Crash Course on Crashes

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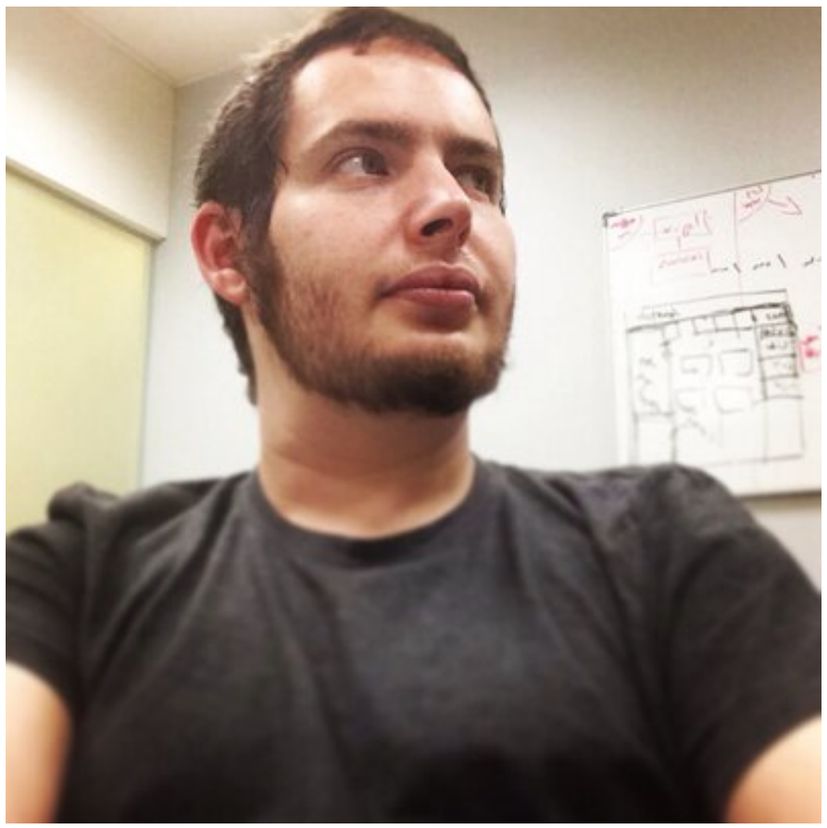
applicaster

AltConf 2019

ABOUT ME

HAVE BEEN IN THE IOS WORLD FOR THE PAST 9 YEARS

- Doing iOS development, React Native, Rails and NodeJS.
- Been with Applicaster for the past 8 years.
- Lead developer and head of Dev Relations team at Applicaster



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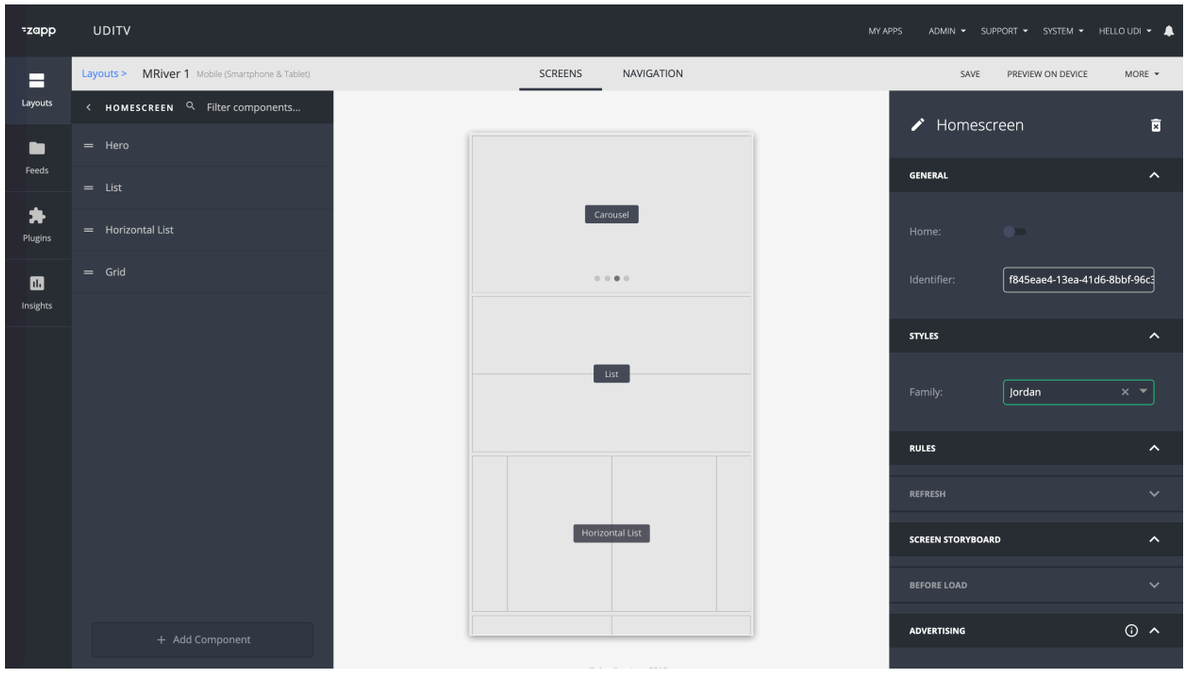

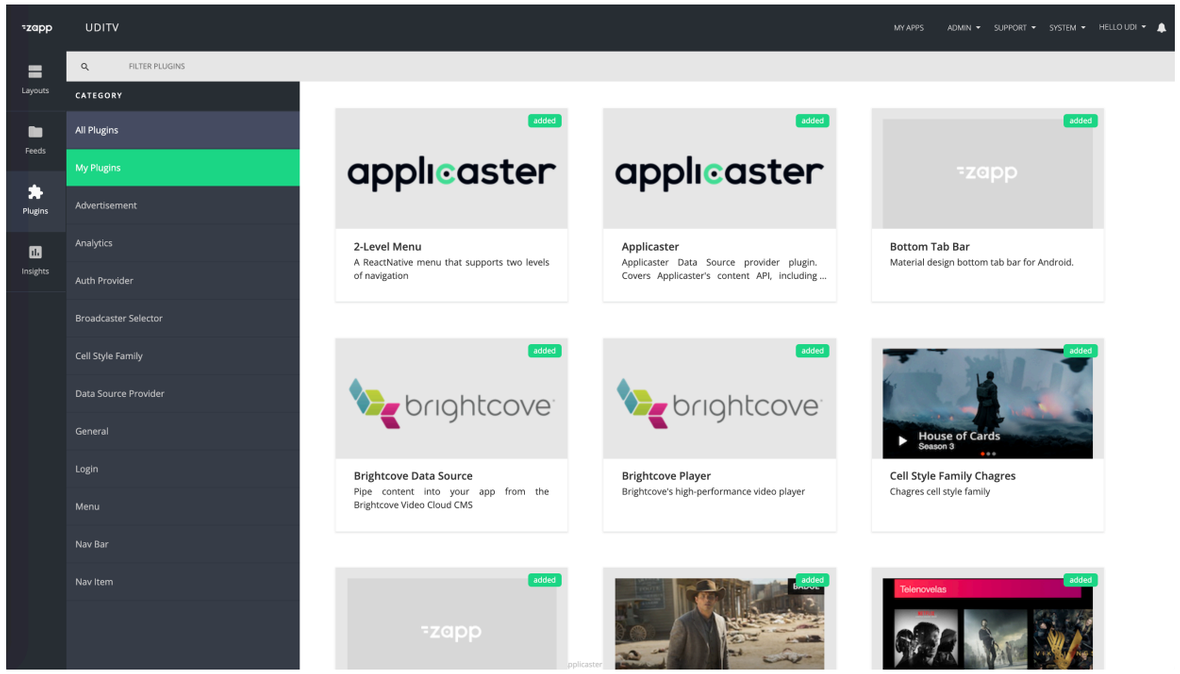

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WHAT WE ARE GOING TO DISCUSS TODAY

- COMMON CRASHES

  A SHORT LIST OF COMMON CRASHES WE ENCOUNTERED AND HANDLED INCLUDING DEBUG TRICKS TO HELP CATCH THOSE COMMON CRASHES

- CRASH LOGS ANATOMY

  HOW DOES A CRASH LOG LOOK LIKE, HOW TO READ THROUGH IT QUICKLY AND HOW TO ADD SYMBOLS IN CASE THEY AREN'T SYMBOLICATED AUTOMATICALLY

- COLLECTING CRASH LOGS

  HOW TO COLLECT CRASH LOGS LOCALLY, FROM ITUNES CONNECT AND FROM CRASH LOG SERVICES

- ALL THE CODE EXAMPLES AND SLIDES ARE AVAILABLE

  HTTP://WWW.GITHUB.COM/APPLICASTER/ALTCONF2019

GOALS

- IDENTIFY THE LINE WHERE THE CODE CRASHES

  BEST CASE SCENARIO - WE ARE ABLE TO PINPOINT THE EXACT LINE OF CODE IN OUR CODE THAT CAUSES THE ISSUE.

- UNDERSTAND THE REASON

  WHY DID THE CRASH HAPPEN? UNDERSTANDING WHY ALWAYS LEADS TO UNDERSTANDING HOW TO FIX

- SHORTEN UNREADABLE STACK / IMPROVE DEBUGGING

  WHEN CRASH DOESN'T HAPPEN DIRECTLY IN OUR CODE, WE WANT TO BE ABLE TO SHORTEN THE UNREADABLE PORTION OF THE STACK TRACE AND TO GET AS MUCH INFO AS POSSIBLE ON THE OBJECT

ABOUT THE EXAMPLES

- SIMPLE

  SIMPLE EXAMPLES OUT OF ONE SINGLE VIEW APPLICATION CONTAINING ALL THE CODE

- NO NETWORKING CODE / ASYNC CODE

  IN REAL LIFE MOST ISSUES WOULD HAPPEN IN MORE COMPLEX, NON-SYNCHRONOUS CODE AND/OR INVOLVE OTHER LIBRARIES

- NO DEPENDANCIES - OPEN SOURCE OR PRECOMPILED LIBRARIES

  IN REAL LIFE, MANY OF US USE COCOAPODS AND IMPORT PRE-COMPILIED LIBRARIES IN ORDER TO SHORTEN DEVELOPMENT TIME AND REDUCE BOILERPLATE CODE AND AVOID “RE-INVENTING THE WHEEL” WHICH IS A GOOD IDEA - HOWEVER THIS COMPLICATES DEBUGGING.

COMMON CRASHES

- UNRECOGNIZED SELECTOR

  WHEN YOU EXPECT ONE OBJECT TYPE BUT YOU ACTUALLY GET ANOTHER.

- BAD MEMORY ACCESS

  MOST COMMONLY DUE TO TRYING TO ACCESS RELEASED OBJECTS AND GETTING GARBAGE FROM THE MEMORY

- WATCHDOGS CRASHES

  MOSTLY DUE TO FAST ALLOCATION OF MEMORY IN A SHORT TIME OR SIGNIFICANT MEMORY LEAKS

- THERE ARE MANY MORE CRASHES

  I'M SURE YOU'E ENCOUNTERED THEM: OUT OF BOUNDS, FORCE UNWRAPPING WRONG CLASSES ETC.

- THE ONES ABOVE ARE COMMON EXAMPLES WHERE IN MY EXPERIENCE XCODE DOESN'T DO A GREAT JOB OF FLUSHING OUT THE CULPRIT.

COMMON CRASHES

GO TO GITHUB.COM/APPLICASTER/ALTCONF2019

THE CODE CONTAINS A SAMPLE THAT WILL HELP YOU REPRODUCE EACH SCENARIO.

UNRECOGNIZED SELECTOR

HAPPENS WHEN A FUNCTION IS CALLED ON A CLASS / OBJECT THAT DOESN'T IMPLEMENT THEM

YOU THINK IT'S ONE TYPE OF OBJECT BUT ACTUALLY ITS NOT

WAY MORE COMMON IN OBJECTIVE C THAN SWIFT

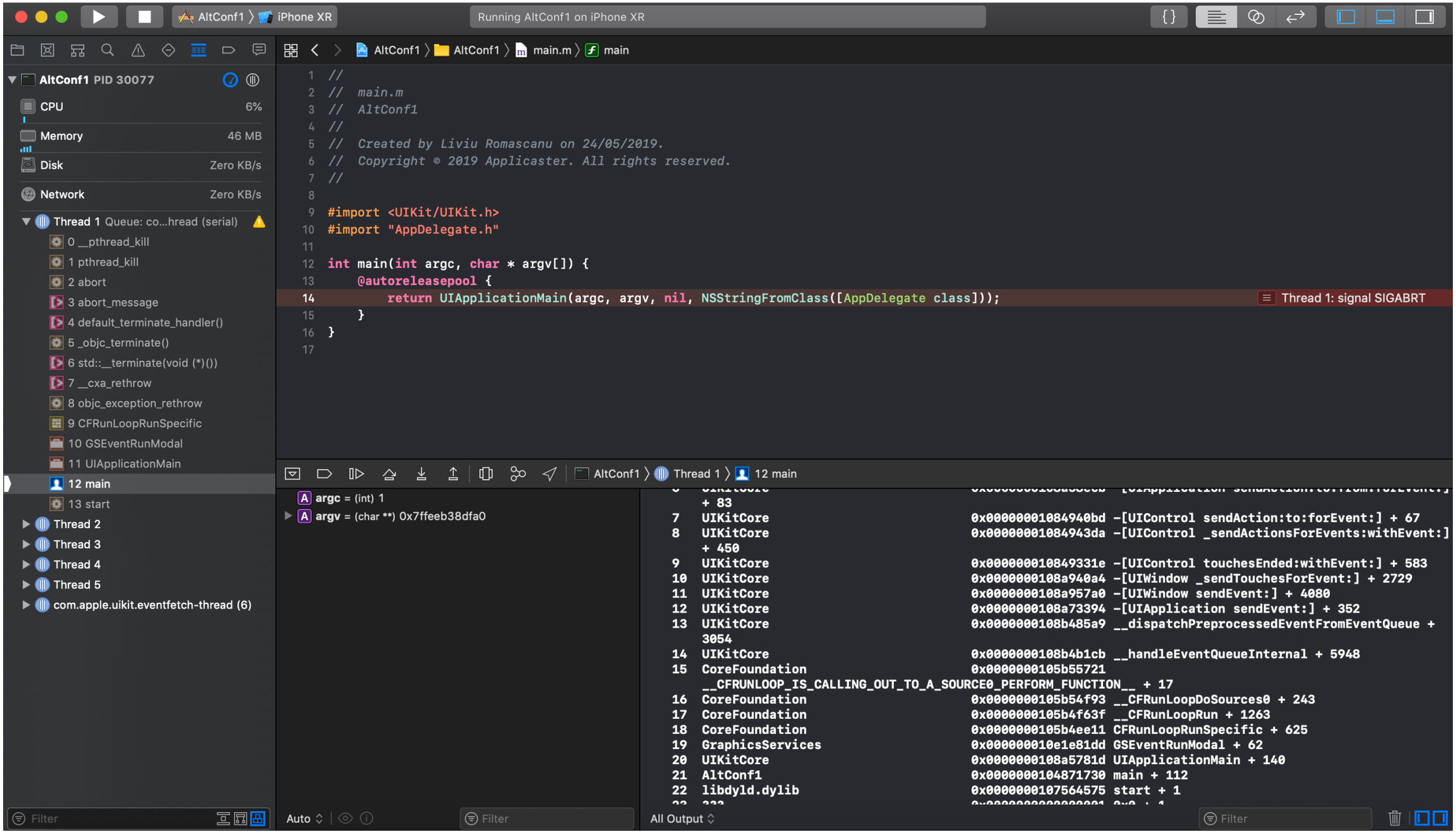
BUT YOU CAN DEFINITELY FIND THEM IN SWIFT - ESPECIALLY IF YOUR FOND OF "!" WHEN UNWRAPPING OBJECTS.

```
NSObject *object =[NSString stringWithFormat:@"[Foo, Bar"];

for (NSString *string in ((NSArray *)object))
{
    NSLog(@"Array object: %@\n", string);
}
```

UNRECOGNIZED SELECTOR

```
2019-05-25 19:57:45.183542-0400 AltConf1[30077:740623] -[__NSCFString countByEnumeratingWithState:objects:count:]: unrecognized
    selector sent to instance 0x600000cc7760
2019-05-25 19:57:45.227413-0400 AltConf1[30077:740623] *** Terminating app due to uncaught exception 'NSInvalidArgumentException',
    reason: '-[__NSCFString countByEnumeratingWithState:objects:count:]: unrecognized selector sent to instance 0x600000cc7760'
*** First throw call stack:
(
    0   CoreFoundation                      0x0000000105bf01bb __exceptionPreprocess + 331
    1   libobjc.A.dylib                     0x000000010518e735 objc_exception_throw + 48
    2   CoreFoundation                      0x0000000105c0ef44 -[NSObject(NSObject) doesNotRecognizeSelector:] + 132
    3   CoreFoundation                      0x0000000105bf4ed6 ___forwarding___ + 1446
    4   CoreFoundation                      0x0000000105bf6da8 _CF_forwarding_prep_0 + 120
    5   AltConf1                            0x000000010487152d -[ViewController unrecognizedSelectorClicked:] + 205
    6   UIKitCore                           0x0000000108a58ecb -[UIApplication sendAction:to:from:forEvent:] + 83
    7   UIKitCore                           0x00000001084940bd -[UIControl sendAction:to:forEvent:] + 67
    8   UIKitCore                           0x00000001084943da -[UIControl _sendActionsForEvents:withEvent:] + 450
    9   UIKitCore                           0x000000010849331e -[UIControl touchesEnded:withEvent:] + 583
    10  UIKitCore                           0x0000000108a940a4 -[UIWindow _sendTouchesForEvent:] + 2729
    11  UIKitCore                           0x0000000108a957a0 -[UIWindow sendEvent:] + 4080
    12  UIKitCore                           0x0000000108a73394 -[UIApplication sendEvent:] + 352
    13  UIKitCore                           0x0000000108b485a9 __dispatchPreprocessedEventFromEventQueue + 3054
    14  UIKitCore                           0x0000000108b4b1cb __handleEventQueueInternal + 5948
    15  CoreFoundation                      0x0000000105b55721 __CFRUNLOOP_IS_CALLING_OUT_TO_A_SOURCE0_PERFORM_FUNCTION__ + 17
    16  CoreFoundation                      0x0000000105b54f93 __CFRunLoopDoSources0 + 243
    17  CoreFoundation                      0x0000000105b4f63f __CFRunLoopRun + 1263
    18  CoreFoundation                      0x0000000105b4ee11 CFRunLoopRunSpecific + 625
    19  GraphicsServices                    0x000000010e1e81dd GSEventRunModal + 62
    20  UIKitCore                           0x0000000108a5781d UIApplicationMain + 140
    21  AltConf1                            0x0000000104871730 main + 112
    22  libdyld.dylib                       0x0000000107564575 start + 1
    23  ???                                 0x0000000000000001 0x0 + 1
)
libc++abi.dylib: terminating with uncaught exception of type NSException
(lldb)
```

UNRECOGNIZED SELECTOR



UNRECOGNIZED SELECTOR

Foundation 〉 Collections 〉 NSFastEnumeration 〉 countByEnumeratingWithState:objects:count:

Instance Method

countByEnumeratingWithState:objects:count:

Returns by reference a C array of objects over which the sender should iterate, and as the return value the number of objects in the array.

Required.

Declaration

```
- (NSUInteger)countByEnumeratingWithState:(NSFastEnumerationState *)state objects:(i
```

Parameters

`state`
Context information that is used in the enumeration to, in addition to other possibilities, ensure that the collection has not been mutated.

`stackbuf`
A C array of objects over which the sender is to iterate.

`len`
The maximum number of objects to return in `stackbuf`.

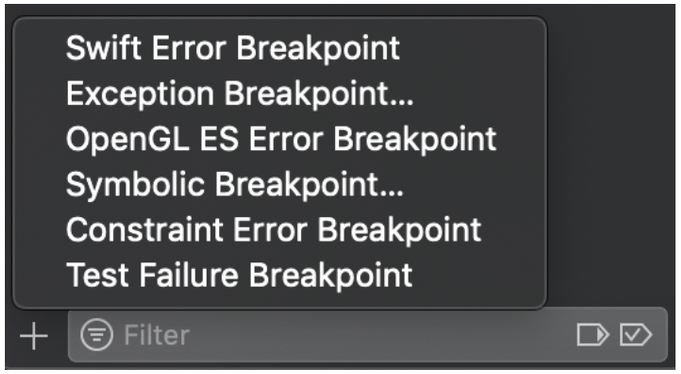
Language
Swift | Objective-C

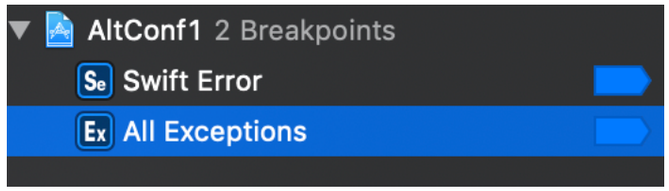
SDKs
iOS 2.0+
macOS 10.5+
tvOS 9.0+
watchOS 2.0+

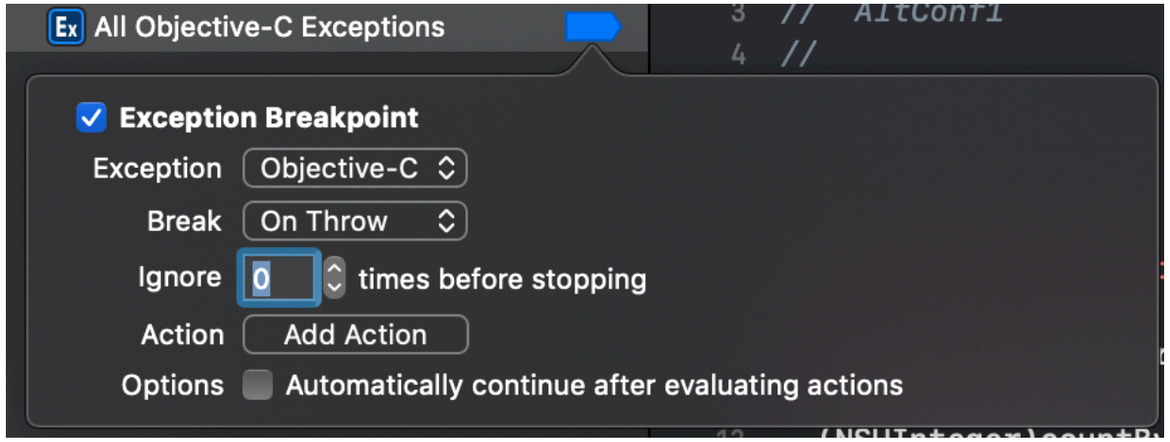
Framework
Foundation

On This Page
Declaration
Parameters
Return Value
Discussion

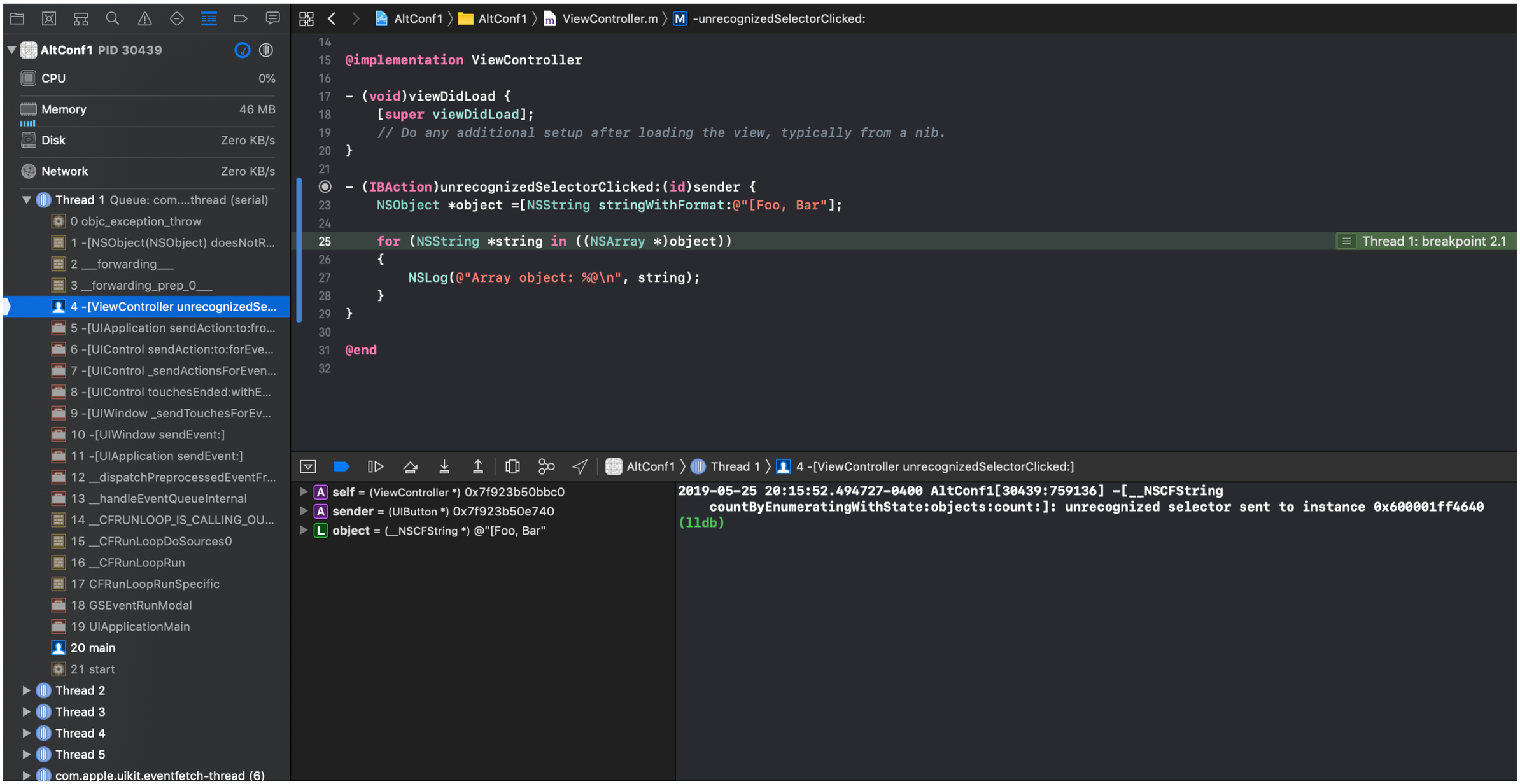
UNRECOGNIZED SELECTOR







UNRECOGNIZED SELECTOR



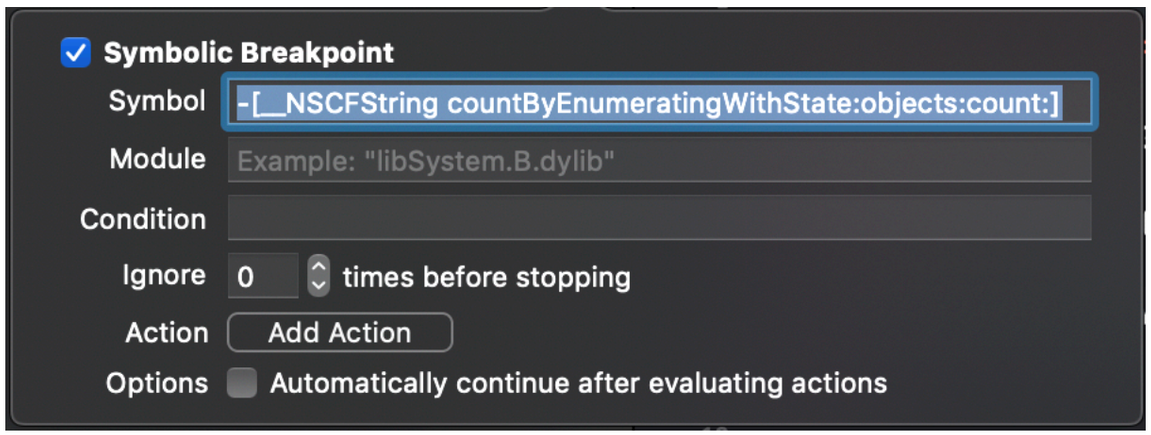
UNRECOGNIZED SELECTOR

CAN WE DO ANY BETTER?

WELL , ACTUALLY - YES WE CAN!

WE CAN UTILIZE ONE OF 2 TOOLS TO ACHIEVE THE SAME RESULT:

1. SYMBOLIC BREAK POINT
2. EXTENSIONS



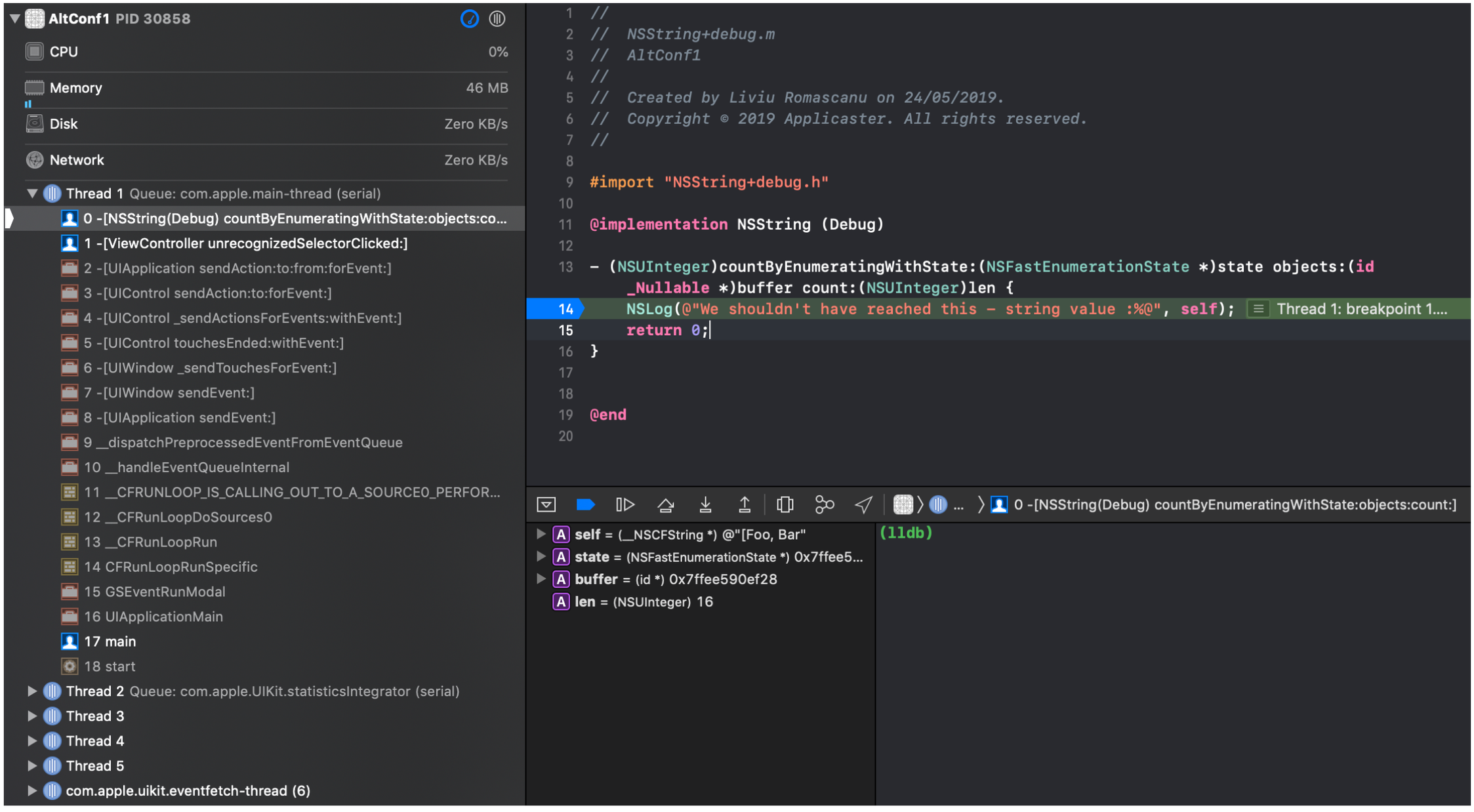
UNRECOGNIZED SELECTOR

EXTENSIONS!

```
#import <Foundation/Foundation.h>

NS_ASSUME_NONNULL_BEGIN

@interface NSString (Debug)

- (NSUInteger)countByEnumeratingWithState:(NSFastEnumerationState *)state objects:(id
    _Nullable *)buffer count:(NSUInteger)len;

@end

NS_ASSUME_NONNULL_END
```

```
#import "NSString+debug.h"

@implementation NSString (Debug)

- (NSUInteger)countByEnumeratingWithState:(NSFastEnumerationState *)state objects:(id
    _Nullable *)buffer count:(NSUInteger)len {
    NSLog(@"We shouldn't have reached this - string value :%@", self);
    return 0;
}


@end
```

UNRECOGNIZED SELECTOR



UNRECOGNIZED SELECTOR

CONCLUSIONS

1. WE FOUND OUT HOW TO GO ABOUT UNRECOGNIZED SELECTORS
2. WE LEARNED HOW TO IMPROVE THE STACK TRACE
3. WE HAVE A TRICK HOW TO AVOID CRASHING, AND HOW TO DEBUG THE OBJECT AND GET THE FULL CONTEXT, EVEN WHEN THE CRASH IS NOT HAPPENING IN OUR CODE

BAD MEMORY ACCESS

IS MY OBJECT STILL IN MEMORY?

THE NEXT FAMILY OF CRASHES WE ARE GONNA TACKLE IS BAD MEMORY ACCESS

```
NSObject *primaryObject = [[NSObject alloc] init];
NSObject __unsafe_unretained *secondaryObject = primaryObject;
primaryObject = nil;
NSLog(@"%@", secondaryObject);
```

BAD MEMORY ACCESS

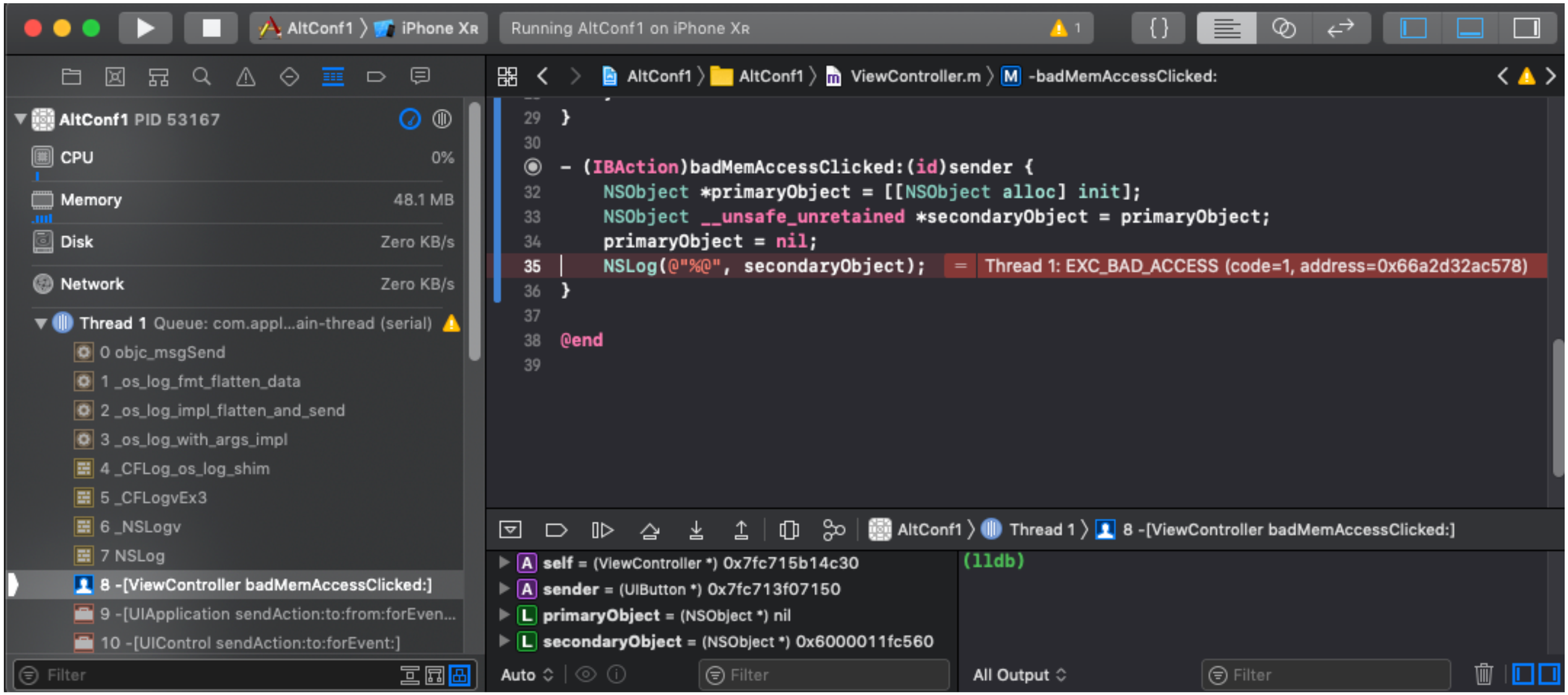
IS MY OBJECT STILL IN MEMORY?

THE NEXT FAMILY OF CRASHES WE ARE GONNA TACKLE IS BAD MEMORY ACCESS

```
Incident Identifier: E8588C36-113C-4DF6-B6CF-4FED47F39F86
CrashReporter Key:   7d7c2ea701941dad131f18a1eddf6d6d63e69615
Hardware Model:      iPad6,3
Process:             AltConf1 [904]
Path:                /private/var/containers/Bundle/Application/69A122D1-AE84-41C6-9107-D983DE8774CF/AltConf1.app/AltConf1
Identifier:          com.applicaster.AltConf1
Version:             1 (1.0)
Code Type:           ARM-64 (Native)
Role:                Non UI
Parent Process:      launchd [1]
Coalition:           com.applicaster.AltConf1 [640]


Date/Time:           2019-05-28 12:52:40.5213 -0400
Launch Time:         2019-05-28 12:52:38.4932 -0400
OS Version:          iPhone OS 12.3 (16F156)
Baseband Version:    n/a
Report Version:      104

Exception Type:  EXC_BAD_ACCESS (SIGSEGV)
Exception Subtype: KERN_INVALID_ADDRESS at 0x0000000b99e044f0
VM Region Info: 0xb99e044f0 is not in any region.  Bytes after previous region: 38551962865
      REGION TYPE                      START - END             [ VSIZE] PRT/MAX SHRMOD  REGION DETAIL
      MALLOC_NANO            0000000280000000-00000002a0000000 [512.0M] rw-/rwx SM=PRV
--->
      UNUSED SPACE AT END

Termination Signal: Segmentation fault: 11
Termination Reason: Namespace SIGNAL, Code 0xb
Terminating Process: exc handler [904]
Triggered by Thread:  0
```

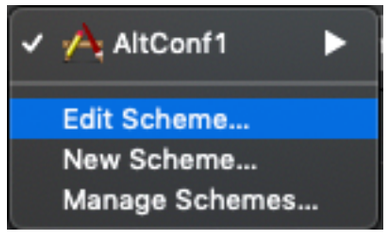
BAD MEMORY ACCESS

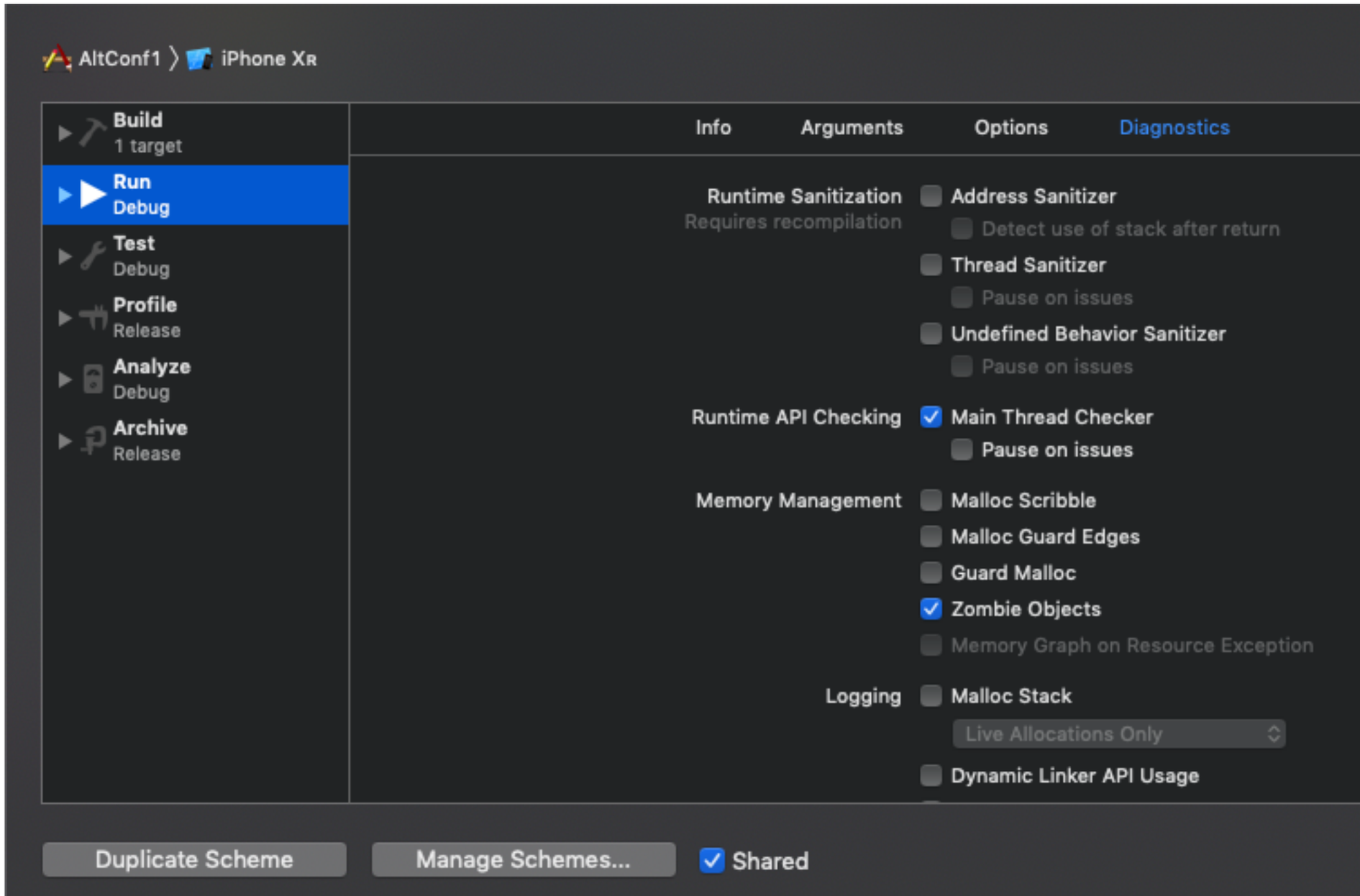
LET'S GO TO THE DEBUGGER



BAD MEMORY ACCESS

ZOMBIES? WHAT DO YOU MEAN ZOMBIES?!?





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BAD MEMORY ACCESS

ZOMBIES? WHAT DO YOU MEAN ZOMBIES?!?

A 101 ON MEMORY MANAGEMENT

- OBJECT HAS A REFERENCE COUNT PROPERTY
- WHEN REFERENCE COUNT BECOMES 0 (NO ONE POINTS TO IT) - OBJECT IS RELEASED
- WHEN TRYING TO ACCESS A RELEASED OBJECT - YOU MIGHT CRASH THE APPLICATION

YOU CAN ENCOUNTER THIS AROUND DELEGATES - EVEN IF THE PUBLIC HEADER FILE SAYS “WEAK” WHICH IS SAFE.

BAD MEMORY ACCESS

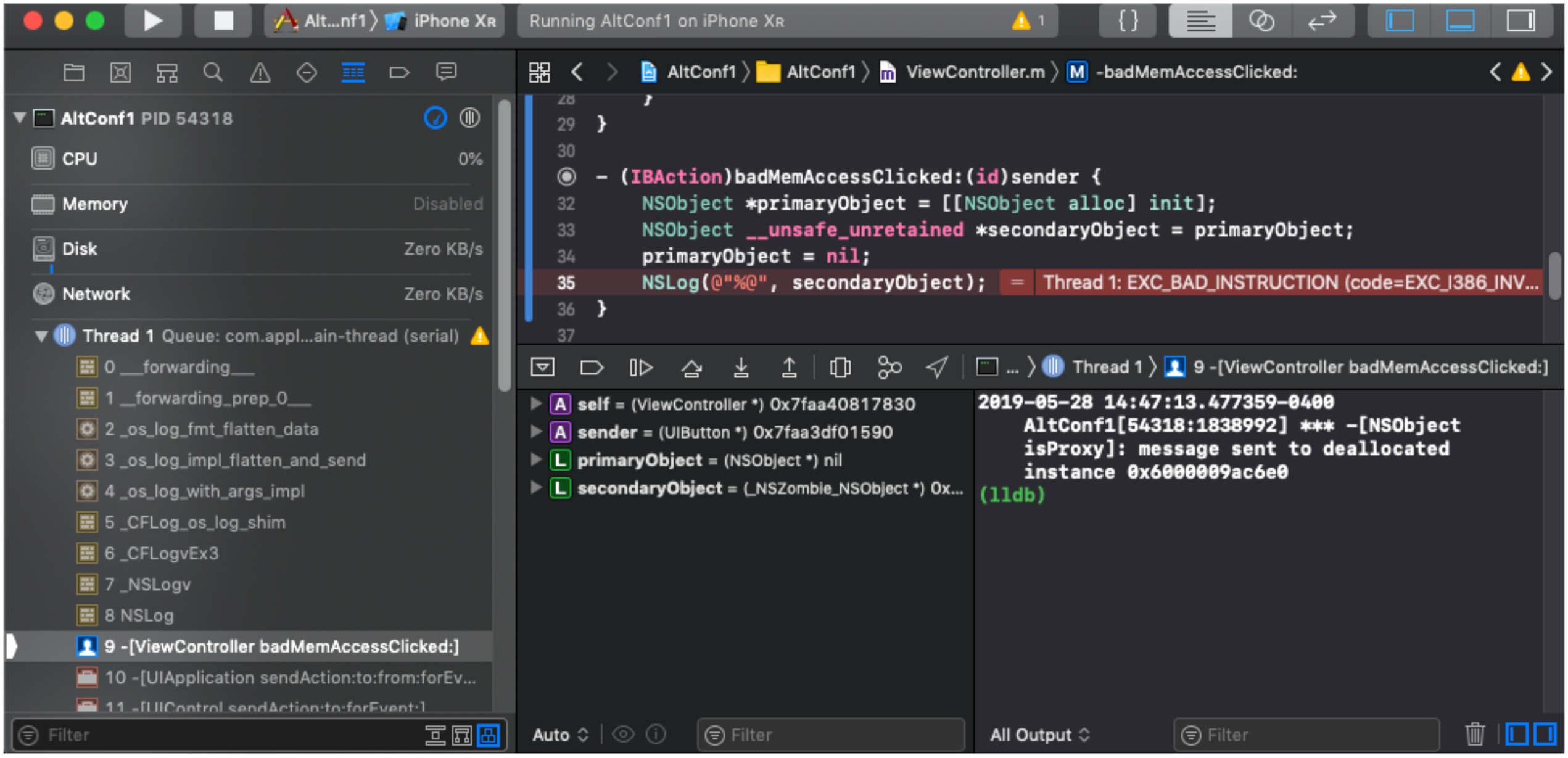
ZOMBIES? WHAT DO YOU MEAN ZOMBIES?!?

THE ZOMBIE OBJECTS FLAG KEEPS THE OBJECT ALIVE IN MEMORY BUT SENDS AN ASSERTION IF A RELEASED OBJECT GETS A MESSAGE.

ENABLING THIS FLAG WILL CAUSE HIGHER MEMORY CONSUMPTION - SO DON’T ALWAYS TURN IT ON.

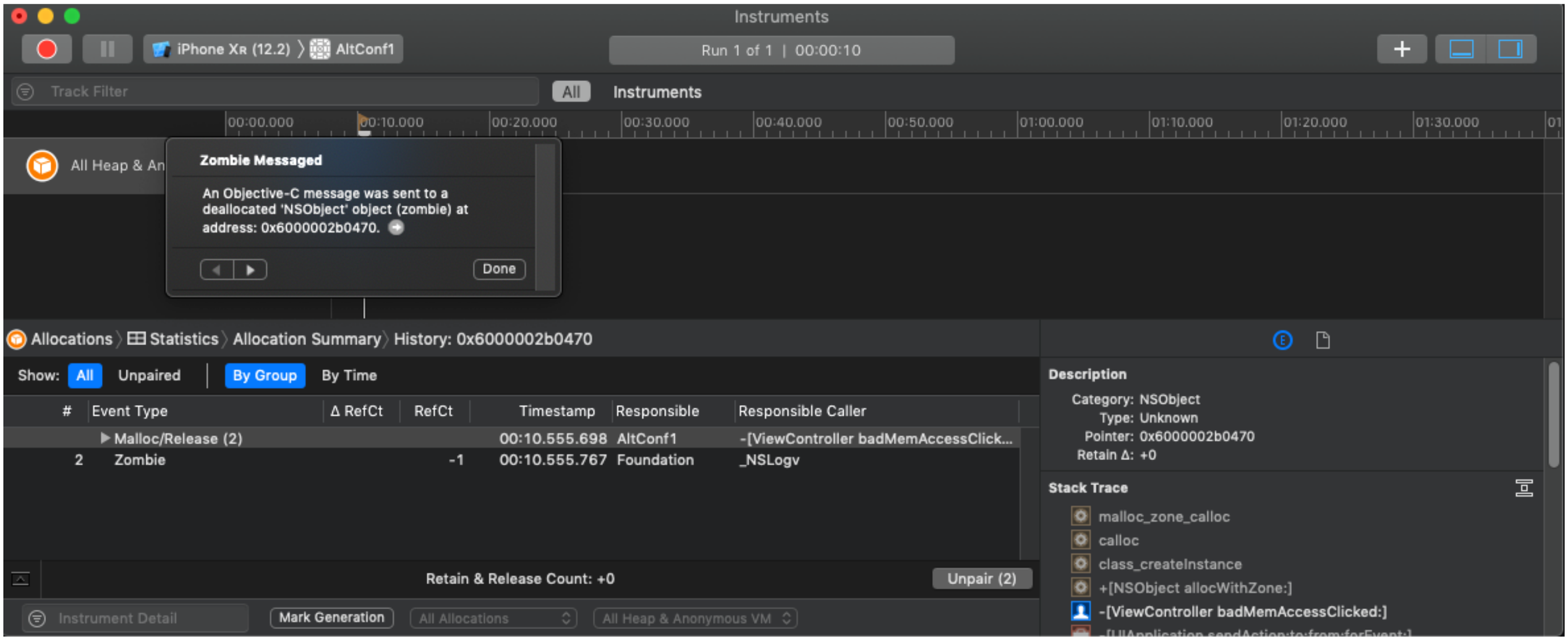
BAD MEMORY ACCESS

HOW IT LOOKS WITH ZOMBIES ENABLED



BAD MEMORY ACCESS

OPTION #2 - ZOMBIES PROFILER



BAD MEMORY ACCESS

CONCLUSIONS

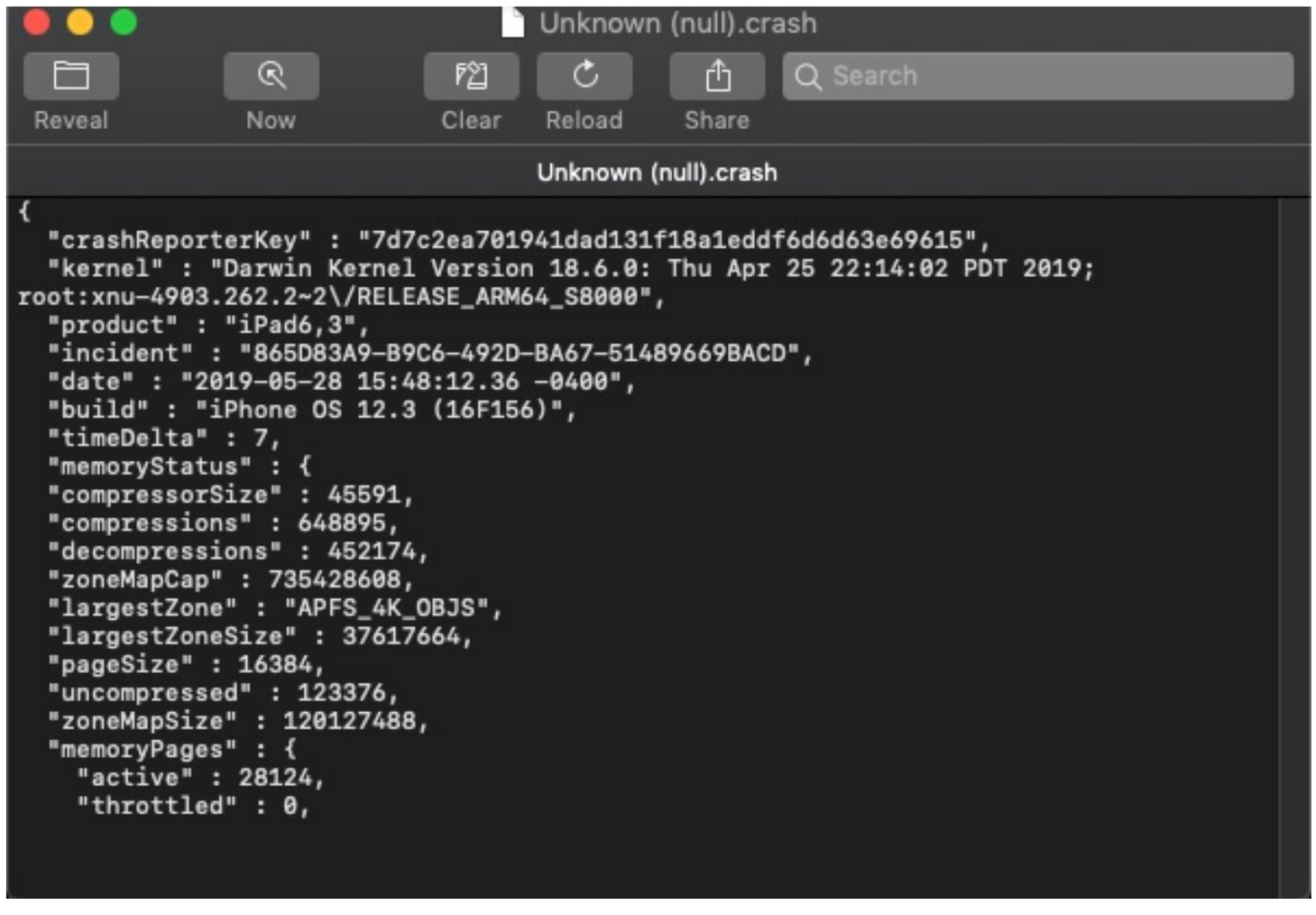
1. WE IDENTIFIED ONE VERY COMMON TYPE OF BAD MEMORY ACCESS
2. WE KNOW HOW TO VERIFY IT'S INDEED THE ISSUE WE ARE ENCOUNTERING
3. WE CAN SEE THE OBJECT TYPE, CALL, CATCH IT DETERMINISTICALLY, AND GET THE MEMORY ADDRESS

WATCHDOG CRASHES

WAIT - WHERE IS MY CRASH LOG?

THE LAST FAMILY OF CRASHES WE WILL DISCUSS ARE CRASHES WHICH DON'T CREATE THE CLASSIC CRASH LOG

```objc
NSMutableArray *imagesArray = [NSMutableArray new];
for (NSInteger i = 0; i >= 0; i++) {
    [imagesArray addObject:[UIImage imageNamed:@"msm"]];
}
```



WATCHDOG CRASHES

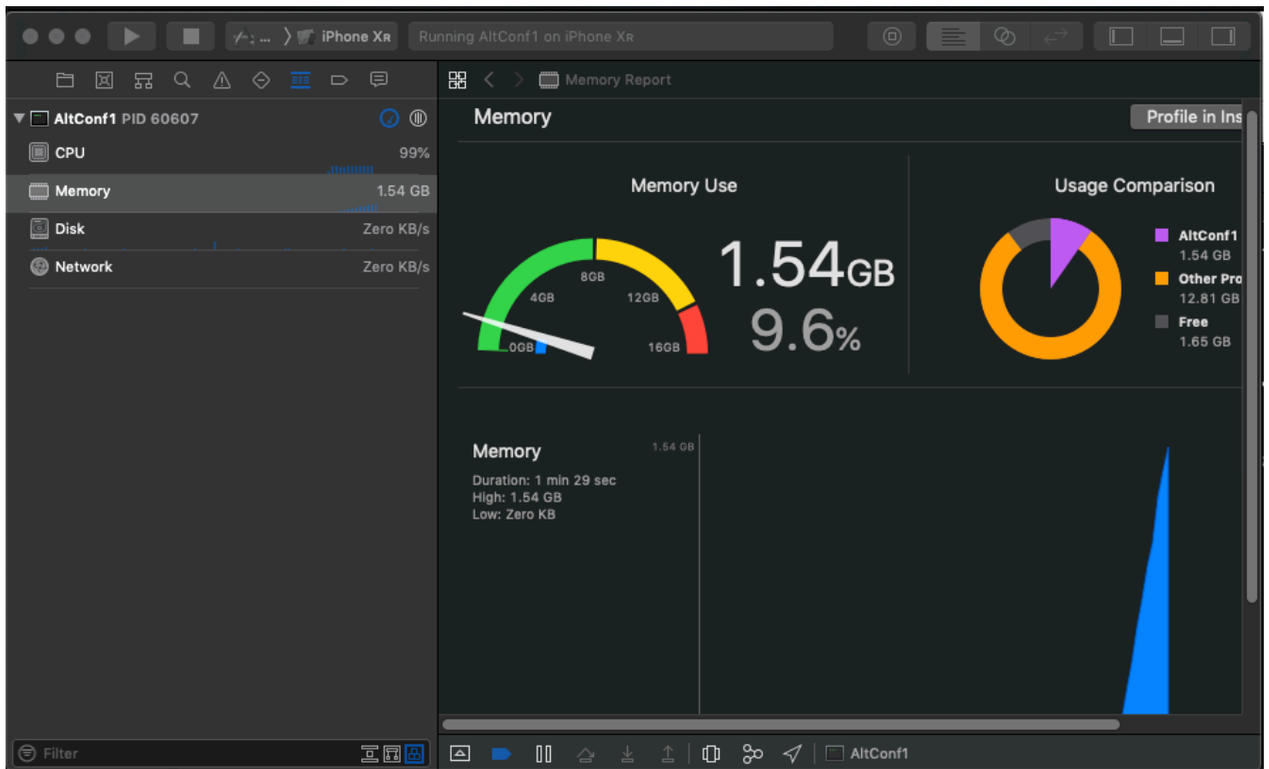
THE HARD PART

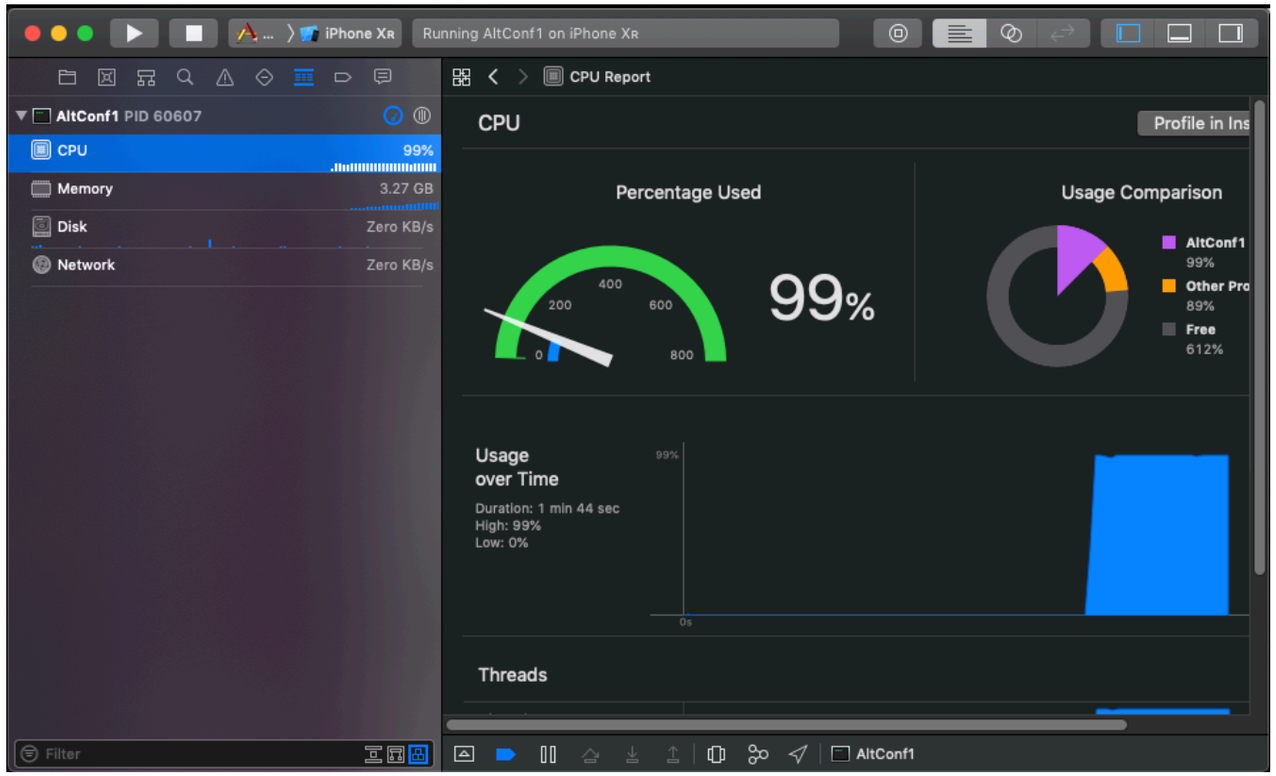
IS UNDERSTANDING WHAT HAPPENED - ESPECIALLY WHEN THE CRASH DOESN'T REPRODUCE IN THE SIMULATOR IN MANY CASES.
YOUR MAC HAS GREATER RESOURCES AND DIFFERENT OS WATCHDOG BEHAVIOR.

XCODE TO THE RESCUE

XCODE ITSELF OFFERS A REALLY NICE VIEW
LET'S REVIEW TWO SCENARIOS:

1. MEMORY ALLOCATIONS
2. CPU USAGE FOR EXAMPLE



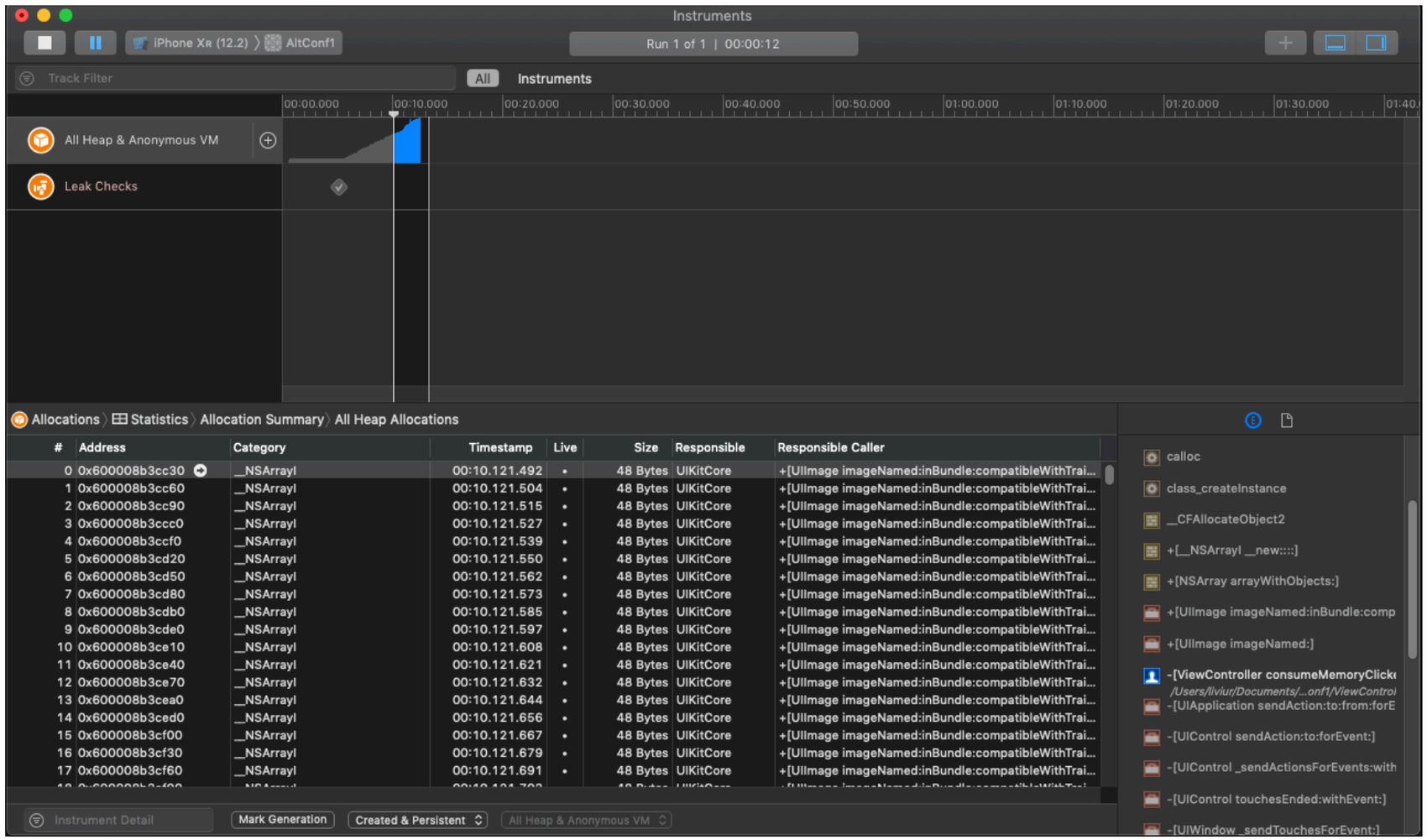


WATCHDOG CRASHES

TIME TO 1 UP IT

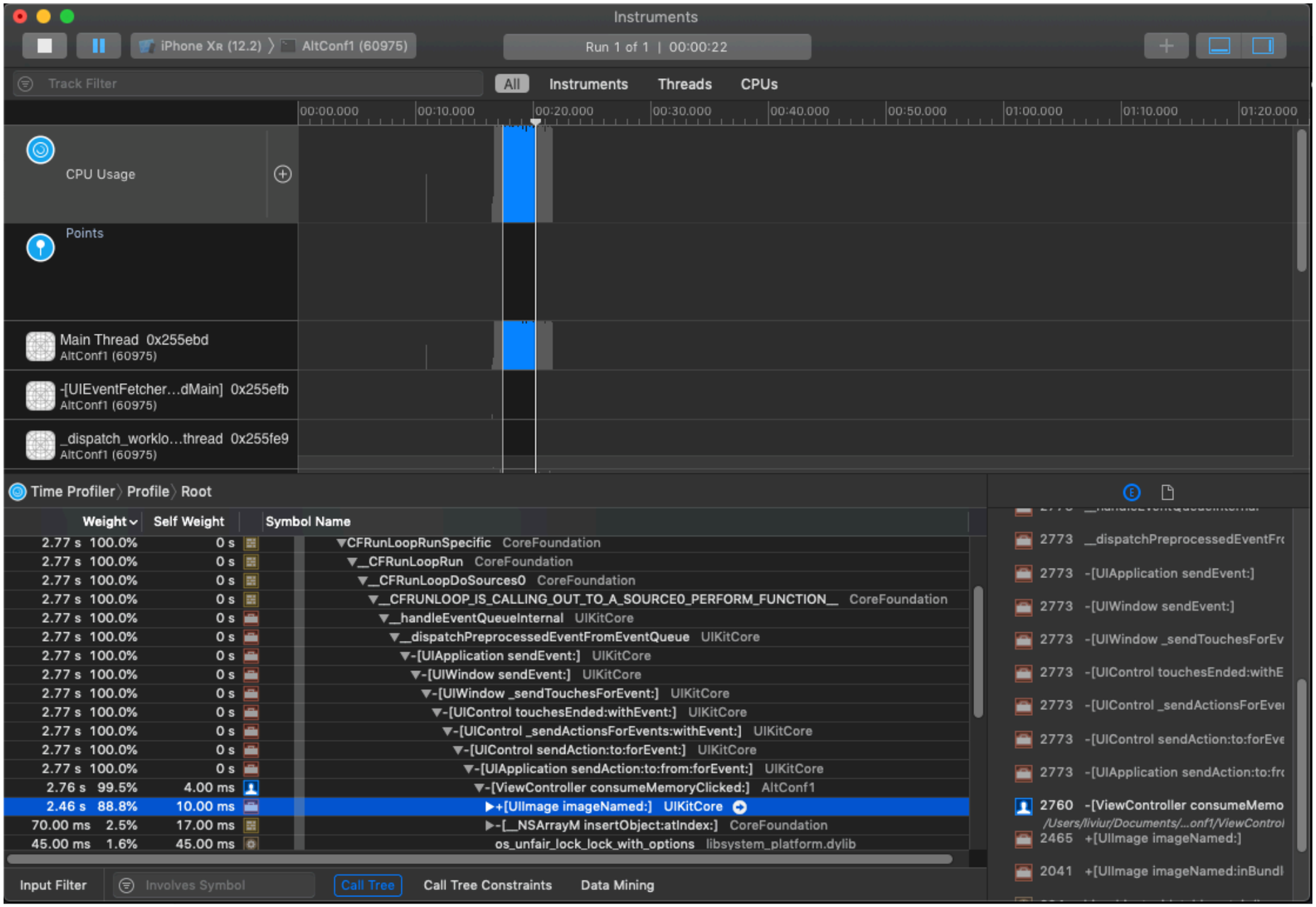
CLICKING PROFILE IN INSTRUMENTS BUTTON ALLOWS YOU TO JUMP DIRECTLY INTO THE RESPECTIVE INSTRUMENTS AND EVEN TRANSFER THE CURRENT DEBUG SESSION IN MOST CASES.

LET’S START WITH THE LEAKS AND ALLOCATIONS INSTRUMENT.



WATCHDOG CRASHES

CPU INSTRUMENT



WATCHDOG CRASHES

CONCLUSIONS

- THESE KIND OF CRASHES ARE A BIT TRICKIER - THEY DON’T ALWAYS GENERATE CRASH LOGS ATTRIBUTED TO THE APPLICATION - EVEN IF THE APPLICATION ITSELF CAUSES THE CRASH

- USE A DEVICE TO REPRODUCE WATCHDOG CRASHES

- FOLLOW THE XCODE DEBUG SESSION PARAMETERS, LIKE CPU AND MEMORY, AND GET COMFORTABLE WITH INSTRUMENTS

BEST PRACTICES

1. USE THE GENERAL BREAK POINTS TO CATCH THINGS EARLY
2. USE SWIFT - WITH A PROPER USE OF OPTIONALS. RARELY DO YOU NEED TO USE FORCE UNWRAP.
3. GET FAMILIAR WITH INSTRUMENTS - THE WWDC INTRO SESSIONS AND WHAT'S NEW ON INSTRUMENTS AND LLDB ARE GOLD MINES - WATCH AT LEAST THE CURRENT / LAST YEAR'S SESSIONS.

UNDERSTANDING CRASH LOGS WWDC 2014 TALK:
HTTPS://DEVELOPER.APPLE.COM/VIDEOS/PLAY/WWDC2018/414/

UNDERSTANDING CRASHES AND CRASH LOGS WWDC 2018 TALK:
HTTPS://DEVELOPER.APPLE.COM/VIDEOS/PLAY/WWDC2018/414/

APPLE TECH NOTE (VERY DETAILED - YET NO LONGER OFFICIALLY UPDATED):
HTTPS://DEVELOPER.APPLE.COM/LIBRARY/ARCHIVE/TECHNOTES/TN2151/_INDEX.HTML

SAMPLE APP AND SLIDES:

CRASH LOG ANATOMY

1. CONTAINS INFO SUCH AS HARDWARE, PROCESS THAT CAUSED THE CRASH , BUNDLE IDENTIFIER, VERSION.

2. CONTAINS THE TIME (LAUNCH AND CRASH) AND THE OS VERSION

3. CONTAINS THE EXCEPTION TYPE, MEMORY ADDRESS RELATED TO THE CRASH, AND THE TERMINATION REASONS. LAST LINE OF THIS SEGMENT CONTAINS THE THREAD - 0 REPRESENTS MAIN THREAD.

4. CONTAINS THE STACK TRACE ON ACTIVE THREADS (LAST COMMANDS CAPTURED AROUND THE CRASH TIME).

```
Incident Identifier: FF19AED4-2677-44D1-A992-91795BC3980A
CrashReporter Key:   7d7c2ea701941dad131f18a1eddf6d6d63e69615
Hardware Model:      iPad6,3
Process:             AltConf1 [901]
Path:                /private/var/containers/Bundle/Application/69A122D1-AE84-41C6-9107-D983DE8774CF/
AltConf1.app/AltConf1
Identifier:          com.applicaster.AltConf1
Version:             1 (1.0)
Code Type:           ARM-64 (Native)
Role:                Non UI
Parent Process:      launchd [1]
Coalition:           com.applicaster.AltConf1 [638]


Date/Time:           2019-05-28 12:51:11.1237 -0400
Launch Time:         2019-05-28 12:51:09.4061 -0400
OS Version:          iPhone OS 12.3 (16F156)
Baseband Version:    n/a
Report Version:      104

Exception Type:  EXC_BAD_ACCESS (SIGSEGV)
Exception Subtype: KERN_INVALID_ADDRESS at 0x0000000447db77f0
VM Region Info: 0x447db77f0 is not in any region.  Bytes after previous region: 7111145457
      REGION TYPE                      START - END             [ VSIZE] PRT/MAX SHRMOD  REGION DETAIL
      MALLOC_NANO            0000000280000000-00000002a0000000 [512.0M] rw-/rwx SM=PRV
--->
      UNUSED SPACE AT END

Termination Signal: Segmentation fault: 11
Termination Reason: Namespace SIGNAL, Code 0xb
Terminating Process: exc handler [901]
Triggered by Thread:  0

Thread 0 name:  Dispatch queue: com.apple.main-thread
Thread 0 Crashed:
0   libobjc.A.dylib                 0x0000000197682530 objc_msgSend + 16
1   libsystem_trace.dylib           0x00000001980c7ff8 _os_log_fmt_flatten_data + 136
2   libsystem_trace.dylib           0x00000001980ce7c8 _os_log_impl_flatten_and_send + 1632
3   libsystem_trace.dylib           0x00000001980d0d7c _os_log_with_args_impl + 396
4   CoreFoundation                  0x000000019848087c _CFLog_os_log_shim + 68
5   CoreFoundation                  0x00000001984807b8 _CFLogvEx3 + 128
6   Foundation                      0x0000000198efc63c _NSLogv + 124
7   Foundation                      0x0000000198efc670 NSLog + 32
8   AltConf1                        0x00000001005a6684 -[ViewController badMemAccessClicked:] + 26244
(ViewController.m:36)
9   UIKitCore                       0x00000001c4795040 -[UIApplication sendAction:to:from:forEvent:] + 96
10  UIKitCore                       0x00000001c423e1c8 -[UIControl sendAction:to:forEvent:] + 80
11  UIKitCore                       0x00000001c423e4e8 -[UIControl _sendActionsForEvents:withEvent:] + 440
12  UIKitCore                       0x00000001c423d554 -[UIControl touchesEnded:withEvent:] + 568
13  UIKitCore                       0x00000001c47cc304 -[UIWindow _sendTouchesForEvent:] + 2108
14  UIKitCore                       0x00000001c47cd52c -[UIWindow sendEvent:] + 3140
15  UIKitCore                       0x00000001c47ad59c -[UIApplication sendEvent:] + 340
16  UIKitCore                       0x00000001c4873714 __dispatchPreprocessedEventFromEventQueue + 1768
17  UIKitCore                       0x00000001c4875e40 __handleEventQueueInternal + 4828
18  UIKitCore                       0x00000001c486f070 __handleHIDEventFetcherDrain + 152
19  CoreFoundation                  0x0000000198422018
__CFRUNLOOP_IS_CALLING_OUT_TO_A_SOURCE0_PERFORM_FUNCTION__ + 24
20  CoreFoundation                  0x0000000198421f98 __CFRunLoopDoSource0 + 88
21  CoreFoundation                  0x0000000198421880 __CFRunLoopDoSources0 + 176
22  CoreFoundation                  0x000000019841c7bc __CFRunLoopRun + 1004
23  CoreFoundation                  0x000000019841c0b0 CFRunLoopRunSpecific + 436
```

CRASH LOG ANATOMY

WHAT TO DO IF I DON'T SEE THE SYMBOLS?

SOMETIMES CRASH LOGS COME WITHOUT ALL THE SYMBOLS - BUT THERE'S A SOLUTION … SOMETIMES.

```
Thread 0 name:  Dispatch queue: com.apple.main-thread
Thread 0 Crashed:
0   libobjc.A.dylib                 0x0000000197682530 0x197665000 + 120112
1   libsystem_trace.dylib           0x00000001980c7ff8 0x1980c0000 + 32760
2   libsystem_trace.dylib           0x00000001980ce7c8 0x1980c0000 + 59336
3   libsystem_trace.dylib           0x00000001980d0d7c 0x1980c0000 + 68988
4   CoreFoundation                  0x000000019848087c 0x198378000 + 1083516
5   CoreFoundation                  0x00000001984807b8 0x198378000 + 1083320
6   Foundation                      0x0000000198efc63c 0x198de2000 + 1156668
7   Foundation                      0x0000000198efc670 0x198de2000 + 1156720
8   AltConf1                        0x00000001045f6684 0x1045f0000 + 26244
9   UIKitCore                       0x00000001c4795040 0x1c3ed7000 + 9166912
10  UIKitCore                       0x00000001c423e1c8 0x1c3ed7000 + 3568072
11  UIKitCore                       0x00000001c423e4e8 0x1c3ed7000 + 3568872
12  UIKitCore                       0x00000001c423d554 0x1c3ed7000 + 3564884
13  UIKitCore                       0x00000001c47cc304 0x1c3ed7000 + 9392900
14  UIKitCore                       0x00000001c47cd52c 0x1c3ed7000 + 9397548
15  UIKitCore                       0x00000001c47ad59c 0x1c3ed7000 + 9266588
16  UIKitCore                       0x00000001c4873714 0x1c3ed7000 + 10077972
17  UIKitCore                       0x00000001c4875e40 0x1c3ed7000 + 10088000
18  UIKitCore                       0x00000001c486f070 0x1c3ed7000 + 10059888
19  CoreFoundation                  0x0000000198422018 0x198378000 + 696344
20  CoreFoundation                  0x0000000198421f98 0x198378000 + 696216
21  CoreFoundation                  0x0000000198421880 0x198378000 + 694400
22  CoreFoundation                  0x000000019841c7bc 0x198378000 + 673724
23  CoreFoundation                  0x000000019841c0b0 0x198378000 + 671920
```

```
Thread 0 name:  Dispatch queue: com.apple.main-thread
Thread 0 Crashed:
0   libobjc.A.dylib                 0x0000000197682530 objc_msgSend + 16
1   libsystem_trace.dylib           0x00000001980c7ff8 _os_log_fmt_flatten_data + 136
2   libsystem_trace.dylib           0x00000001980ce7c8 _os_log_impl_flatten_and_send + 1632
3   libsystem_trace.dylib           0x00000001980d0d7c _os_log_with_args_impl + 396
4   CoreFoundation                  0x000000019848087c _CFLog_os_log_shim + 68
5   CoreFoundation                  0x00000001984807b8 _CFLogvEx3 + 128
6   Foundation                      0x0000000198efc63c _NSLogv + 124
7   Foundation                      0x0000000198efc670 NSLog + 32
8   AltConf1                        0x00000001005a6684 -[ViewController badMemAccessClicked:] + 26244
(ViewController.m:36)
9   UIKitCore                       0x00000001c4795040 -[UIApplication sendAction:to:from:forEvent:] + 96
10  UIKitCore                       0x00000001c423e1c8 -[UIControl sendAction:to:forEvent:] + 80
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14  UIKitCore                       0x00000001c47cd52c -[UIWindow sendEvent:] + 3140
15  UIKitCore                       0x00000001c47ad59c -[UIApplication sendEvent:] + 340
16  UIKitCore                       0x00000001c4873714 __dispatchPreprocessedEventFromEventQueue + 1768
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18  UIKitCore                       0x00000001c486f070 __handleHIDEventFetcherDrain + 152
19  CoreFoundation                  0x0000000198422018
__CFRUNLOOP_IS_CALLING_OUT_TO_A_SOURCE0_PERFORM_FUNCTION__ + 24
20  CoreFoundation                  0x0000000198421f98 __CFRunLoopDoSource0 + 88
21  CoreFoundation                  0x0000000198421880 __CFRunLoopDoSources0 + 176
22  CoreFoundation                  0x000000019841c7bc __CFRunLoopRun + 1004
23  CoreFoundation                  0x000000019841c0b0 CFRunLoopRunSpecific + 436
```

CRASH LOG ANATOMY

LET'S GET TO IT:

1. EXPORT THE XCODE DEVELOPER DIRECTORY TO "DEVELOPER_DIR" ENV VARIABLE:

```
export DEVELOPER_DIR=/Applications/Xcode.app/Contents/Developer
```

2. FOR SIMPLICITY'S SAKE - PLACE THE CRASH LOG AND THE BINARY / DSYM IN THE SAME DIRECTORY

3. LOCATE YOUR SYMBOLICATE CRASHLOG UTILITY. ITS USUAL LOCATION IS:

```
/Applications/Xcode.app/Contents/SharedFrameworks/DVTFoundation.framework/Versions/A/Resources/symbolicatecrash
```

4. RUN THE SYMBOLICATE CRASHLOG UTILITY:

<Symbolicate crashlog path>/symbolicatecras <log.crash> <binary.app> -o <symbolicated.crash>

PARAMETERS ARE:

1. UNSYMBOLICATED CRASH LOG
2. APP PACKAGE (BINARY.APP) IN CASE DWARF WAS USED AND IT'S A RICH BINARY OR DSYM DIRECTORY (BINARY.APP/DSYM)
3. OUTPUT FILE AFTER "-O" PARAMETER, OR ALTERNATIVELY YOU CAN FUNNEL (>) THE OUTPUT INTO A CRASH FILE.

NOTICE - YOU CAN ADD ADDITIONAL DSYM FILES IF YOU USE DEVELOPMENT BUILT DYNAMIC FRAMEWORKS WITH A "-D" PARAMETER

COLLECTING CRASH LOGS

HOW TO GRAB CRASH REPORTS

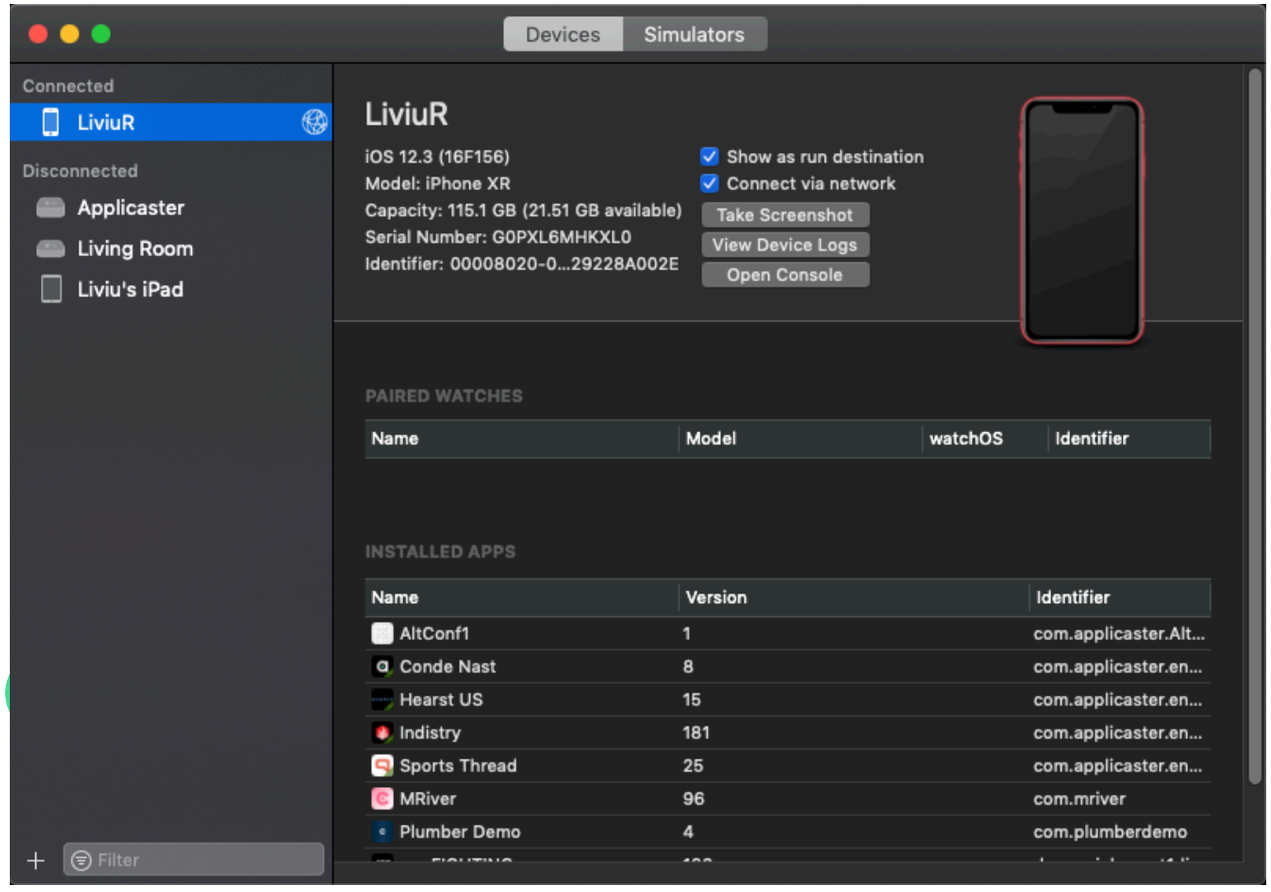
3 MAIN METHODS:

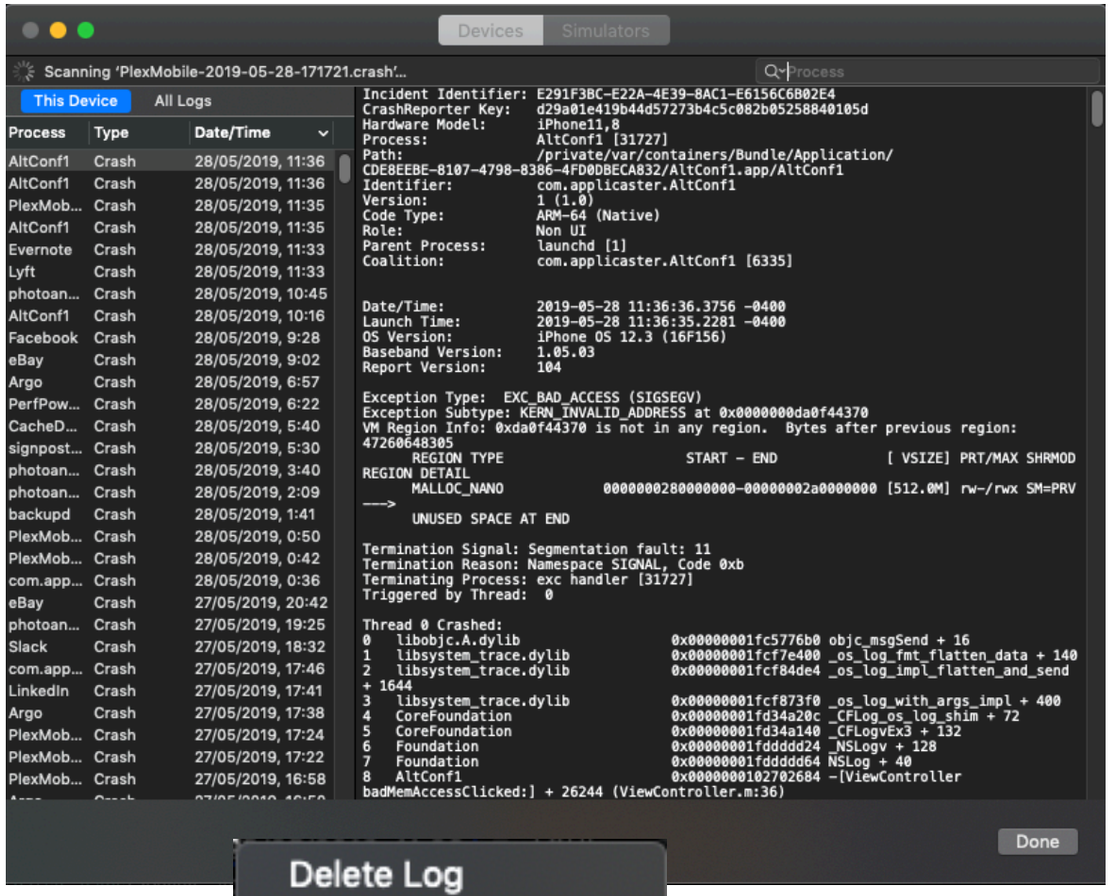
- GRAB FROM DEVICE WITH XCODE
- GET FROM ITUNES CONNECT WITH XCODE
- USE CRASH LOG COLLECTING SDK

COLLECTING CRASH LOGS

GRABBING CRASHES FROM A DEVICE

1. Connect the device via USB
2. Unlock the device
3. Open Xcode
4. Windows -> Devices and Simulators / Cmd-Shift-2
5. Choose device
6. Click View Device Logs. You might need to wait for device logs to sync
7. Right click to delete, export, or re-symbolicate log



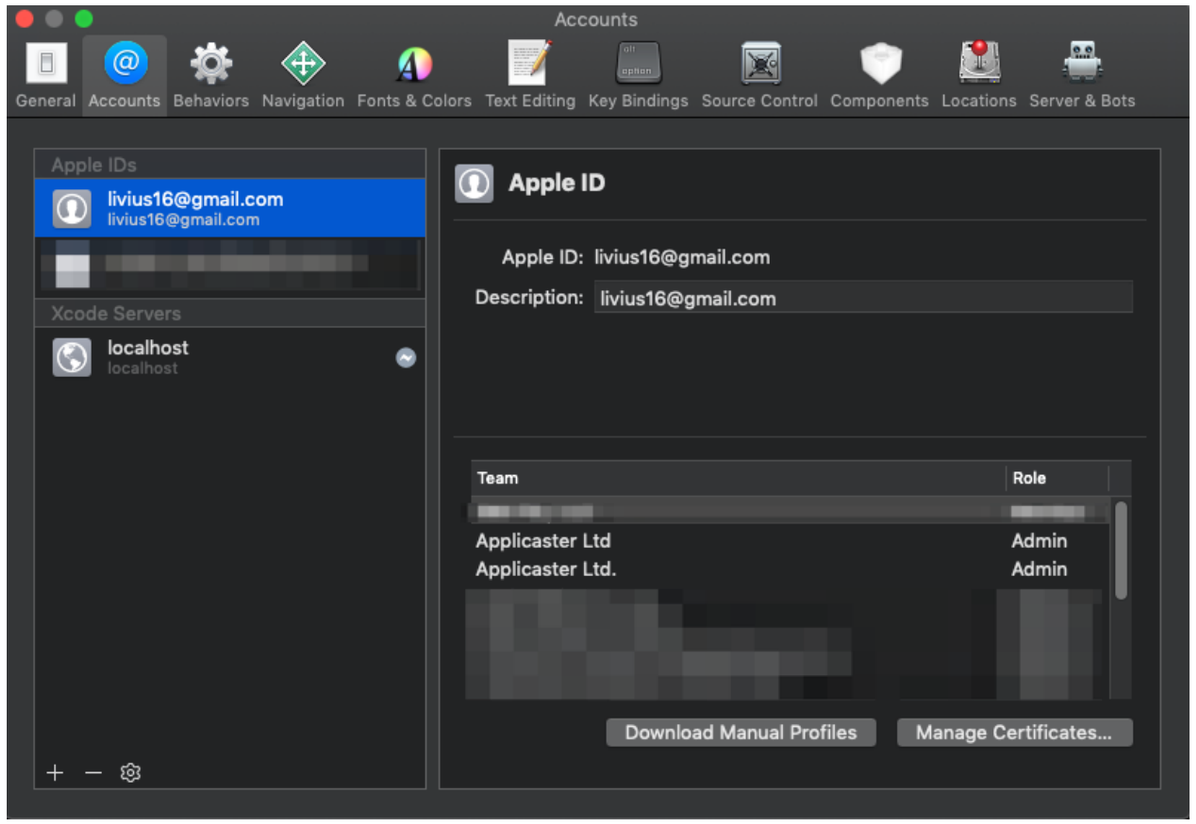


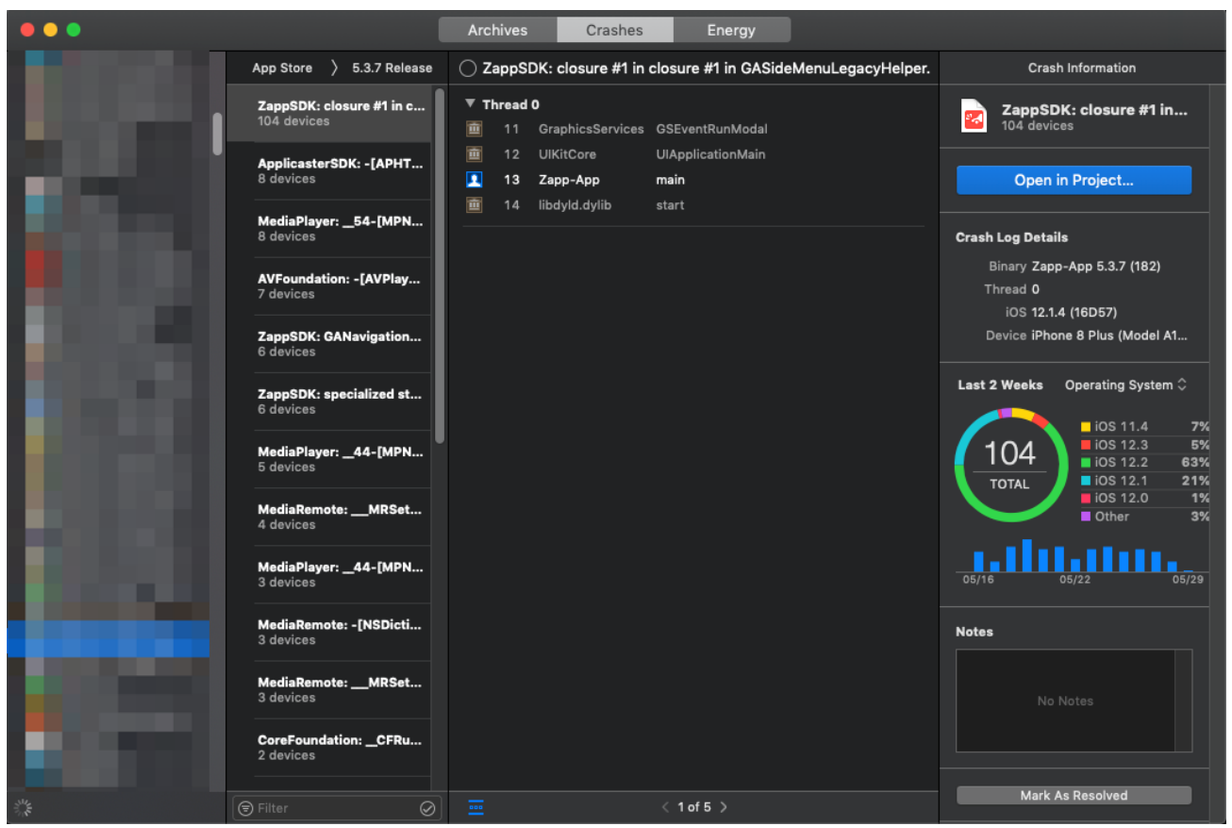
COLLECTING CRASH LOGS

HOW TO GRAB CRASH LOGS FROM ITUNES CONNECT THROUGH XCODE

1. OPEN XCODE
2. XCODE -> PREFERENCES -> ACCOUNTS -
   - MAKE SURE YOUR DEVELOPER / ITUNES CONNECT ACCOUNTS ALL EXIST AND ARE LOGGED IN.
3. WINDOWS -> ORGANIZER
4. CHOOSE YOUR APP ON THE LEFT PANE -> CRASHES

YOU'LL GET STACK TRACE INFO, USUALLY 5 LOGS PER CRASH, SOME INFO ABOUT THE AFFECTED DEVICES, AND LIMITED STATISTICS





COLLECTING CRASH LOGS

USING THIRD PARTY CRASH COLLECTING SERVICES

IF YOU'RE WORKING ON LARGE SCALE APPS - OR WANT TO MONITOR CRASH LOGS DAILY - YOU PROBABLY NEED A CRASH REPORTING SDK AND SERVICE.

THERE ARE A FEW OF COMPANIES GIVING THIS SERVICE IN THE MARKET WITH VARIOUS INTEGRATION LEVELS.

A FEW EXAMPLES IN THE MARKET:

1. HOCKEYAPP (MIGRATING TO VISUAL STUDIO APP CENTER - MICROSOFT)
2. CRASHLYTICS (NOW FIREBASE CRASHLYTICS - GOOGLE)
3. INSTABUG

MOST OF THEM REQUIRE YOU TO INTEGRATE AN SDK INTO THE APP, SET UP WITH AN IDENTIFIER, AND UPLOAD THE ".APP" AND ".DSYM" IN ORDER TO GET SYMBOLICATED CRASH LOGS.

USING CRASH LOG SERVICES ALSO GIVES THE BENEFIT OF DAILY MAILS, FULL HISTORY, DOWNLOADING FULL CRASH LOGS, AND ADVANCED STATISTICS.

SO WHAT WE TALKED ABOUT TODAY

COMMON CRASHES

A SHORT LIST OF COMMON CRASHES WE ENCOUNTER AND HANDLE, INCLUDING DEBUG TRICKS TO HELP CATCH THOSE COMMON CRASHES

CRASH LOG ANATOMY

HOW DOES A CRASH LOG LOOK LIKE, READING THROUGH IT QUICKLY, AND ADDING SYMBOLS IN CASE THEY AREN'T SYMBOLICATING AUTOMATICALLY

COLLECTING CRASH LOGS

HOW TO COLLECT CRASH LOGS LOCALLY, FROM ITUNES CONNECT, AND FROM CRASH LOG SERVICES

ALL THE CODE EXAMPLES AND SLIDES ARE AVAILABLE
HTTP://WWW.GITHUB.COM/APPLICASTER/ALTCONF2019

Questions ?

@livius16

We’re always hiring…

https://www.applicaster.com/careers

Partner?

If you have a product relevant to media apps:
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