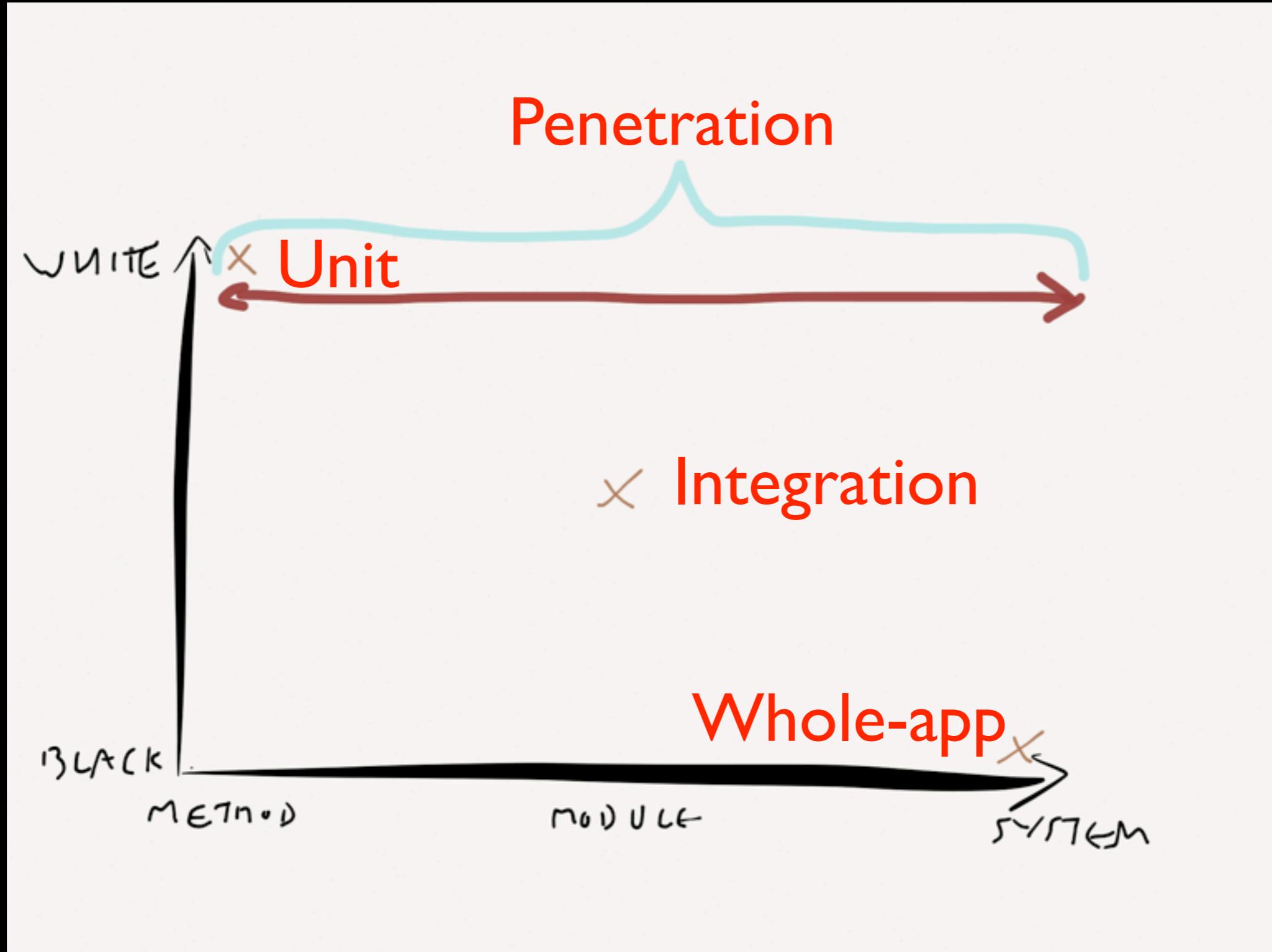


Testing iOS Apps

Graham Lee / [@secboffin](https://twitter.com/secboffin)



A lot to cover

Agenda

Agenda

- High-level overview of testing options

Agenda

- High-level overview of testing options
- Native iOS apps, with some browser component

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- High-level overview of testing options
- Native iOS apps, with some browser component
- Unit tests

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- High-level overview of testing options
- Native iOS apps, with some browser component
- Unit tests
- Integration tests

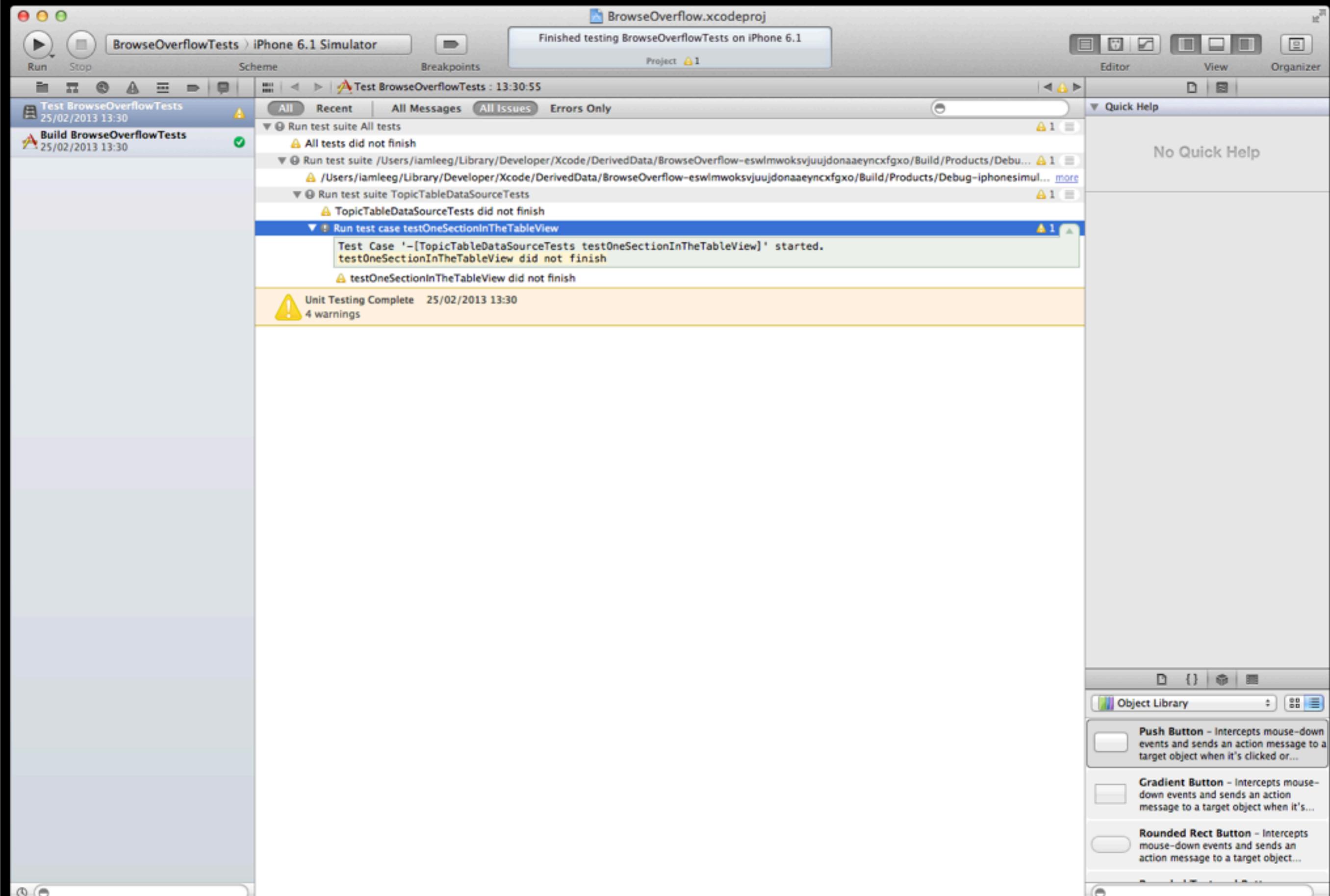
Agenda

- High-level overview of testing options
- Native iOS apps, with some browser component
- Unit tests
- Integration tests
- Penetration tests

Unit Tests

- OCUnit built into Xcode
- Reasonable GUI Integration as of v4
- Baroque and outdated syntax





BrowseOverflow.xcodeproj — TopicTableDataSourceTests.m

Testing BrowseOverflowTests on iPhone 6.1 Simulator

Project □ 1

Run Stop Scheme Breakpoints Editor View Organizer

BrowseOverflowTests Paused

Thread 1 com.apple.main-thread

- 0 -[TopicTableDataSourceTests t...
 - 1 _invoking_
 - 21 UIApplicationMain
 - 22 main

Thread 2 com.apple.libdispatch-manager

Thread 3

Thread 4 WebThread

Thread 5

Thread 6 com.apple.NSURLConnectionLoader

Thread 7

Thread 8

Thread 9

Thread 10

Thread 11 com.apple.CFSocket.private

Thread 12 JavaScriptCore::BlockFree

Thread 13 JavaScriptCore::Marking

Thread 14 JavaScriptCore::Marking

Thread 15 JavaScriptCore::Marking

Thread 16

```
@implementation TopicTableDataSourceTests
{
    TopicTableDataSource *dataSource;
    NSArray *topicsList;
}

- (void)setUp {
    dataSource = [[TopicTableDataSource alloc] init];
    Topic *sampleTopic = [[Topic alloc] initWithName:@"iPhone" tag:@"iphone"];
    topicsList = [NSArray arrayWithObject:sampleTopic];
    [dataSource setTopics:topicsList];
}

- (void)tearDown {
    dataSource = nil;
    topicsList = nil;
}

- (void)testOneTableRowForOneTopic {
    STAssertEquals((NSInteger)[topicsList count], [dataSource tableView:nil numberOfRowsInSection:0], @"As there's one topic, there should be one row in the table");
}

- (void)testTwoTableRowsForTwoTopics {
    Topic *topic1 = [[Topic alloc] initWithName:@"Mac OS X" tag:@"macosx"];
    Topic *topic2 = [[Topic alloc] initWithName:@"Cocoa" tag:@"cocoa"];
    NSArray *twoTopicsList = [NSArray arrayWithObjects:topic1, topic2, nil];
    [dataSource setTopics:twoTopicsList];
    STAssertEquals((NSInteger)[twoTopicsList count], [dataSource tableView:nil numberOfRowsInSection:0], @"There should be two rows in the table for two topics");
}

- (void)testOneSectionInTheTableView {
    STAssertThrows([dataSource tableView:nil numberOfRowsInSection:1], @"Data source doesn't allow asking about additional sections");
}

- (void)testDataSourceCellCreationRequiresOneSection {
    NSIndexPath *secondSection = [NSIndexPath indexPathForRow:0 inSection:1];
    STAssertThrows([dataSource tableView:nil cellForRowAtIndexPath:secondSection], @"Data source will not prepare cells for unexpected sections");
}

- (void)testDataSourceCellCreationWillNotCreateMoreRowsThanItHasTopics {
    NSIndexPath *afterLastTopic = [NSIndexPath indexPathForRow:[topicsList count] inSection:0];
    STAssertThrows([dataSource tableView:nil cellForRowAtIndexPath:afterLastTopic], @"Data source will not prepare more cells than there are topics");
}
```

Thread 1: breakpoint 1.1

Object Library

- Push Button – Intercepts mouse-down events and sends an action message to a target object when it's clicked or...
- Gradient Button – Intercepts mouse-down events and sends an action message to a target object when it's...
- Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...

Auto □

All Output □

TopicTableDataSource.m:48
Test Case '-[TopicTableDataSourceTests testDataSourceCellCreationWillNotCreateMoreRowsThanItHasTopics]' passed (0.000 seconds).
Test Case '-[TopicTableDataSourceTests testOneSectionInTheTableView]' started.
(lldb)

```
@implementation StackOverflowCommunicatorTests

- (void)setUp {
    communicator = [[InspectableStackOverflowCommunicator alloc] init];
}

- (void)tearDown {
    [communicator cancelAndDiscardURLConnection];
}

- (void)testSearchingForQuestionsOnTopicCallsTopicAPI {
    [communicator searchForQuestionsWithTag: @"ios"];
    STAssertEqualObjects([[communicator URLToFetch] absoluteString], @"http://
api.stackoverflow.com/1.1/search?tagged=ios&pagesize=20", @"Use the search API to find
questions with a particular tag");
}

@end
```

<https://github.com/philSquared/Catch>

“CATCH stands for C++ Automated Test Cases in Headers and is a multi-paradigm automated test framework for C, C++ and Objective-C. It is implemented entirely in a set of headers, but is packaged up as a single header for extra convenience.”

```

TEST_CASE("parser/API", "Design the public interface for the parser")
{
    FZASourceParser *parser = [FZASourceParser new];
    SECTION("acceptableIO", "Accept unparsed, generate parsed targets")
    {
        TestBuildTarget *target = [TestBuildTarget new];
        id <FZABuildTarget> output = nil;
        target.parsed = YES;
        CHECK_THROWS(output = [parser parse: target]);
        CHECK(output == nil);

        target.parsed = NO;
        CHECK_NOTHROW(output = [parser parse: target]);
        CHECK([output conformsToProtocol: @protocol(FZABuildTarget)]);
        CHECK([[output name] isEqualToString: [target name]]);
        CHECK([output isParsed] == YES);
        [target release];
    }
    [parser release];
}

TEST_CASE("parser/run", "Run through the test project and see what we find")
{
    FZASourceParser *parser = [FZASourceParser new];
    FZAXcodeProject *project = [[FZAXcodeProject alloc] initWithProjectFolder:
    @"TestProject.xcodeproj"];
    id <FZABuildTarget> parsedTarget = [parser parse: [project targetAtIndex: 0]];
    REQUIRE(parsedTarget != nil);
    CHECK([parsedTarget countOfFunctions] == 1);
    [project release];
    [parser release];
}

```

It's not a “unit test” framework...

- ...it's a framework for running tests
- ...and for reporting test results
- Integration tests, whole-app tests

Calabash

- <https://github.com/calabash/calabash-ios>
- <http://calaba.sh>
- BDD-style spec format for tests
- Automatic runner/reporter

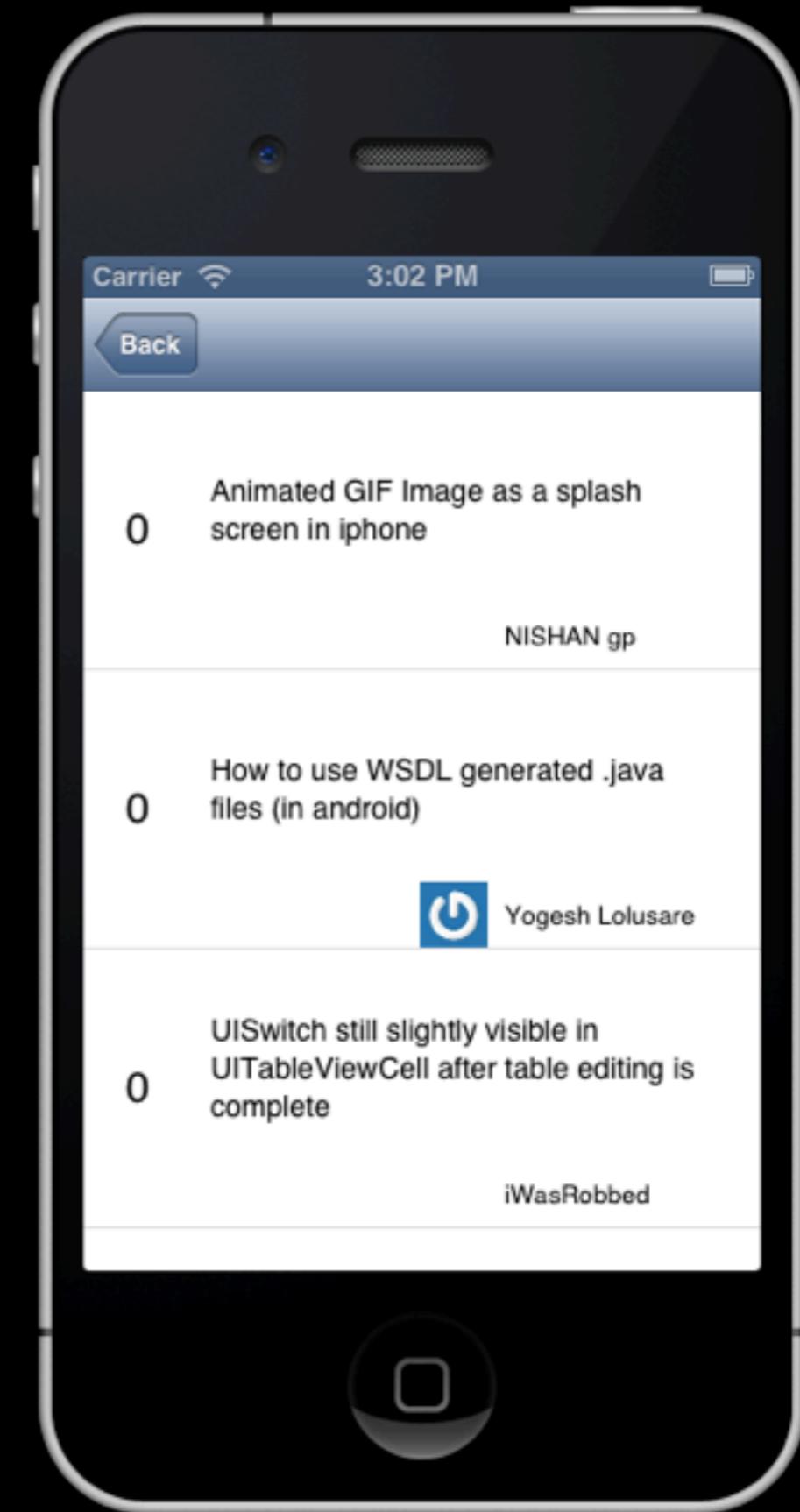
\$ calabash-ios console

```
> query("label")
...
[0] {
    "rect" => {
        "center_y" => 261.5,
        "width" => 300,
        "center_x" => 160,
        "height" => 43,
        "x" => 10,
        "y" => 240
    },
    "frame" => {
        "width" => 300,
        "height" => 43,
        "x" => 10,
        "y" => 0
    },
    "description" => "<UILabel: 0x72f0920;
frame = (10 0; 300 43); text = 'iPhone';
clipsToBounds = YES; userInteractionEnabled =
NO; layer = <CALayer: 0x72f09b0>>",
        "UIType" => "UIView",
        "class" => "UILabel"
    },
...
}
```



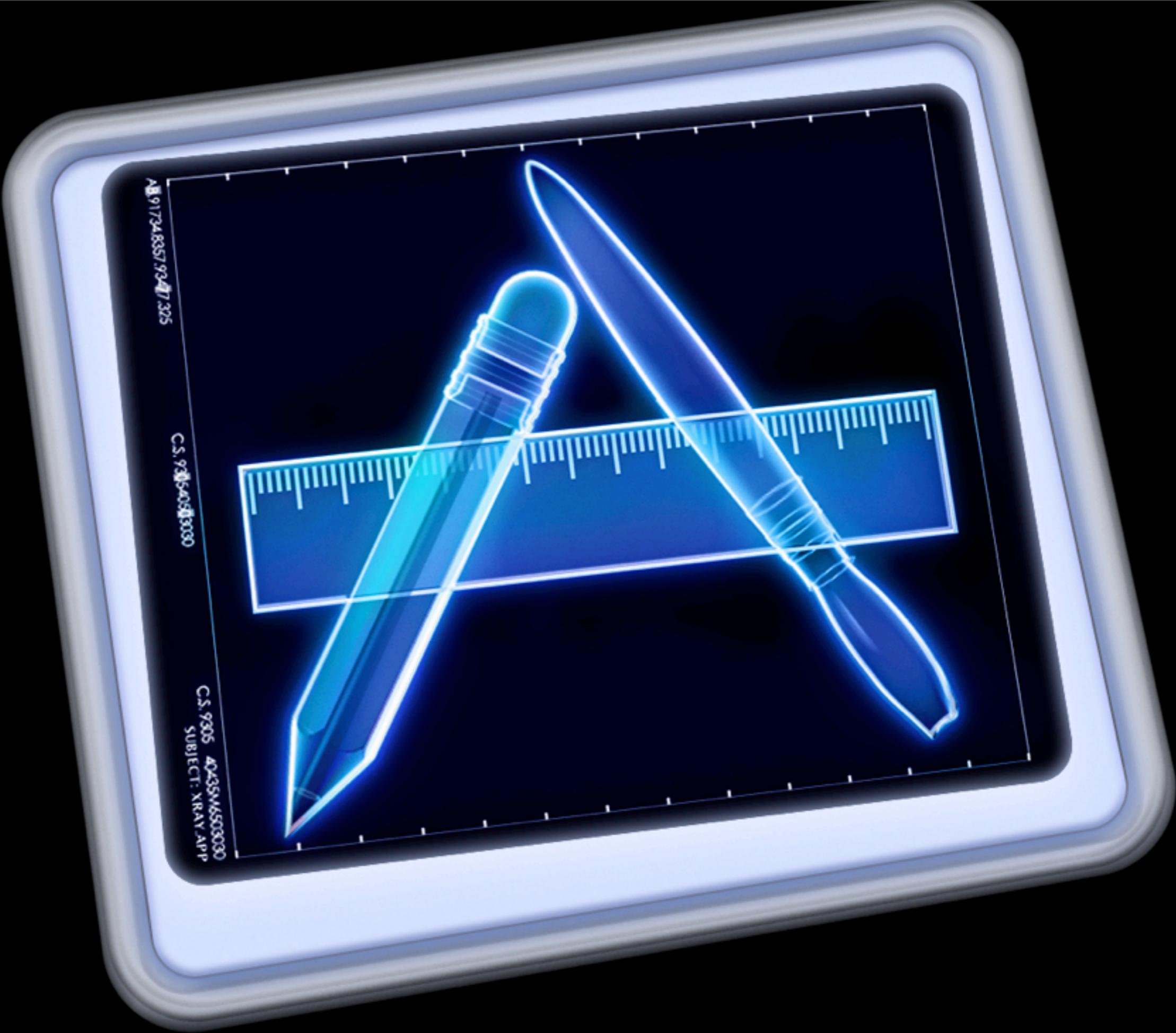
```
$ calabash-  
ios console
```

```
> touch(query("label  
marked:'iPhone'"))
```



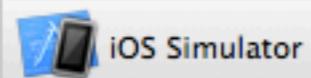
Given I am on the Welcome Screen
Then I choose the section iPhone
And take picture

Then "I choose the section \$section" do |section|
 touch("view label text:'#{section}'")
end



Profile 'BrowseOverflow'

Choose Trace Template or Existing Document:



iOS Simulator
All
Memory
CPU
File System



User
All
Document

Open
Recent



Blank



Allocations



Leaks



Activity Monitor



Zombies



Time Profiler



System Trace



Automation



Automation

This template executes a script which simulates UI interaction for an iOS application launched from Instruments.



Cancel

Profile

```
var target = UIATarget.localTarget();
var app = target.frontMostApp();
var window = app mainWindow();
target.logElementTree();
```

Instruments

Record Target Inspection Range Run 1 of 1 View Library Message Search Extended Detail

Automation

Automation

Status: Script is stopped

Scripts: New Script

Add Remove

Script Options: Run on Record (checked), Pause

Logging: Continuously Log Results (unchecked), Choose Location..., Export Traced Results..., Take Screenshot

Editor Log

Index	Timestamp	Log Messages	Log Type
0	16:08:48 GMT	The target application appears to have died	Fail
1	16:09:04 GMT	UIATarget: name:iPhone Simulator rect:{[0, 0], {320, 480}}	Debug
2	16:09:04 GMT	UIAApplication: name:BrowseOverflow rect:{[0, 20], {320, 460}}	Debug
3	16:09:04 GMT	UIAWindow: rect:{[0, 0], {320, 480}}	Debug
4	16:09:04 GMT	> UIANavigationBar: rect:{[0, 20], {320, 44}}	Debug
8	16:09:04 GMT	> UIATableView: name:Empty list value:rows 1 to 5 of 5 rect:{[0, 64], {320, 416}}	Debug
9	16:09:04 GMT	> UIATableCell: name:iPhone rect:{[0, 64], {320, 44}}	Debug
10	16:09:04 GMT	UIAStaticText: name:iPhone value:iPhone rect:{[0, 64], {320, 44}}	Debug
11	16:09:04 GMT	> UIATableCell: name:Cocoa Touch rect:{[0, 108], {320, 44}}	Debug
13	16:09:04 GMT	> UIATableCell: name:UIKit rect:{[0, 152], {320, 44}}	Debug
15	16:09:04 GMT	> UIATableCell: name:Objective-C rect:{[0, 196], {320, 44}}	Debug
17	16:09:04 GMT	> UIATableCell: name:Xcode rect:{[0, 240], {320, 44}}	Debug
19	16:09:04 GMT	> UIAWindow: rect:{[0, 0], {320, 480}}	Debug

Instruments

Record Target Inspection Range Run 1 of 1 View Library Message Search Extended Detail

Automation

Automation

Status

Script is stopped

Scripts

New Script

Add Remove

Script Options

Run on Record Pause

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Continuously Log Results

Choose Location... Export Traced Results... Take Screenshot

Editor Log

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2	16:09:04 GMT	UIAApplication: name:BrowseOverflow rect:{[0, 20], {320, 460}}	Debug
3	16:09:04 GMT	UIAWindow: rect:{[0, 0], {320, 480}}	Debug
4	16:09:04 GMT	UIANavigationBar: rect:{[0, 20], {320, 44}}	Debug
8	16:09:04 GMT	UIATableView: name:Empty list value:Rows 1 to 3 of 3 rect:{[0, 64], {320, 440}}	Debug
9	16:09:04 GMT	UIATableCell: name:iPhone rect:{[0, 64], {320, 44}}	Debug
10	16:09:04 GMT	UIAStaticText: name:iPhone value:iPhone rect:{[0, 64], {320, 44}}	Debug
11	16:09:04 GMT	UIATableCell: name:Cocoa Touch rect:{[0, 108], {320, 44}}	Debug
13	16:09:04 GMT	UIATableCell: name:UIKit rect:{[0, 152], {320, 44}}	Debug
15	16:09:04 GMT	UIATableCell: name:Objective-C rect:{[0, 196], {320, 44}}	Debug
17	16:09:04 GMT	UIATableCell: name:Xcode rect:{[0, 240], {320, 44}}	Debug
19	16:09:04 GMT	UIAWindow: rect:{[0, 0], {320, 480}}	Debug

```
var target = UIATarget.localTarget();
var app = target.frontMostApp();
var window = app mainWindow();
var tableView = window.tableViews()[0];
var iPhoneCell = tableView.cells()
["iPhone"];
iPhoneCell.tap();
```

WWDC 2010 Session 306:Automating UI Testing
with Instruments



Testing app-bundled JS



X

D: THE ANKH-MORPORK MAP

Welcome to **Ankh-Morpork** – city of a thousand surprises!

We offer up this guide to our vibrant metropolis for your information and delight.

- Pinch to zoom and pan around two detailed maps of the city
- Discover more about the **businesses, services and landmarks** of our fair city by tapping on their icons
- Navigate your way around using the searchable **directory** and **street index**

Credits_en_GB.html DOM Tree E html E body E div.paper E div.papercontent E div.crest

Credits_en_GB.html

- closeButton@2x.png
- credits_book.png
- credits_ibookstore@2x.png
- credits.css

<html>

 <head>...</head>

 <body>

 <div class="toppadding"></div>

 <div class="paper">

 <div class="papertop"></div>

 <div class="papercontent">

 <div class="closebutton">...</div>

 <div class="crest"></div>

 <h1>Discworld: The Ankh-Morpork Map</h1>

 <div class="headerdivider"></div>

 <p class="centered">...</p>

 <div class="smalldivider"></div>

 <p class="bullet">...</p>

 <div class="smalldivider"></div>

 <p class="bullet">...</p>

 <div class="smalldivider"></div>

 <p class="bullet">...</p>

 <div class="smalldivider"></div>

 <div class="bullet">...</div>

 </div>

 </div>

 </body>

</html>

Type

MIME Type text/html

Resource Type Document

Location

Full URL file:///Users/leeg/Documents/Agant/ankh-morpork/Compleat%20Ankh-Morpork/Credits_en_GB.html

Scheme file

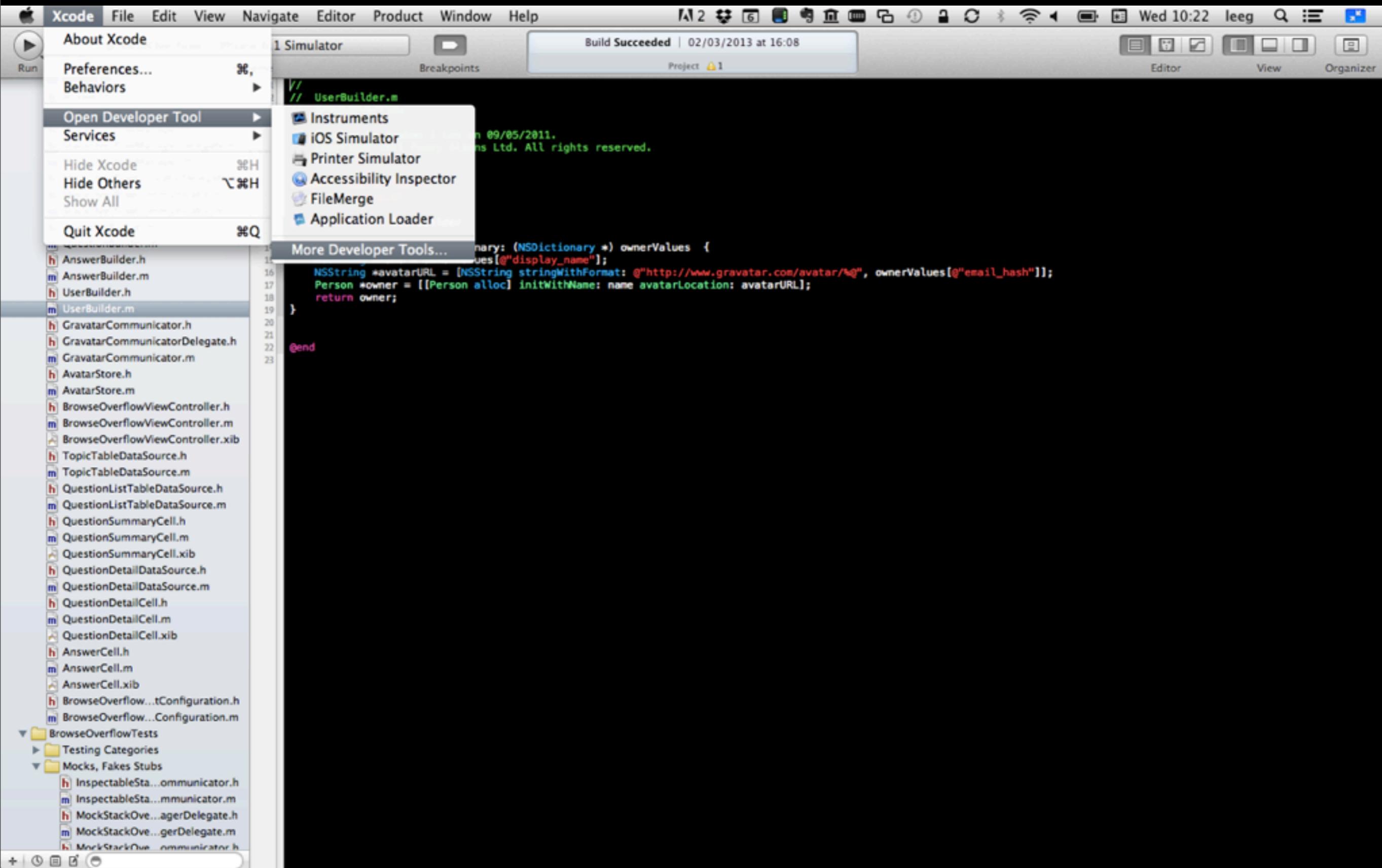
Path /Users/leeg/Documents/Agant/ankh-morpork/Compleat%20Ankh-Morpork/Credits_en_GB.html

Filename Credits_en_GB.html

Query Parameters

No Query Parameters

Request Headers



Xcode File Edit View Navigate Editor Product Window Help

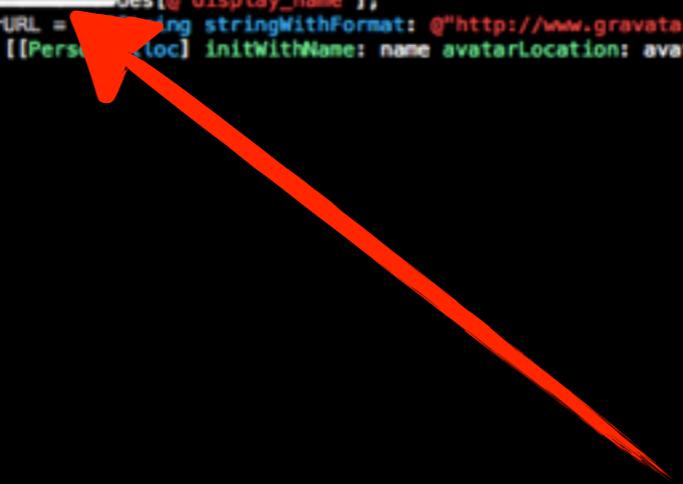
Run

About Xcode Preferences... Behaviors Open Developer Tool Services Hide Xcode Hide Others Show All Quit Xcode

1 Simulator Breakpoints Build Succeeded | 02/03/2013 at 16:08 Project 1

Instruments iOS Simulator Printer Simulator Accessibility Inspector FileMerge Application Loader More Developer Tools...

```
// UserBuilder.m
...
15    NSString *display_name = [ownerValues objectForKey:@"display_name"];
16    NSString *avatarURL = [ownerValues objectForKey:@"email_hash"];
17    Person *owner = [[Person alloc] initWithName: name avatarLocation: avatarURL];
18    return owner;
19 }
20
21 @end
```



The screenshot shows the Xcode interface with the "UserBuilder.m" file open in the editor. The "More Developer Tools..." option in the "Open Developer Tool" submenu is highlighted with a red arrow. The code in the editor is as follows:

```
// UserBuilder.m
...
15    NSString *display_name = [ownerValues objectForKey:@"display_name"];
16    NSString *avatarURL = [ownerValues objectForKey:@"email_hash"];
17    Person *owner = [[Person alloc] initWithName: name avatarLocation: avatarURL];
18    return owner;
19 }
20
21 @end
```

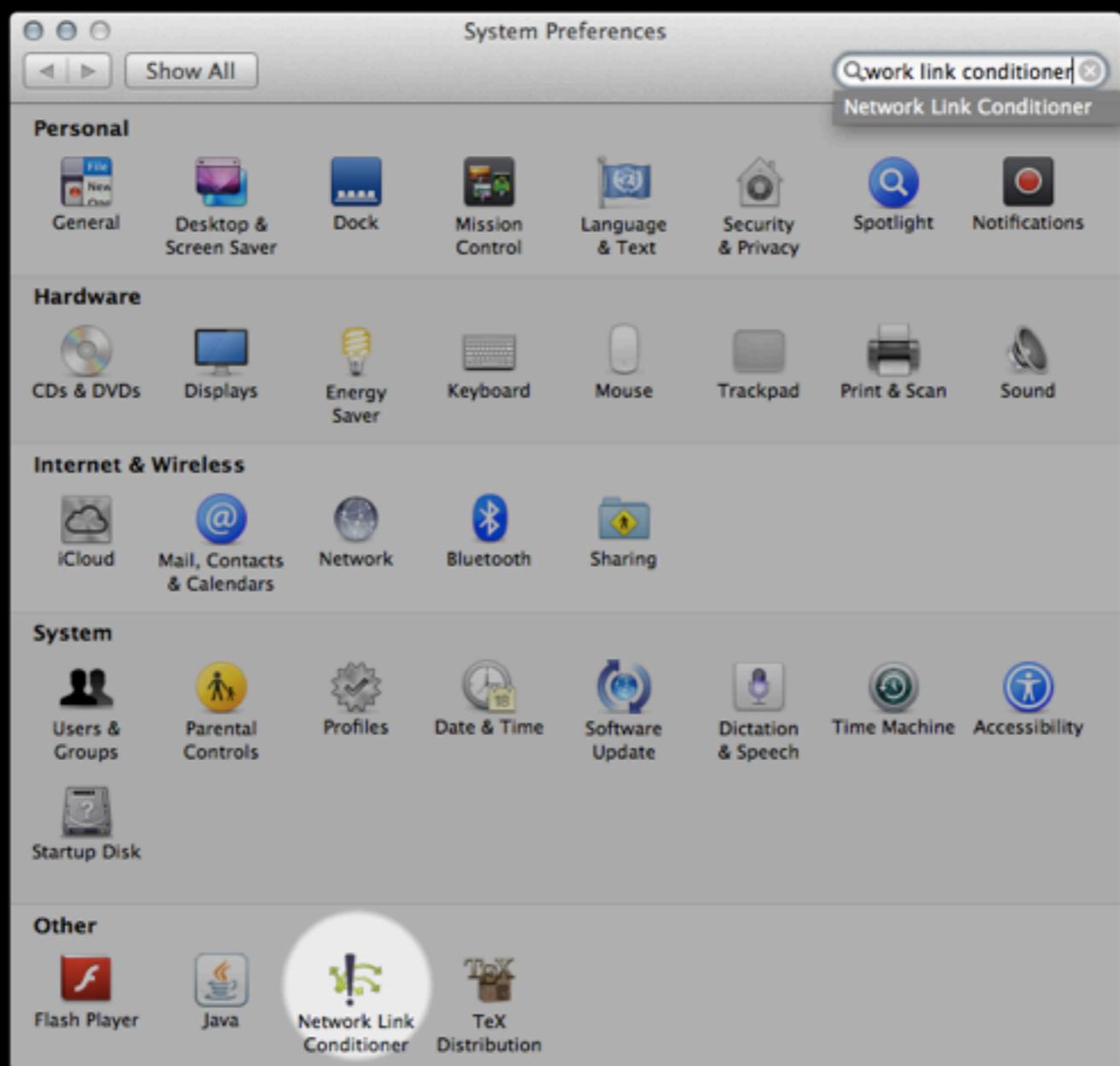
▼ Hardware IO Tools for Xcode - Late July 2012

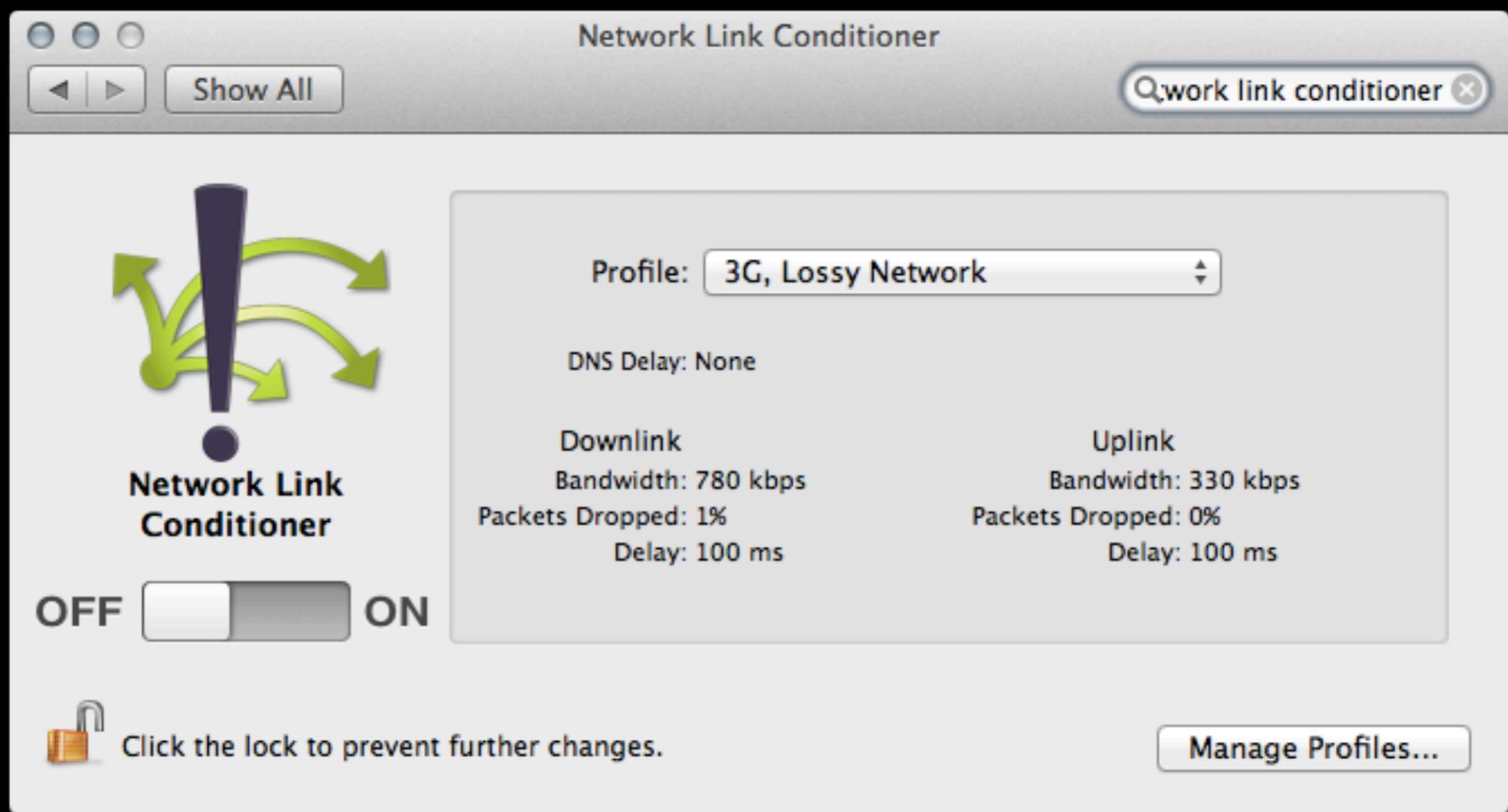
Nov 26, 2012

This package includes tools for developing for specific hardware and external devices. These tools were formerly bundled in the Xcode installer, and include: PacketLogger, IORegistryExplorer, Bluetooth Explorer, and the Network Link Conditioner pane for System Preferences. Tools in this package support running on OS X Mountain Lion.

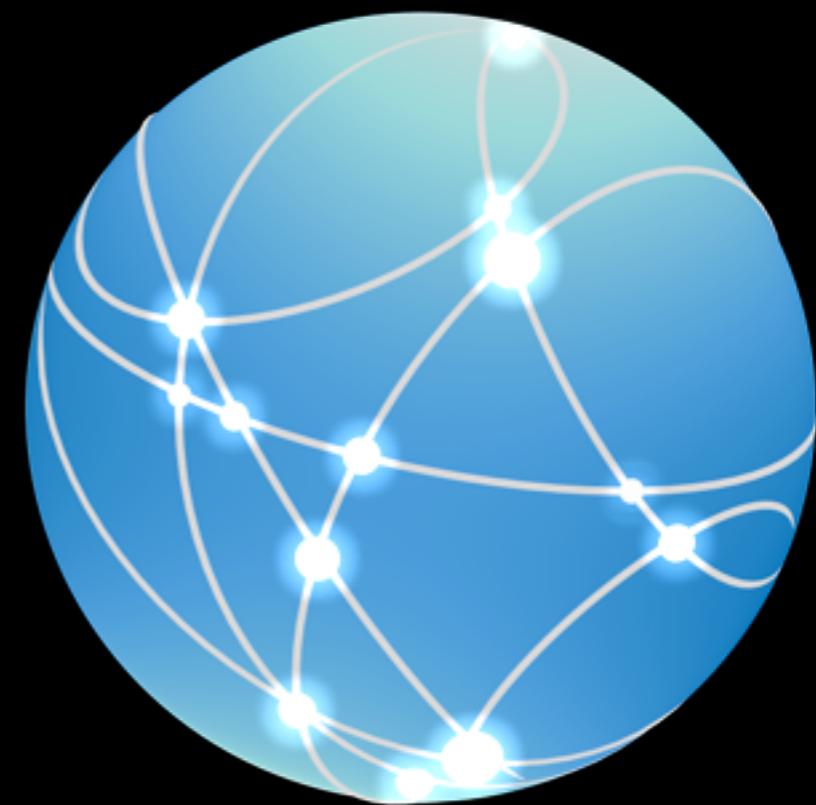


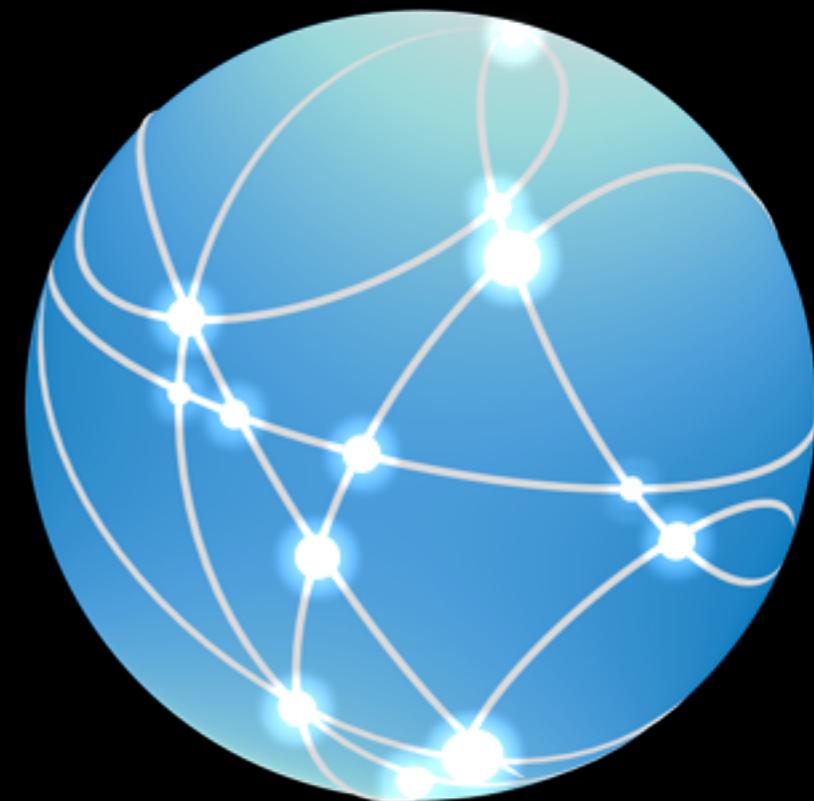
Hardware IO Tools for Xcode 4.4 - Late J
2012
.dmg(28.86 MB)





- [UIWebView
stringByEvaluatingJavaScriptFromString:]





[https://www.owasp.org/index.php/
IOS Developer Cheat Sheet](https://www.owasp.org/index.php/IOS_Developer_Cheat_Sheet)

Testing iOS APPS

Graham Lee / [@secboffin](https://twitter.com/@secboffin)

