). This bot is configured to notify committers when they introduce new issues.

[Download Integration Logs](#) | [Open in Xcode](#)

After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.

Issues (1)

Warning in Harmony/Harmony/ViewController.swift:22
User-Defined Issue: Reminder to revisit this code tomorrow
Introduced by [John Appleseed](#) (1e6f973)

Commits (1)

<https://gitbucket.example.com/scm/Harmony.git> (master)

1e6f973 1 Warning [John Appleseed](#) - Jun 14, 2016 10:45 PM
Adding a reminder for later.

Server information

Hostname: teamserver.example.com
Software:
OS X 10.12
Xcode 8.0, Server 5.1.50

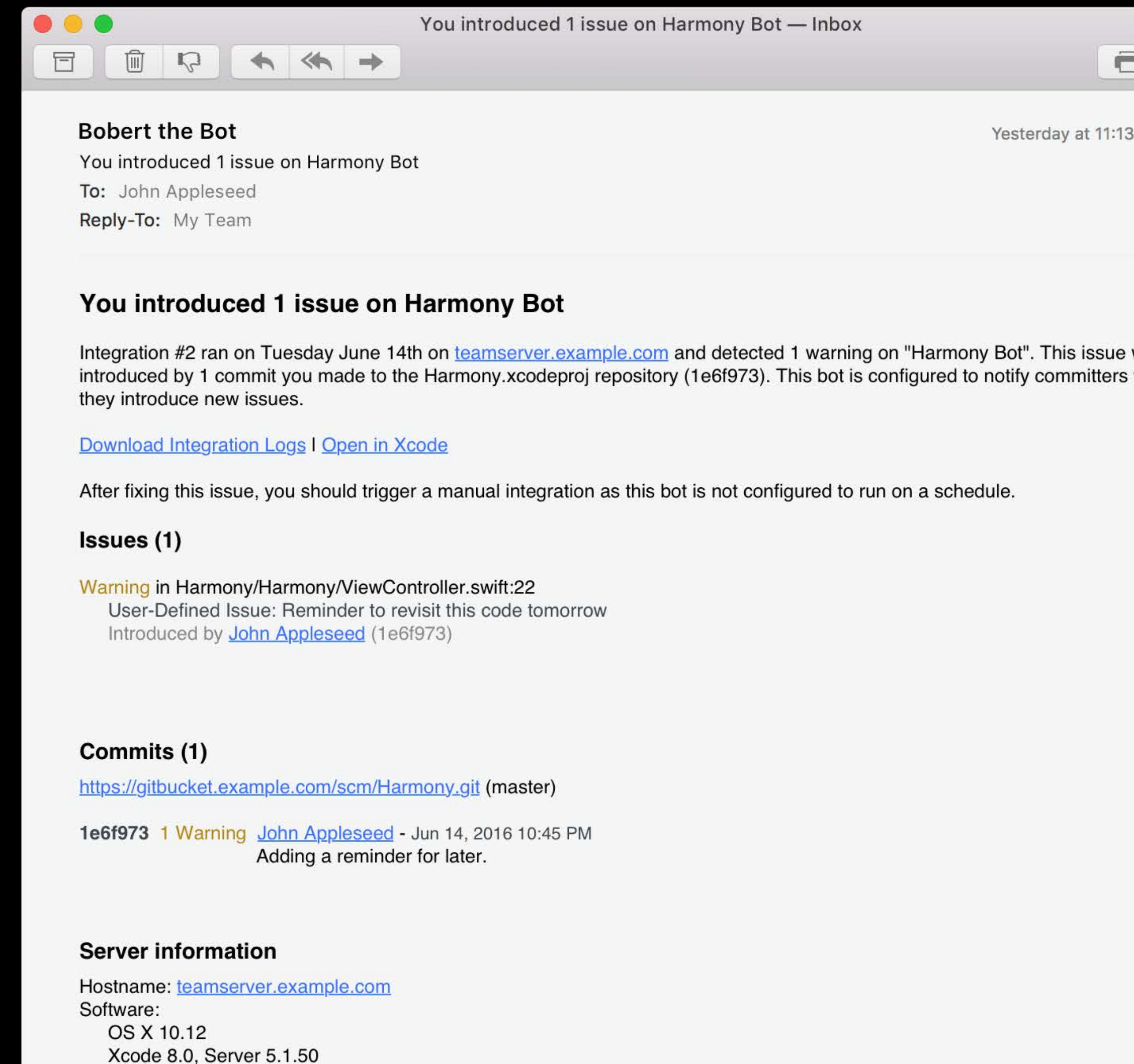
Issue Tracking and Blame

Identifying issue owners

Lets you know when it's time to act

You broke it

NEW



You introduced 1 issue on Harmony Bot — Inbox

Robert the Bot Yesterday at 11:13

You introduced 1 issue on Harmony Bot
To: John Appleseed
Reply-To: My Team

You introduced 1 issue on Harmony Bot

Integration #2 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". This issue was introduced by 1 commit you made to the Harmony.xcodeproj repository (1e6f973). This bot is configured to notify committers when they introduce new issues.

[Download Integration Logs](#) | [Open in Xcode](#)

After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.

Issues (1)

Warning in Harmony/Harmony/ViewController.swift:22
User-Defined Issue: Reminder to revisit this code tomorrow
Introduced by [John Appleseed](#) (1e6f973)

Commits (1)

<https://gitbucket.example.com/scm/Harmony.git> (master)

1e6f973 **1 Warning** [John Appleseed](#) - Jun 14, 2016 10:45 PM
Adding a reminder for later.

Server information

Hostname: teamserver.example.com
Software:
OS X 10.12
Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

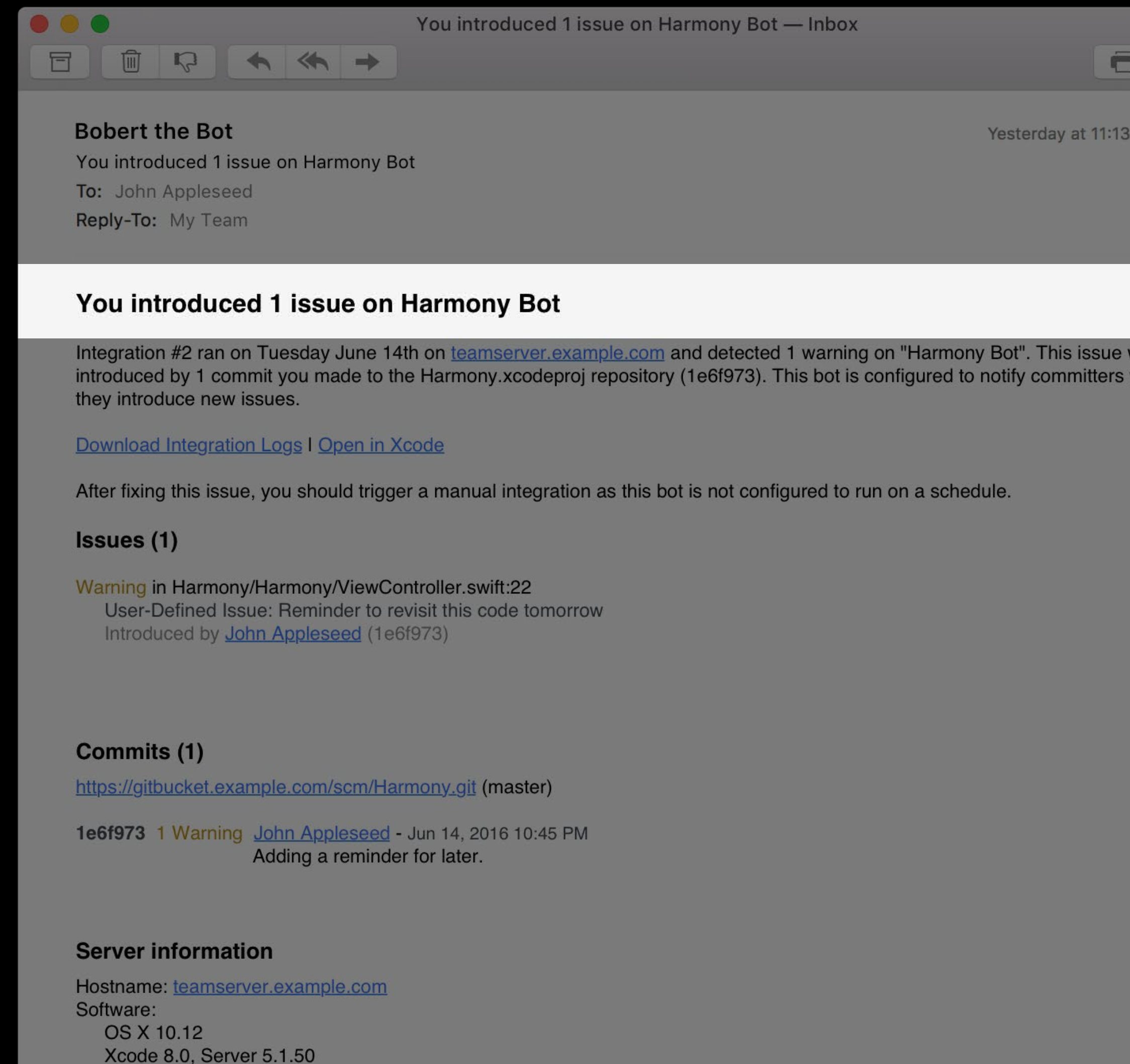
Identifying issue owners



Lets you know when it's time to act

You broke it

- You introduced an issue



Issue Tracking and Blame

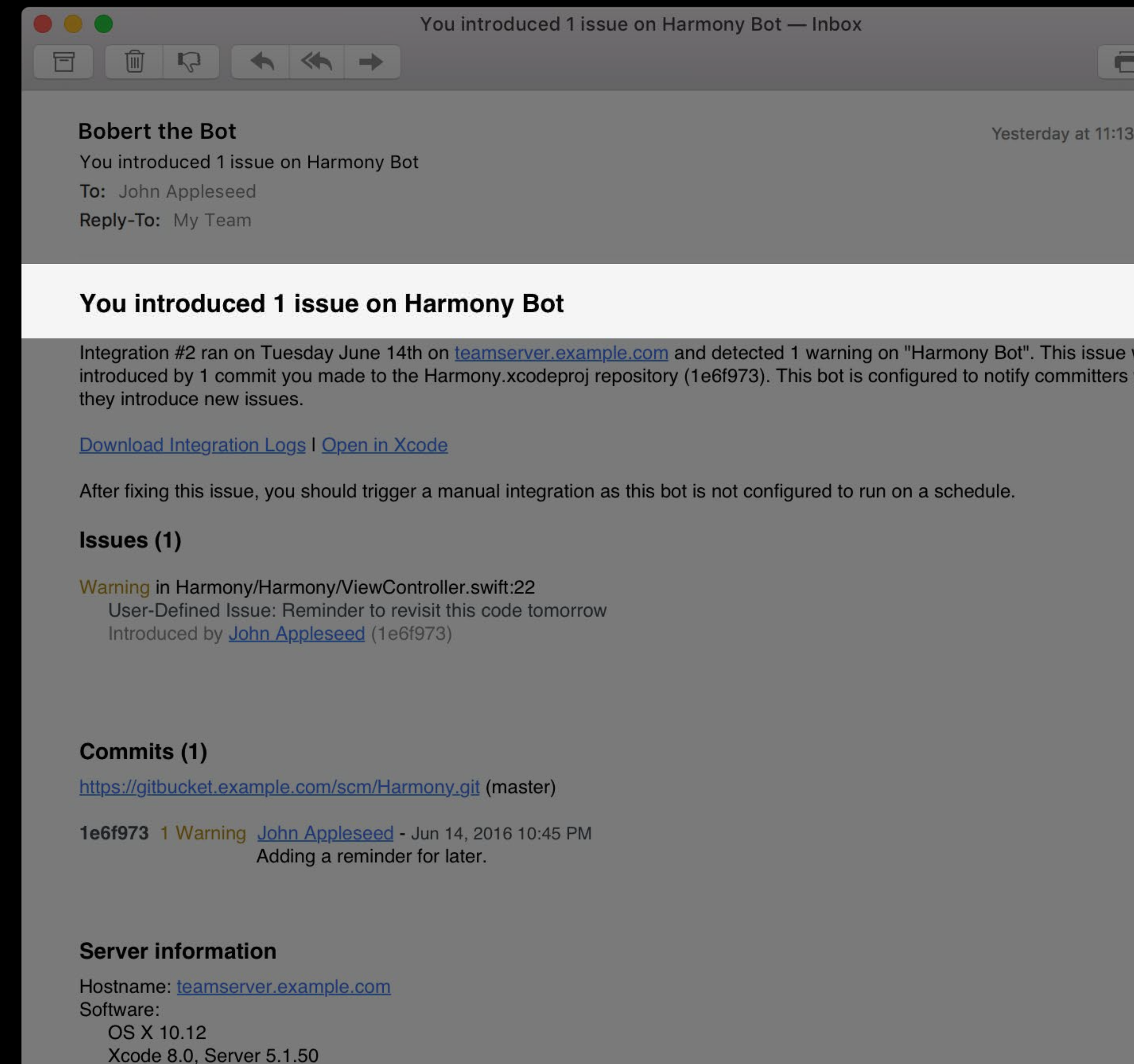
Identifying issue owners

NEW

Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified



The screenshot shows an email notification window titled "You introduced 1 issue on Harmony Bot — Inbox". The sender is "Robert the Bot" and the message is dated "Yesterday at 11:13". The email content includes:

- Subject:** You introduced 1 issue on Harmony Bot
- To:** John Appleseed
- Reply-To:** My Team
- Body:**
 - Integration #2 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". This issue introduced by 1 commit you made to the Harmony.xcodeproj repository (1e6f973). This bot is configured to notify committers they introduce new issues.
 - [Download Integration Logs](#) | [Open in Xcode](#)
 - After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.
 - Issues (1)**
 - Warning** in Harmony/Harmony/ViewController.swift:22
 - User-Defined Issue: Reminder to revisit this code tomorrow
 - Introduced by [John Appleseed](#) (1e6f973)
 - Commits (1)**
 - <https://gitbucket.example.com/scm/Harmony.git> (master)
 - 1e6f973 1 Warning [John Appleseed](#) - Jun 14, 2016 10:45 PM
 - Adding a reminder for later.
 - Server information**
 - Hostname: teamserver.example.com
 - Software:
 - OS X 10.12
 - Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

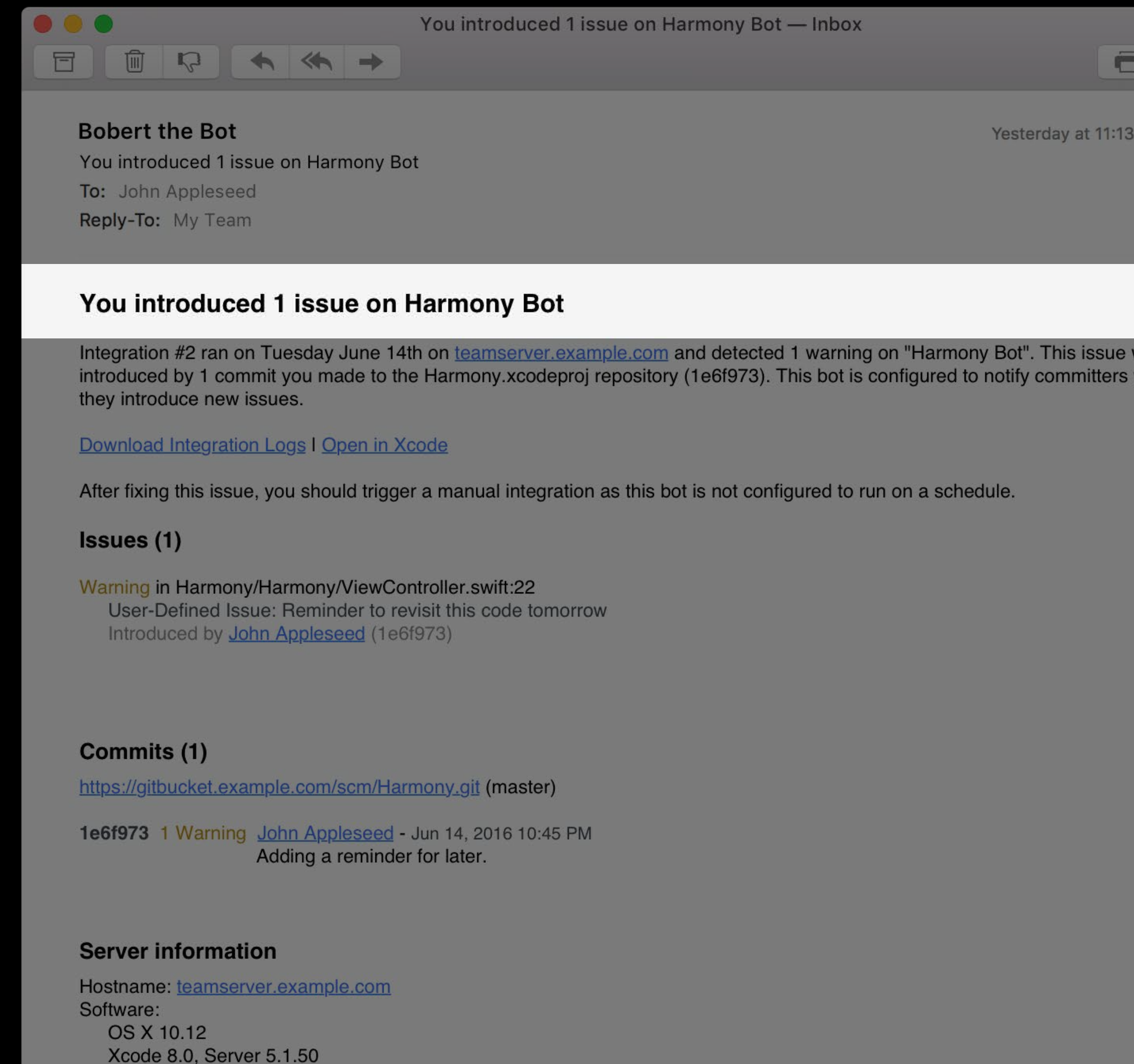
Identifying issue owners

NEW

Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified
- You are the only committer



The screenshot shows an email notification window titled "You introduced 1 issue on Harmony Bot — Inbox". The sender is "Robert the Bot" and the recipient is "John Appleseed". The email content includes:

- You introduced 1 issue on Harmony Bot**
- Integration #2 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". This issue introduced by 1 commit you made to the Harmony.xcodeproj repository (1e6f973). This bot is configured to notify committers they introduce new issues.
- [Download Integration Logs](#) | [Open in Xcode](#)
- After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.
- Issues (1)**
- Warning** in Harmony/Harmony/ViewController.swift:22
User-Defined Issue: Reminder to revisit this code tomorrow
Introduced by [John Appleseed](#) (1e6f973)
- Commits (1)**
- <https://gitbucket.example.com/scm/Harmony.git> (master)
- 1e6f973 1 Warning [John Appleseed](#) - Jun 14, 2016 10:45 PM
Adding a reminder for later.
- Server information**
- Hostname: teamserver.example.com
- Software:
 - OS X 10.12
 - Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

Identifying issue owners

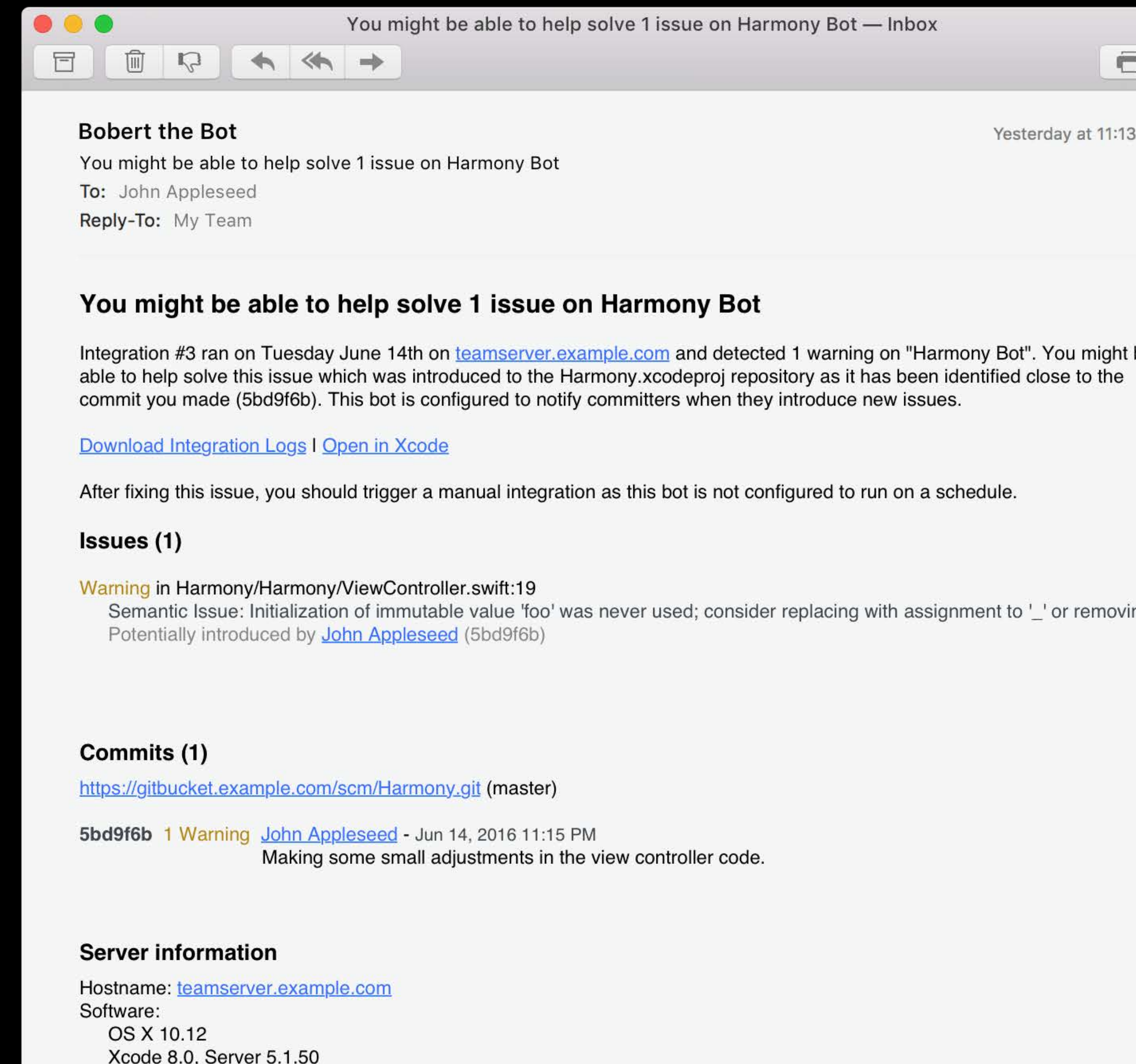
NEW

Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified
- You are the only committer

You can help fix it



The screenshot shows an email interface with a title bar that reads "You might be able to help solve 1 issue on Harmony Bot — Inbox". The email is from "Bobert the Bot" and is dated "Yesterday at 11:13". The body of the email contains the following information:

- Subject:** You might be able to help solve 1 issue on Harmony Bot
- To:** John Appleseed
- Reply-To:** My Team
- Content:** Integration #3 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". You might be able to help solve this issue which was introduced to the Harmony.xcodeproj repository as it has been identified close to the commit you made (5bd9f6b). This bot is configured to notify committers when they introduce new issues.
- Links:** [Download Integration Logs](#) | [Open in Xcode](#)
- Action:** After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.
- Issues (1):** **Warning** in Harmony/Harmony/ViewController.swift:19
Semantic Issue: Initialization of immutable value 'foo' was never used; consider replacing with assignment to '_' or removing
Potentially introduced by [John Appleseed](#) (5bd9f6b)
- Commits (1):** <https://gitbucket.example.com/scm/Harmony.git> (master)
5bd9f6b 1 Warning [John Appleseed](#) - Jun 14, 2016 11:15 PM
Making some small adjustments in the view controller code.
- Server information:**
Hostname: teamserver.example.com
Software:
OS X 10.12
Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

NEW

Identifying issue owners

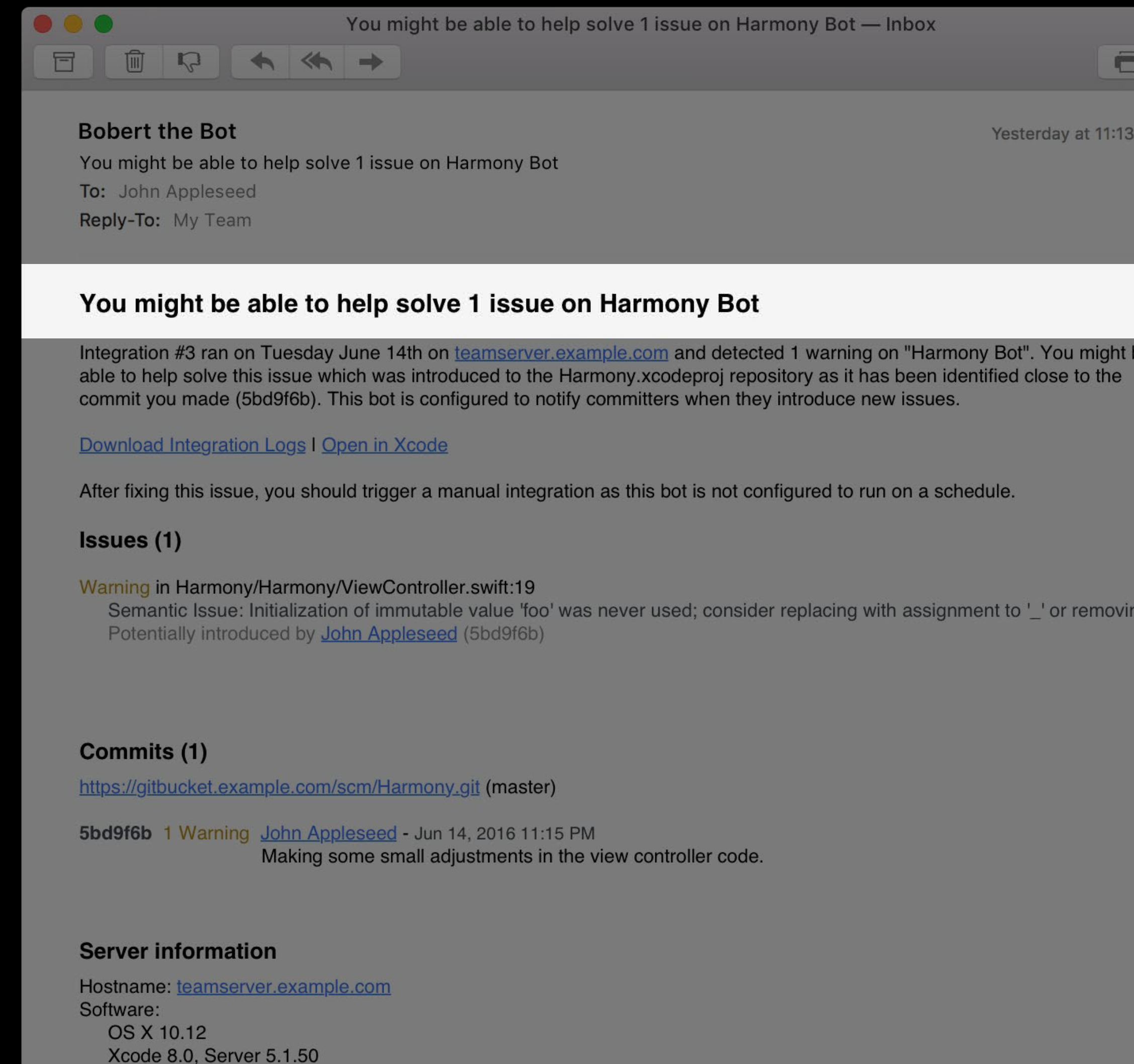
Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified
- You are the only committer

You can help fix it

- You probably know how to fix an issue



The screenshot shows an email interface with a title bar that reads "You might be able to help solve 1 issue on Harmony Bot — Inbox". The email header identifies the sender as "Robert the Bot" and the recipient as "John Appleseed". The main body of the email contains the following information:

- Subject:** You might be able to help solve 1 issue on Harmony Bot
- Content:** Integration #3 ran on Tuesday June 14th on teamserver.example.com and detected 1 warning on "Harmony Bot". You might be able to help solve this issue which was introduced to the Harmony.xcodeproj repository as it has been identified close to the commit you made (5bd9f6b). This bot is configured to notify committers when they introduce new issues.
- Links:** [Download Integration Logs](#) | [Open in Xcode](#)
- Action:** After fixing this issue, you should trigger a manual integration as this bot is not configured to run on a schedule.
- Issues (1):** Warning in Harmony/Harmony/ViewController.swift:19
Semantic Issue: Initialization of immutable value 'foo' was never used; consider replacing with assignment to '_' or removing it.
Potentially introduced by [John Appleseed](#) (5bd9f6b)
- Commits (1):** <https://gitbucket.example.com/scm/Harmony.git> (master)
5bd9f6b 1 Warning [John Appleseed](#) - Jun 14, 2016 11:15 PM
Making some small adjustments in the view controller code.
- Server information:** Hostname: teamserver.example.com
Software: OS X 10.12, Xcode 8.0, Server 5.1.50

Issue Tracking and Blame

NEW

Identifying issue owners

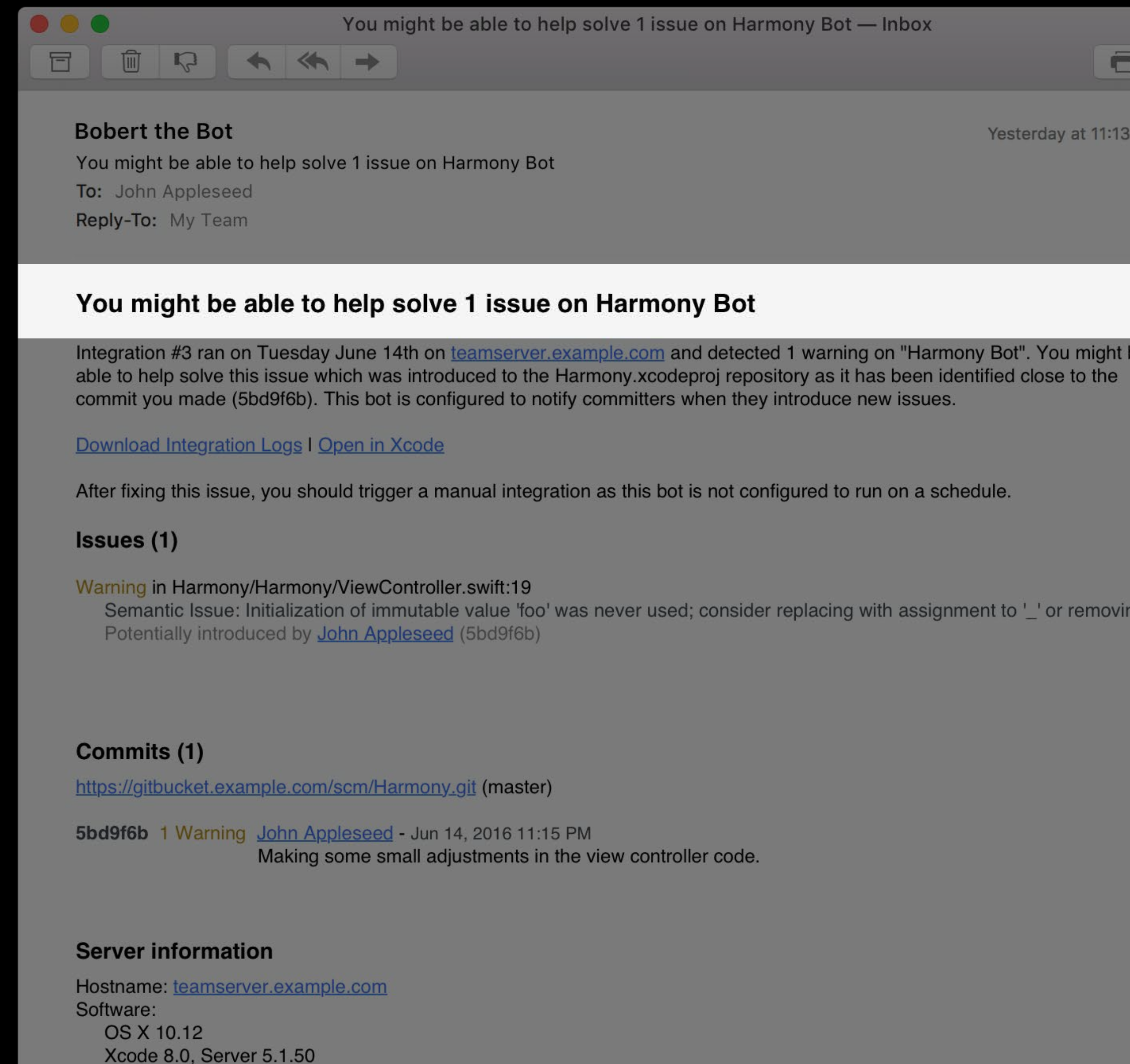
Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified
- You are the only committer

You can help fix it

- You probably know how to fix an issue
- You seem to know about the area involved



Issue Tracking and Blame

NEW

Identifying issue owners

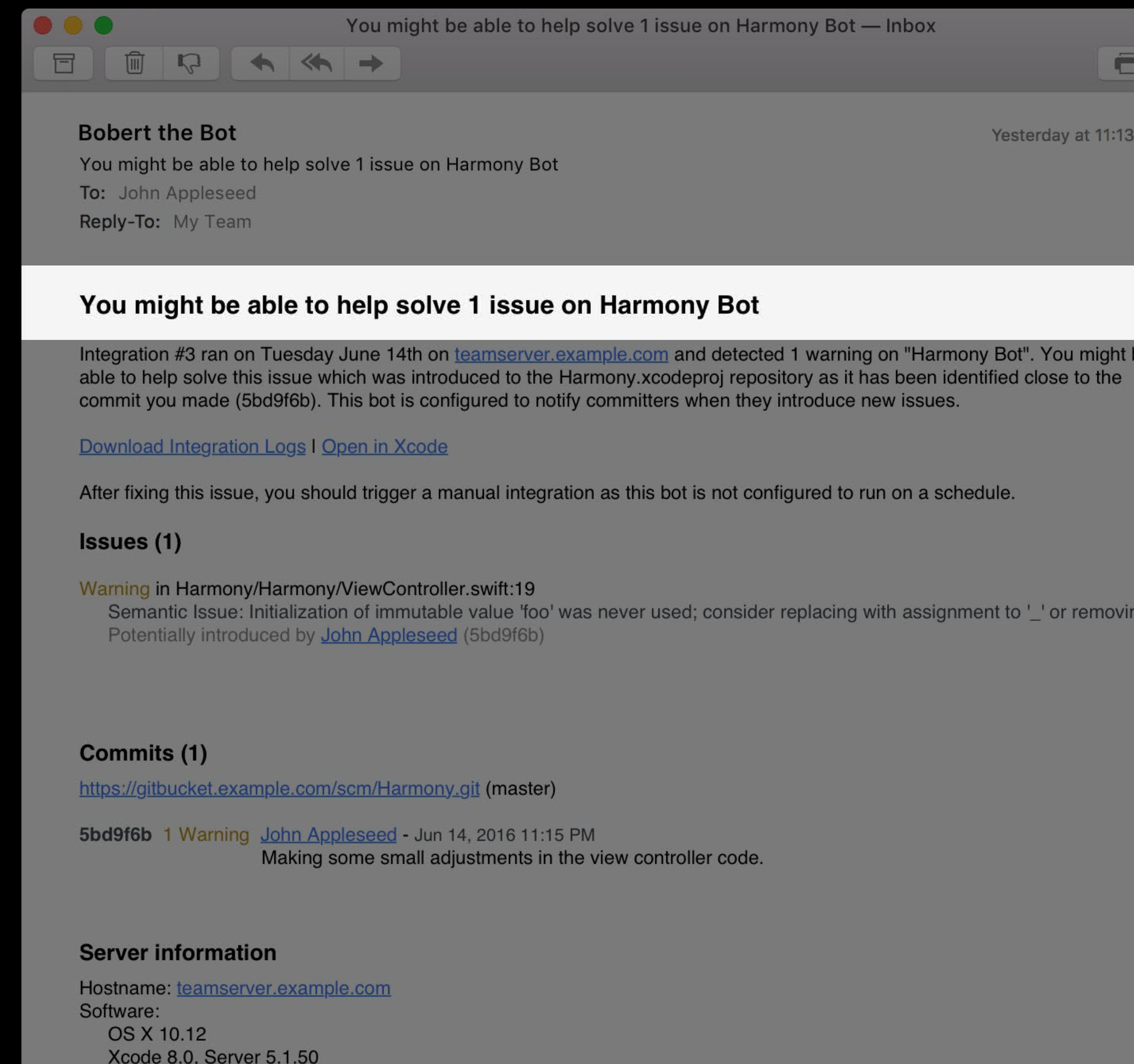
Lets you know when it's time to act

You broke it

- You introduced an issue
- Issue is on or near line you modified
- You are the only committer

You can help fix it

- You probably know how to fix an issue
- You seem to know about the area involved
- Fuzzy matching



Issue Tracking and Blame

Bot configuration changes

NEW

Integration #5 of Harmony Bot Failed with 1 Test Failure — Inbox

Robert the Bot Yesterday at 11:13

Integration #5 of Harmony Bot Failed with 1 Test Failure
To: John Appleseed
Reply-To: My Team

Integration #5 of Harmony Bot Failed with 1 Test Failure

The total number of passing tests in this integration was 14. There was 1 commit.

Summary

Bot Configuration Changes
Testing enabled

Integration Results
15 tests
14 passing tests
1 test failure (+1)

Committers
[John Appleseed](#)

Open Issues Introduced in This Integration

Test Failure in Harmony/HarmonyTests/HarmonyTests.swift:41
Assertions: XCTAssertEqual failed: ("Optional(-1.49)") is not equal to ("Optional(-1.46)") -
Introduced by configuration change

Commits (1)
<https://gitbucket.example.com/scm/Harmony.git> (master)

1d6f573 [John Appleseed](#) - Jun 14, 2016 10:48 PM
Editing a test

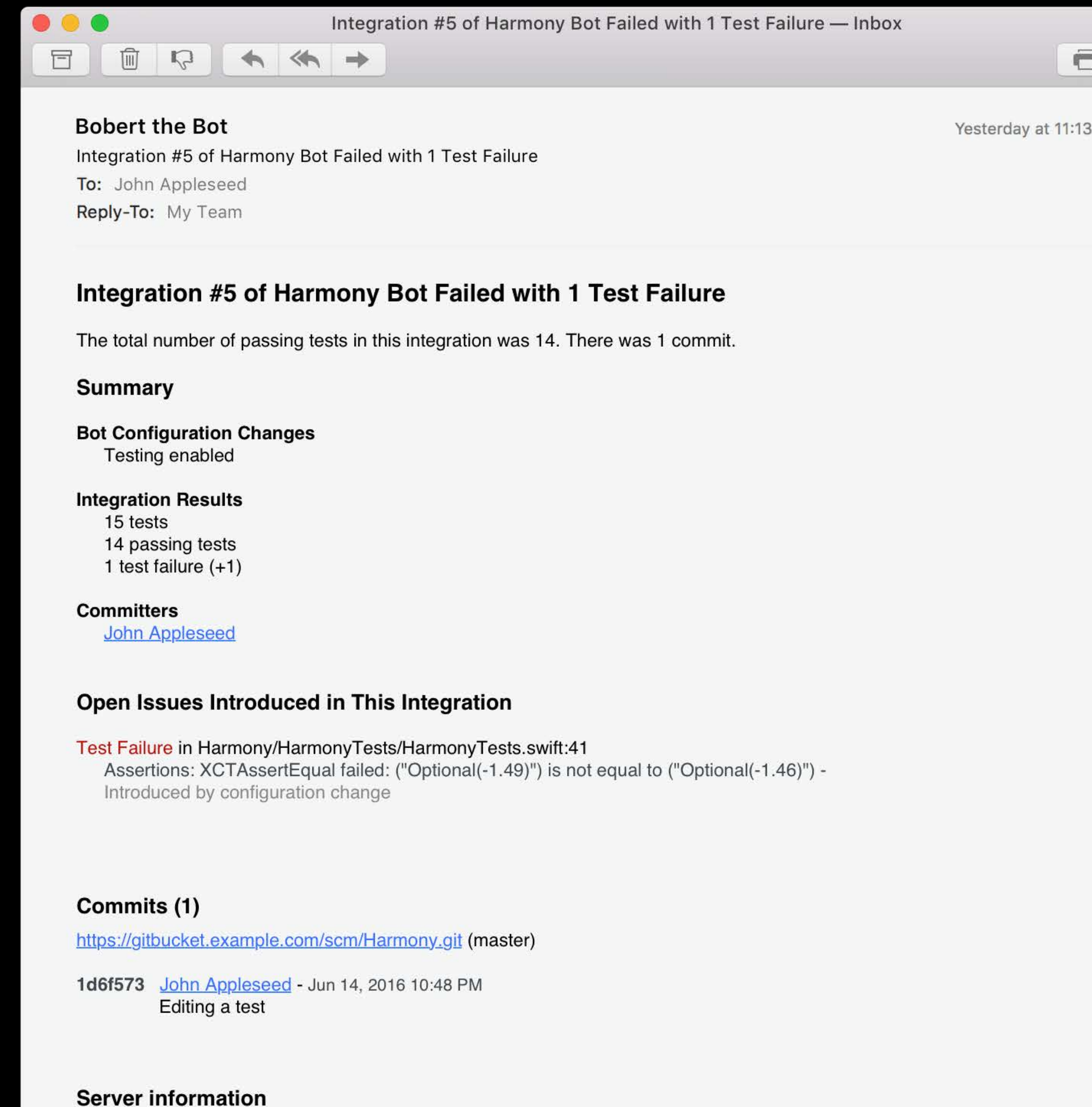
Server information

Issue Tracking and Blame

Bot configuration changes

Tracks changes to your bot configuration

NEW



Integration #5 of Harmony Bot Failed with 1 Test Failure — Inbox

Bobert the Bot Yesterday at 11:13
Integration #5 of Harmony Bot Failed with 1 Test Failure
To: John Appleseed
Reply-To: My Team

Integration #5 of Harmony Bot Failed with 1 Test Failure

The total number of passing tests in this integration was 14. There was 1 commit.

Summary

Bot Configuration Changes
Testing enabled

Integration Results
15 tests
14 passing tests
1 test failure (+1)

Committers
[John Appleseed](#)

Open Issues Introduced in This Integration

Test Failure in Harmony/HarmonyTests/HarmonyTests.swift:41
Assertions: XCTAssertEqual failed: ("Optional(-1.49)") is not equal to ("Optional(-1.46)") -
Introduced by configuration change

Commits (1)
<https://gitbucket.example.com/scm/Harmony.git> (master)

1d6f573 [John Appleseed](#) - Jun 14, 2016 10:48 PM
Editing a test

Server information

Issue Tracking and Blame

Bot configuration changes

Tracks changes to your bot configuration

Attributes issues to changes where possible

NEW

Integration #5 of Harmony Bot Failed with 1 Test Failure — Inbox

Robert the Bot Yesterday at 11:13
Integration #5 of Harmony Bot Failed with 1 Test Failure
To: John Appleseed
Reply-To: My Team

Integration #5 of Harmony Bot Failed with 1 Test Failure

The total number of passing tests in this integration was 14. There was 1 commit.

Summary

Bot Configuration Changes
Testing enabled

Integration Results
15 tests
14 passing tests
1 test failure (+1)

Committers
[John Appleseed](#)

Open Issues Introduced in This Integration

Test Failure in Harmony/HarmonyTests/HarmonyTests.swift:41
Assertions: XCTAssertEqual failed: ("Optional(-1.49)") is not equal to ("Optional(-1.46)") -
Introduced by configuration change

Commits (1)
<https://gitbucket.example.com/scm/Harmony.git> (master)

1d6f573 [John Appleseed](#) - Jun 14, 2016 10:48 PM
Editing a test

Server information

Issue Tracking and Blame

Bot configuration changes

Tracks changes to your bot configuration

Attributes issues to changes where possible

Included in email reports

A screenshot of an email report titled "Integration #5 of Harmony Bot Failed with 1 Test Failure". The sender is "Robert the Bot" and the recipient is "John Appleseed". The report includes a summary of the integration results, a section for bot configuration changes, and details of the test failure. A white circular callout highlights the "Summary" and "Integration Results" sections.

Integration #5 of Harmony Bot Failed with 1 Test Failure — Inbox

Robert the Bot Yesterday at 11:13
Integration #5 of Harmony Bot Failed with 1 Test Failure
To: John Appleseed
Reply-To: My Team

Integration #5 of Harmony Bot Failed with 1 Test Failure

The total number of passing in this integration was 14. There was 1 commit.

Summary

Bot Configuration Changes
Testing enabled

Integration Results
15 tests
14 passing tests
1 test failure (+1)

Commit by [John Appleseed](#)

Open Issues Introduced in This Integration

Test Failure in Harmony/HarmonyTests/HarmonyTests.swift:41
Assertions: XCTAssertEqual failed: ("Optional(-1.49)") is not equal to ("Optional(-1.46)") -
Introduced by configuration change

Commits (1)
<https://gitbucket.example.com/scm/Harmony.git> (master)

1d6f573 [John Appleseed](#) - Jun 14, 2016 10:48 PM
Editing a test

Server information

Upgrade Integrations

When it's not your fault

NEW

The screenshot shows a web interface for a CI/CD system. The top navigation bar includes the project name 'Harmony', the build status 'Build Succeeded', and the time 'Yesterday at 2:'. The main content area is divided into a left sidebar and a right main panel.

Left Sidebar: A list of build runs is shown, sorted by group. The 'Harmony Bot bots.example.com' group is expanded, showing a list of 'Integrate' and 'Upgrade' runs. The most recent run, 'Upgrade (11) Today, 3:31 PM', is highlighted with a yellow warning icon and a red 'x' icon, indicating a failed test.

Right Main Panel: The details for the selected 'Upgrade (11)' run are displayed. The status is 'Failed tests'. The scheme is 'Harmony' and the branch is 'master'. The start time is 'Today, 3:13 PM' and the duration is '2 minutes, 52 seconds'. A large red circle with a white '0' in the center is shown, indicating that no tests passed. Below this, a red exclamation mark icon is followed by the text 'ERRORS' and 'No Change'.

Bot Configuration Changes: A list of changes is shown, including 'Xcode upgraded from 7.3.1 to 8.0 beta' and 'Xcode SDKs upgraded'.

New Issues (2 warnings): Two warnings are listed, both related to the deprecated method 'asynchronously(group:qos:flags:execute:)' in 'Harmony/Harmony/ViewController.swift'. The first warning is at line 29 and the second is at line 43. Both are introduced by the Xcode upgrade.

Upgrade Integrations

When it's not your fault

Re-integrates your project

NEW

The screenshot shows a CI/CD interface for a project named 'Harmony'. The top navigation bar indicates the build status as 'Build Succeeded' and the time as 'Yesterday at 2:05 PM'. The main panel displays details for a specific build, 'Upgrade (11)', which has a status of 'Failed tests'. The build details include the scheme 'Harmony', branch 'master', start time 'Today, 3:13 PM', and duration '2 minutes, 52 seconds'. A large red circle with a '0' inside and a red exclamation mark icon labeled 'ERRORS' indicates the build failed. Below the build details, there is a section for 'Bot Configuration Changes' which lists 'Xcode upgraded from 7.3.1 to 8.0 beta' and 'Xcode SDKs upgraded'. A 'New Issues' section shows two warnings: 'Warning 'asynchronously(group:qos:flags:execute:)' is deprecated: In Harmony/Harmony/ViewController.swift:29 Introduced by Xcode upgrade' and 'Warning 'asynchronously(group:qos:flags:execute:)' is deprecated: In Harmony/Harmony/ViewController.swift:43 Introduced by Xcode upgrade'. The sidebar on the left shows a list of builds, with the current build 'Upgrade (11)' highlighted. The sidebar also shows a list of other builds, including 'Integrate (13)' through 'Integrate (1)'. The sidebar has two tabs: 'By Group' and 'By Time'.

Upgrade Integrations

When it's not your fault

NEW

Re-integrates your project

Same revision as the last integration

The screenshot shows a CI/CD interface for a project named 'Harmony'. The top navigation bar indicates 'Harmony | Build Succeeded | Yesterday at 2:00'. The main view is titled 'Harmony Bot > Upgrade (11)'. On the left, a list of integration runs is shown, sorted by time. The 'Upgrade (11)' run is highlighted with a white background and a yellow warning icon. The right panel shows details for the 'Upgrade (11)' run, including 'Status: Failed tests', 'Scheme: Harmony', 'Branch: master', 'Start Time: Today, 3:13 PM', and 'Duration: 2 minutes, 52 seconds'. A large red circle with a white '0' and a red exclamation mark icon indicates 'ERRORS'. Below this, the 'Bot Configuration Changes' section lists 'Xcode upgraded from 7.3.1 to 8.0 beta' and 'Xcode SDKs upgraded'. The 'New Issues' section shows two warnings: 'Test Failure UI Testing Failure - Exceeded timeout of 30 seconds, w...' and 'Warning 'asynchronously(group:qos:flags:execute:)' is deprecated:...'.

Upgrade Integrations

When it's not your fault

NEW

Re-integrates your project

Same revision as the last integration

Any new issues are due to the upgrade

The screenshot shows a CI/CD interface for a project named "Harmony". The top navigation bar indicates the build status as "Build Succeeded" and the time as "Yesterday at 2:05 PM". The main content area is divided into two panels. The left panel, titled "By Group", shows a list of integration runs. The right panel, titled "Summary", provides details for the selected "Upgrade (11)" run.

Integration List (Left Panel):

- Harmony 6/6/16, 6:40 PM
- Harmony (no locat... Yesterday, 2:05 PM)
- Project Today, 3:29 PM
- Harmony Bot bots.example.com
 - Integrate (13) Today, 4:12 PM
 - Integrate (12) Today, 3:46 PM
 - Upgrade (11) Today, 3:31 PM
 - Integrate (10) Today, 3:00 PM
 - Integrate (9) Today, 9:41 AM
 - Integrate (8) Yesterday, 3:00 PM
 - Integrate (7) 6/13/16, 3:00 PM
 - Integrate (6) 6/12/16, 3:00 PM
 - Integrate (5) 6/11/16, 3:00 PM
 - Integrate (4) 6/11/16, 10:23 AM
 - Integrate (3) 6/10/16, 3:00 PM
 - Integrate (2) 6/9/16, 3:00 PM
 - Integrate (1) 6/8/16, 3:00 PM

Integration Details (Right Panel):

Integrate (11)
Status: Failed tests
Scheme: Harmony
Branch: master
Start Time: Today, 3:13 PM
Duration: 2 minutes, 52 seconds

Bot Configuration Changes

- Xcode upgraded from 7.3.1 to 8.0 beta
- Xcode SDKs upgraded

New Issues (2 warnings)

- Test Failure** UI Testing Failure - Exceeded timeout of 30 seconds, w...
Test case: -[HarmonyUITests testExample()] in Harmony/HarmonyU...
Introduced by Xcode upgrade
- Warning** 'asynchronously(group:qos:flags:execute:)' is deprecated:
In Harmony/Harmony/ViewController.swift:29
Introduced by Xcode upgrade
- Warning** 'asynchronously(group:qos:flags:execute:)' is deprecated:
In Harmony/Harmony/ViewController.swift:43
Introduced by Xcode upgrade

Upgrade Integrations

When it's not your fault

NEW

Re-integrates your project

Same revision as the last integration

Any new issues are due to the upgrade

Prevents blaming you for broken builds

The screenshot shows a CI/CD interface for a project named 'Harmony'. The top navigation bar indicates 'Harmony | Build Succeeded | Yesterday at 2:05 PM'. The main view is titled 'Harmony Bot > Upgrade (11)'. On the left, a list of builds is shown, sorted by time. The current build, 'Upgrade (11) Today, 3:31 PM', is highlighted with a yellow warning icon and a red 'x' icon. Below the list, the details for the 'Upgrade (11)' build are shown. The status is 'Failed tests', the scheme is 'Harmony', and the branch is 'master'. The start time is 'Today, 3:13 PM' and the duration is '2 minutes, 52 seconds'. A large red circle with a white '0' in the center is displayed, indicating a failed build. Below this, a red exclamation mark icon is followed by the text 'ERRORS' and 'No Change'. Under the heading 'Bot Configuration Changes', two items are listed: 'Xcode upgraded from 7.3.1 to 8.0 beta' and 'Xcode SDKs upgraded'. Under the heading 'New Issues (2 warnings)', two warnings are listed: 'Warning 'asynchronously(group:qos:flags:execute:)' is deprecated: In Harmony/Harmony/ViewController.swift:29 Introduced by Xcode upgrade' and 'Warning 'asynchronously(group:qos:flags:execute:)' is deprecated: In Harmony/Harmony/ViewController.swift:43 Introduced by Xcode upgrade'.

Configurable Integration User



Configurable Integration User

Improved visibility into your integrations



Configurable Integration User

Improved visibility into your integrations

Allows customization



Configurable Integration User

Improved visibility into your integrations

Allows customization

You own and manage how your integrations run



Configurable Integration User

Improved visibility into your integrations

Allows customization

You own and manage how your integrations run

Can be any user on the system



Configurable Integration User

Improved visibility into your integrations

Allows customization

You own and manage how your integrations run

Can be any user on the system

Runs as a menu extra





Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
- Groups

Services

- Caching
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Xcode



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode ↻

Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
- Groups

Services

- Caching
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Testing User

Xcode Server requires a logged-in user to integrate your projects. It is recommended that you use a dedicated, non-administrative user.

OFF

User Account:

Full Name:

Account Name:

Password:

Verify:

Allow user to administer this server

Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode



Server

- Example Server
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- Certificates
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- Stats

Accounts

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- Mail
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- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Xcode

Preparing to configure Xcode Server...

OFF



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode ↻

Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

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Services

- Caching
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- Contacts
- File Sharing
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- Messages
- Profile Manager
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- Wiki
- Xcode

Advanced



Xcode

Configuring Xcode Server...

OFF



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode ↻

Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
- Groups

Services

- Caching
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Xcode

Upgrading Xcode Server data...

OFF



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode ↻

Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
- Groups

Services

- Caching
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Xcode

Configuring access...

OFF



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
Download the latest version of Xcode ↻

Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
- Groups

Services

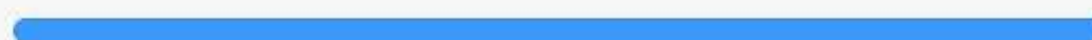
- Caching
- Calendar
- Contacts
- File Sharing
- Mail
- Messages
- Profile Manager
- Time Machine
- VPN
- Websites
- Wiki
- Xcode

Advanced



Xcode

Finishing Xcode Server setup...



Choose Xcode to begin

Use Xcode Server to continually build and test your team's apps.
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Choose Xcode...



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

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- Wiki
- Xcode

Advanced



You must log in as Customized Integration User to run integrations.

Integrations will not start until you log in. If you use fast user switching to return to this user, integrations will continue to run in the background.

Don't Log In Log In

ON

Learn about configuring devices for this service

Permissions: Logged in users can create bots, anyone can view bots

Edit Permissions...

Build using: Xcode 8.0 (8A147)

Choose Xcode...

Run tests as: Customized Integration User (Logged Out)

Log In...

Developer Teams: No Teams

Add Team...

Development Devices:

| Name | Type | Status |
|---|------|--------|
| Add a developer team to test on iOS devices | | |

View bots

Search



Server

- Example Server
- Alerts
- Certificates
- Logs
- Stats

Accounts

- Users
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Services

- Caching
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- Contacts
- File Sharing
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- VPN
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- Wiki
- Xcode

Advanced



Xcode



Settings Repositories

Status: ● Available on your local network at Example-Server.local
[Learn about configuring devices for this service](#)

Permissions: Logged in users can create bots, anyone can view bots
[Edit Permissions...](#)

Build using: Xcode 8.0 (8A147)
[Choose Xcode...](#)

Run tests as: ● Customized Integration User (Logged In)
[Switch User...](#)

Developer Teams: No Teams
[Add Team...](#)

Development Devices:

| Name | Type | Status |
|---|------|--------|
| Add a developer team to test on iOS devices | | |

[View bots](#)

Demo

Xcode Server

Configurable Integration User



Configurable Integration User

Improved visibility



Configurable Integration User

Improved visibility

Customized simulators



Configurable Integration User

Improved visibility

Customized simulators

Normal macOS user



Configurable Integration User

Improved visibility

Customized simulators

Normal macOS user

Runs as a menu extra



Configurable Integration User

Best practices



Configurable Integration User

Best practices

Dedicate a new user



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock

Customize for your needs



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock

Customize for your needs

- Simulators



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock

Customize for your needs

- Simulators
- Networking (VPN and proxies)



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock

Customize for your needs

- Simulators
- Networking (VPN and proxies)
- User data and settings



Configurable Integration User

Best practices

Dedicate a new user

Avoid using administrator accounts

Stay logged in with Fast User Switching

Disable screen lock

Customize for your needs

- Simulators
- Networking (VPN and proxies)
- User data and settings
- Advanced provisioning



xcodebuild

Building block for Continuous Integration Systems

xcodebuild

Test action

```
xcodebuild test -workspace <path>  
               -scheme <name>  
               -destination <specifier>
```


xcodebuild

Test action

```
xcodebuild test -workspace <path>  
              -scheme <name>  
              -destination <specifier>
```

Builds sources

xcodebuild

Test action

```
xcodebuild test -workspace <path>  
               -scheme <name>  
               -destination <specifier>
```

Builds sources

Installs app on destination if needed

xcodebuild

Test action

```
xcodebuild test -workspace <path>  
              -scheme <name>  
              -destination <specifier>
```

Builds sources

Installs app on destination if needed

Runs tests

xcodebuild

Test action

```
xcodebuild test -workspace <path>  
              -scheme <name>  
              -destination <specifier>
```

Builds sources

Installs app on destination if needed

Runs tests

Reports results in console

Test Options

Customizing tests

NEW

```
xcodebuild test -workspace <path>  
               -scheme <name>  
               -destination <specifier>  
               -only-testing:TestBundleA/TestSuiteA/TestCaseA  
               -only-testing:TestBundleB/TestSuiteB  
               -only-testing:TestBundleC
```

Test Options

Customizing tests

NEW

```
xcodebuild test -workspace <path>  
               -scheme <name>  
               -destination <specifier>  
               -only-testing:TestBundleA/TestSuiteA/TestCaseA  
               -only-testing:TestBundleB/TestSuiteB  
               -only-testing:TestBundleC
```

```
xcodebuild test -scheme <name>  
               -skip-testing:TestBundleD/TestSuiteD/TestCaseD
```


Additional Test Actions

Separating building from testing

NEW



Test

Additional Test Actions

Separating building from testing

NEW

Build for Testing

Test without Building

Building for Testing

Only building

NEW

```
xcodebuild build-for-testing -workspace <path>  
-scheme <name>  
-destination <specifier>
```


Building for Testing

NEW

Only building

```
xcodebuild build-for-testing -workspace <path>  
-scheme <name>  
-destination <specifier>
```

Builds sources for testing

Building for Testing

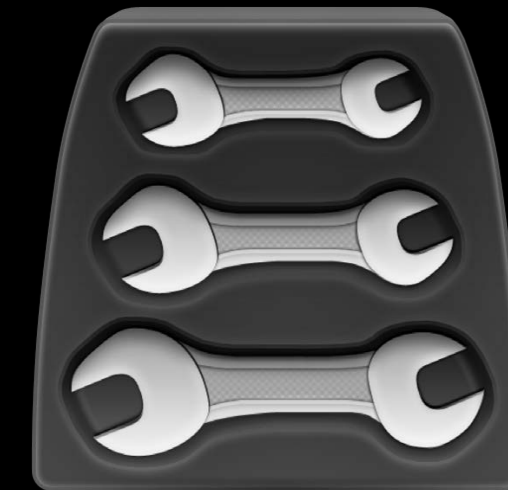
Only building

NEW

```
xcodebuild build-for-testing -workspace <path>  
-scheme <name>  
-destination <specifier>
```

Builds sources for testing

Outputs products in Derived Data



Building for Testing

Only building

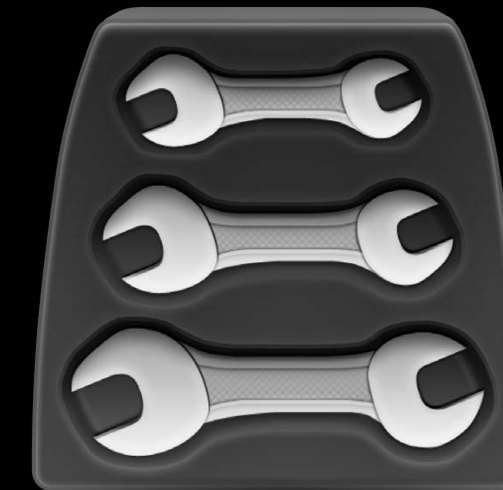
NEW

```
xcodebuild build-for-testing -workspace <path>  
-scheme <name>  
-destination <specifier>
```

Builds sources for testing

Outputs products in Derived Data

Generates an xctestrun file



Test Without Building

Only testing

NEW

```
xcodebuild test-without-building -workspace <path>  
                                     -scheme <name>  
                                     -destination <specifier>
```

Finds binary products in Derived Data

Test Without Building

NEW

Only testing

```
xcodebuild test-without-building -workspace <path>  
                                -scheme <name>  
                                -destination <specifier>
```

Finds binary products in Derived Data

Installs if necessary

Test Without Building

NEW

Only testing

```
xcodebuild test-without-building -workspace <path>  
                                -scheme <name>  
                                -destination <specifier>
```

Finds binary products in Derived Data

Installs if necessary

Runs tests and report results as before

Test Without Building

Only testing

NEW

```
xcodebuild test-without-building -xctestrun <path>  
-destination <specifier>
```

Test Without Building

Only testing

NEW

```
xcodebuild test-without-building -xctestrun <path>  
                                -destination <specifier>
```

Ingests the xctestrun file



Test Without Building

Only testing

NEW

```
xcodebuild test-without-building -xctestrun <path>  
                                -destination <specifier>
```

Ingests the xctestrun file

Finds binary products relative to xctestrun file



Test Without Building

Only testing

NEW

```
xcodebuild test-without-building -xctestrun <path>  
                                -destination <specifier>
```

Ingests the xctestrun file

Finds binary products relative to xctestrun file

Runs tests, reports results as before



xcodebuild

Distributed testing

Build Machine

Test Machine #1

Test Machine #2

xcodebuild

Distributed testing



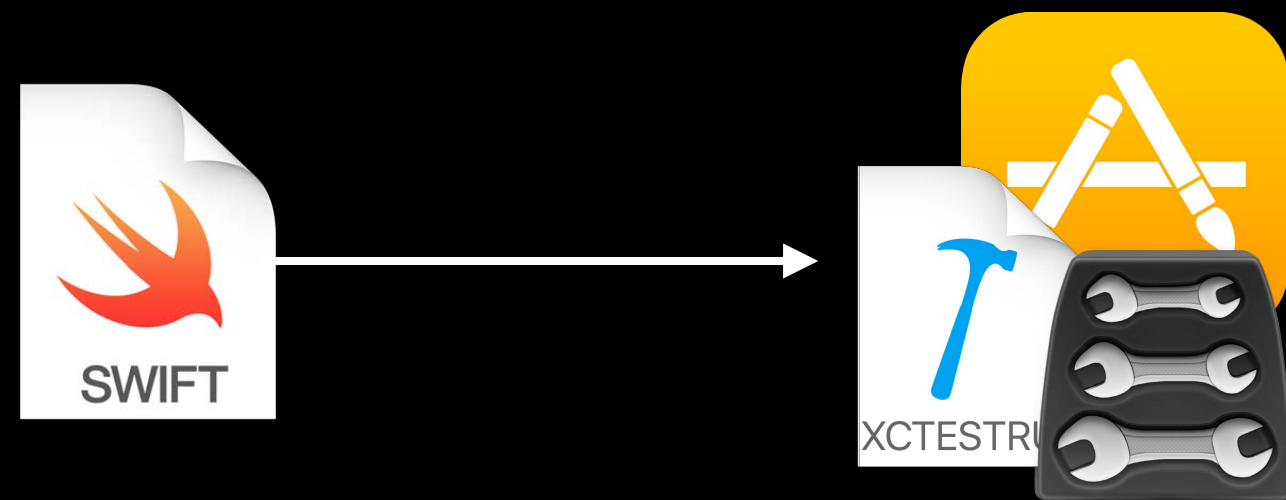
Build Machine

Test Machine #1

Test Machine #2

xcodebuild

Distributed testing



```
xcodebuild build-for-testing
```

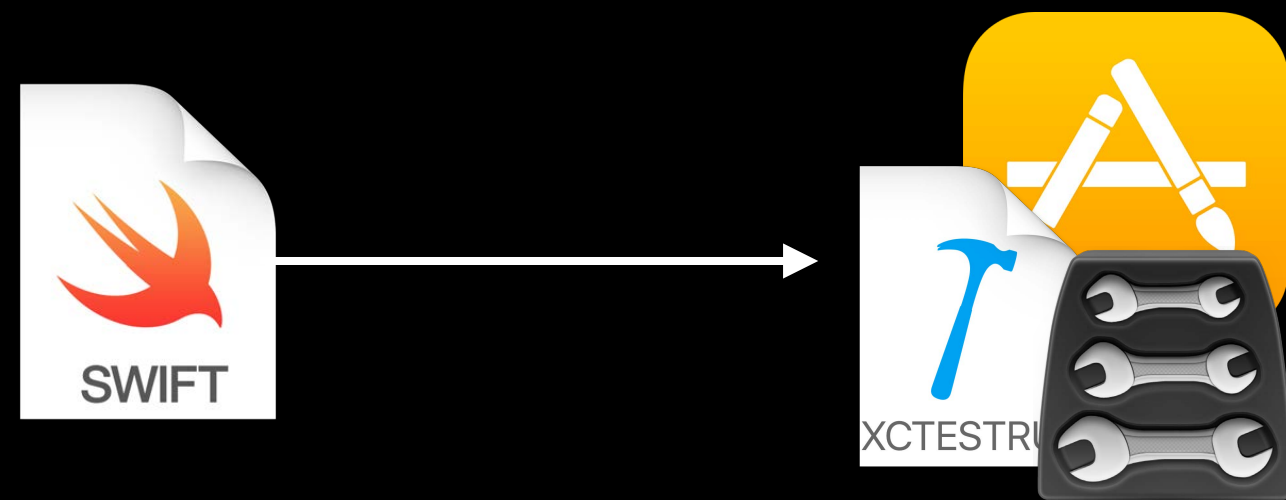
Build Machine

Test Machine #1

Test Machine #2

xcodebuild

Distributed testing



```
xcodebuild build-for-testing
```

Build Machine



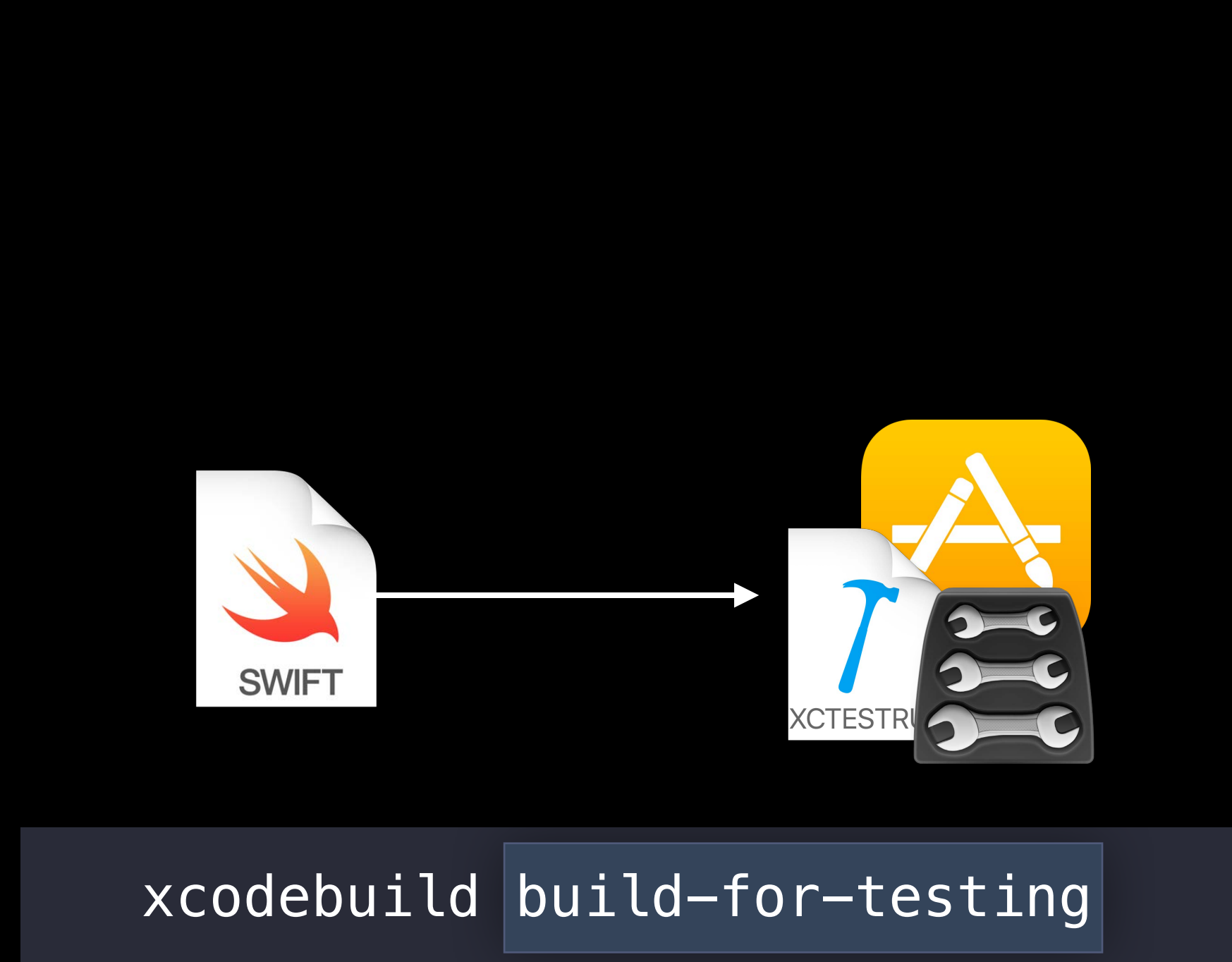
Test Machine #1



Test Machine #2

xcodebuild

Distributed testing



Build Machine



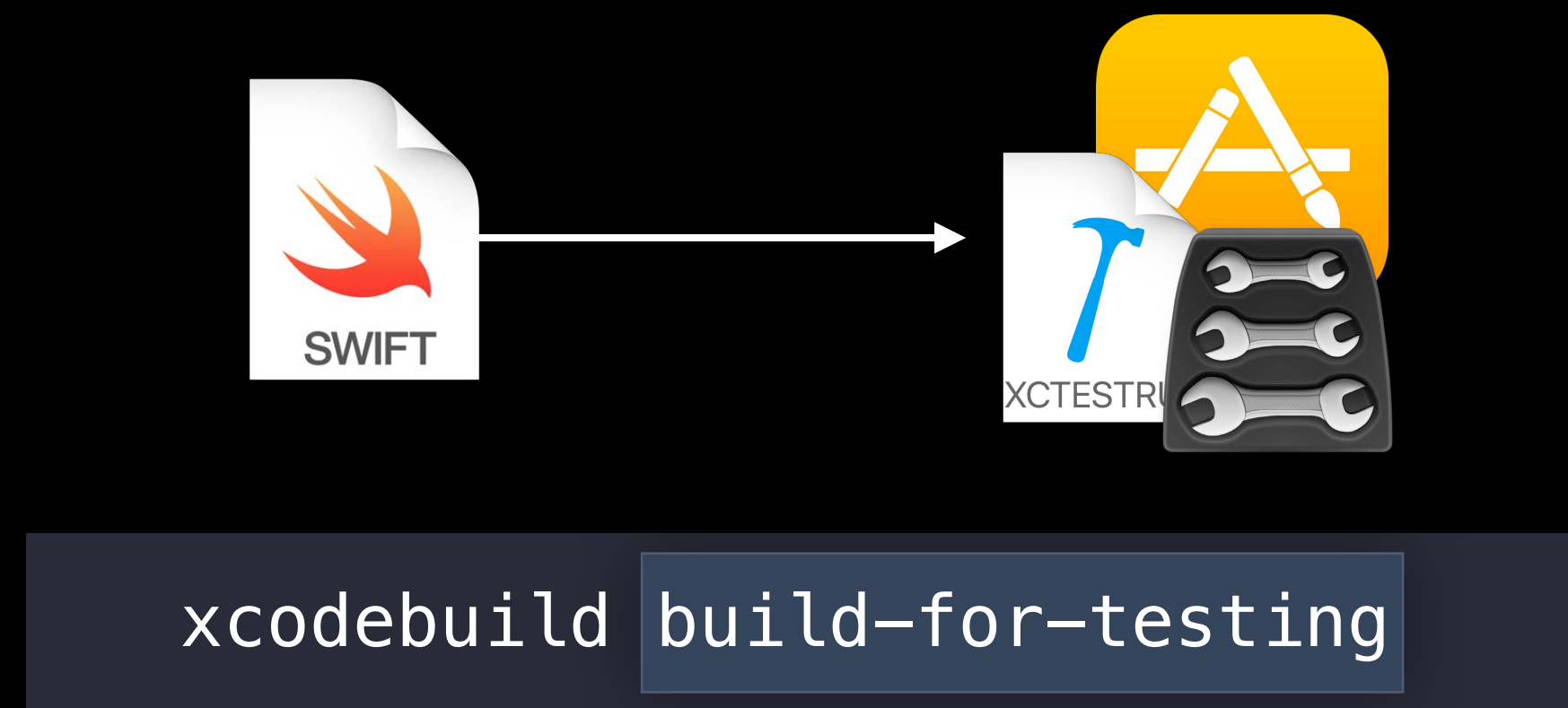
Test Machine #1



Test Machine #2

xcodebuild

Distributed testing



Build Machine



Test Machine #1



Test Machine #2

xctestrun

Test manifest

NEW

xctestrun

Test manifest

NEW



xctestrun

Test manifest

Tests to run or skip

NEW



xctestrun

Test manifest

Tests to run or skip

Environment variables

NEW



xctestrun

Test manifest

Tests to run or skip

Environment variables

Command-line arguments

NEW



xctestrun

Test manifest

Tests to run or skip

Environment variables

Command-line arguments

Documentation in man pages

NEW



xctestrun

Test manifest

Tests to run or skip

Environment variables

Command-line arguments

Documentation in man pages

```
man xcodebuild.xctestrun
```

NEW



Summary



Summary

Testing Concepts

Xcode

- Crash Log Gathering

Xcode Server

- Advanced Triggers
- Issue Tracking and Blame
- Configurable Integration User

xcodebuild





More Information

<https://developer.apple.com/wwdc16/409>

Labs

Xcode Open Hours

Developer Tools
Lab C

Thursday 9:00AM

Xcode Open Hours

Developer Tools
Lab B

Friday 9:00AM



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