

# custom keyboards

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SwiftKey

iOSDevU

iOSDevUK

iOSDevWeekly

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123



EN CS

 SwiftKey

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# SwiftKey for iOS

- #1 Free App in Sep 2014
- Apple's Best of 2014
- The Verge: Best keyboard for your iPhone



💭 What is the single most  
used app on your iPhone?

“iosdev”

iOSDevUK

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iOSDevWeekly

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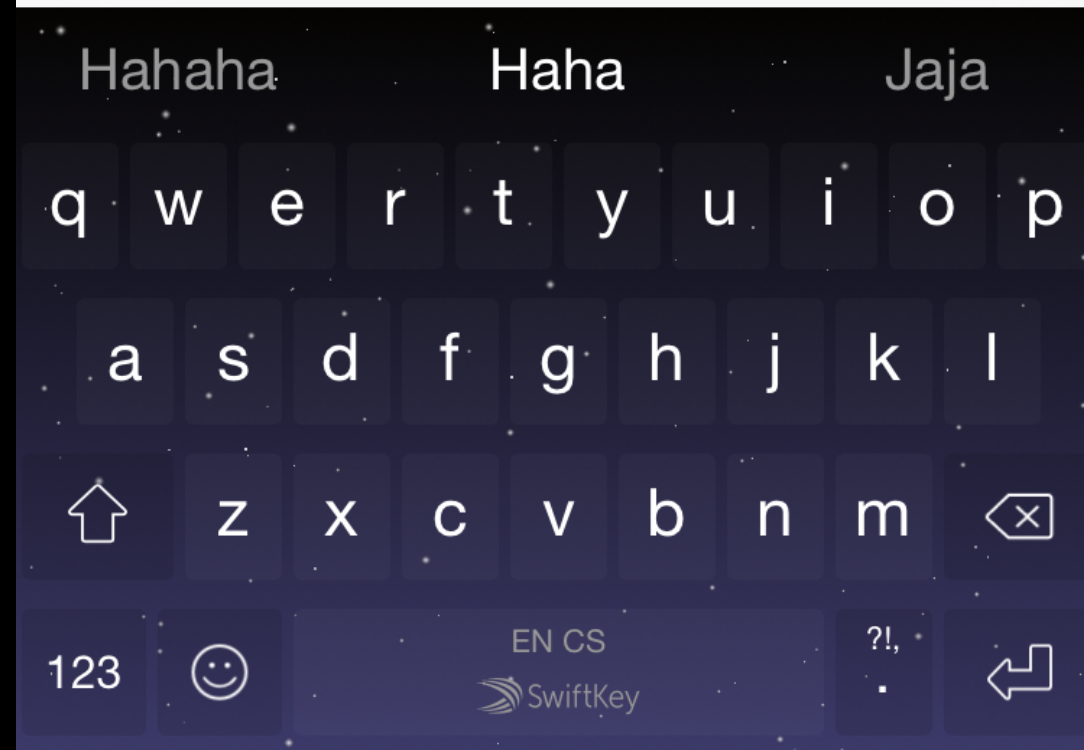
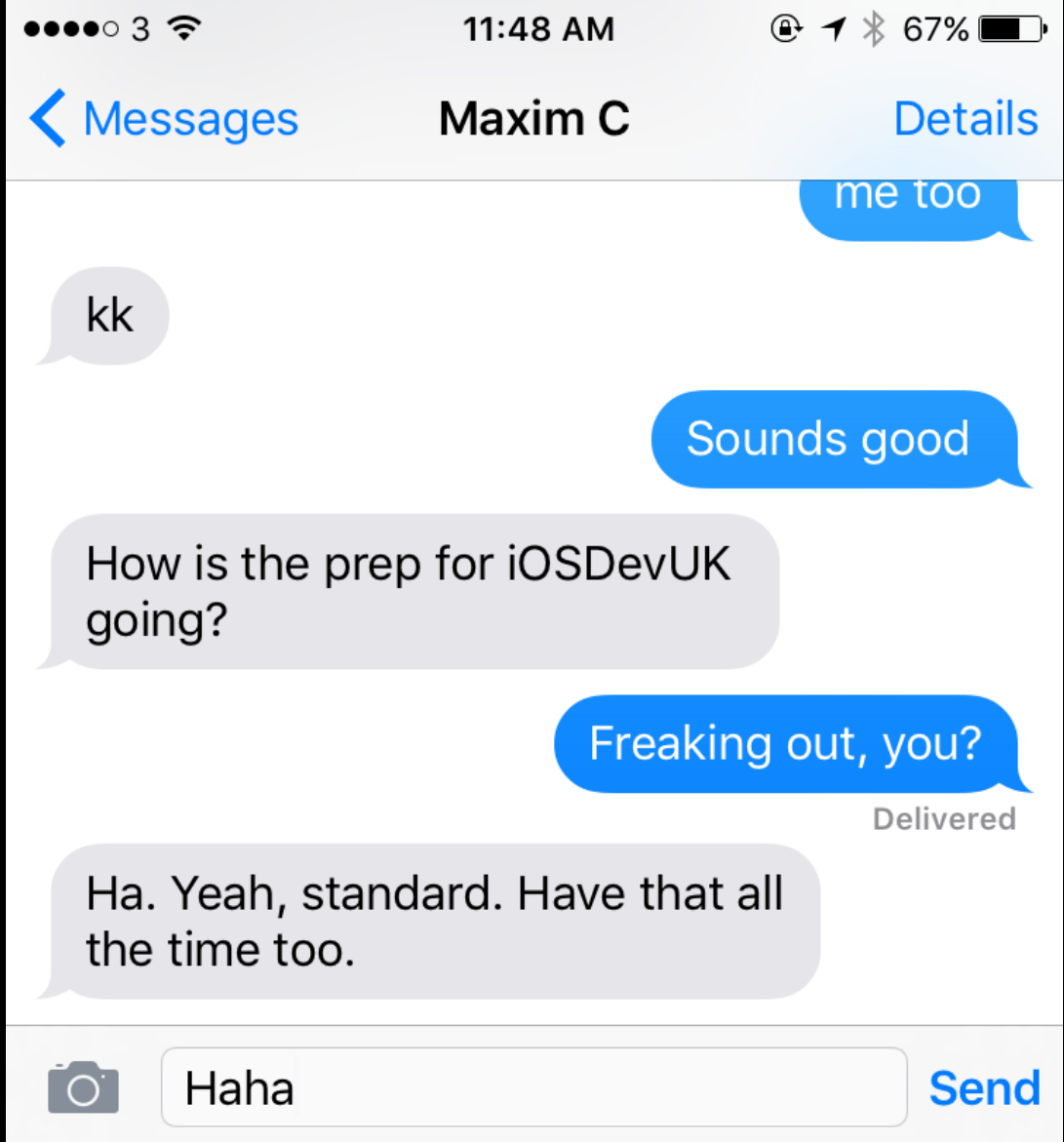
EN CS

 SwiftKey

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Cancel Update Status Post

To: Friends

 Using Facebook at iOSDevUK

     London

iosDev iOSDevUK iOSDevWeekly

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123 😊 EN CS SwiftKey ?!, ↵



Welcome to the iOSDevUK confe



111

Tweet

confe conference conferences

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123



EN CS  
SwiftKey

@#  
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Cancel Very important email Send

To: [everyone@gmail.com](mailto:everyone@gmail.com)

Cc/Bcc, From: honza@swiftkey.com

Subject: Very important email

You should not forg

Sent from my iPhone



# Reminders

0

Done

+ Put my hands up in the air like I  
dont



dont

don't

dost

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123

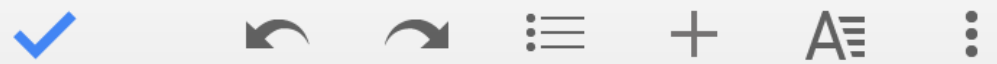


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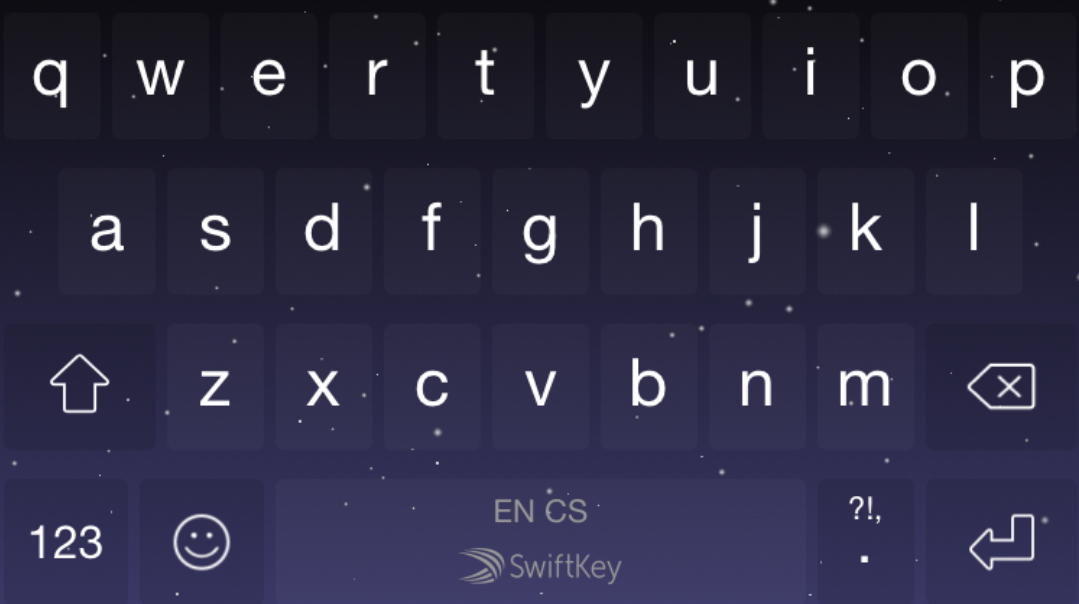




I am an important documents

Text that should be read by you! Watc

Watc Watch Watching



 **czechboy0** modified this issue 13 days ago

Comment on issue

Something to consider

Close and comment

Comment

considered consider considering

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123 😊 EN CS SwiftKey ?!, ↵

Sushi Cancel



Sushi Bars



BEST MATCHES

**SUSHISAMBA London**

Asian Fusion · 110 Bishopsgate, London

★★★★☆ 1059 reviews on TripAdvisor

**sushi**

**Sticks N Sushi**

Japanese · 11 Henrietta Street, London

★★★★☆ 328 reviews on TripAdvisor

Sunshine Sushi Suspicious

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123 ☺ EN CS SwiftKey ?!, 🔍

🔍 paris



CANCEL



Paris Garden  
London



Paris  
France



Paris Gardens  
Paris Garden, London



Café de Paris  
London



Paris  
Brixton Station Road, London



Search for "paris"

Paris

paris

Parish

q w e r t y u i o p

a s d f g h j k l

⬆ z x c v b n m ➡

123



EN CS  
SwiftKey

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lady

Cancel

Apple Music

My Music

lady antebellum

lady gaga

lady leshurr

lady killers

lady in red

lady marmalade

lady antebellum long stretch of love

lady's

lady

ladybug

q w e r t y u i o p

a s d f g h j k l

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EN CS  
SwiftKey

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$t(\text{keyboard}) > t(\text{not-keyboard})$

# custom keyboards on iOS

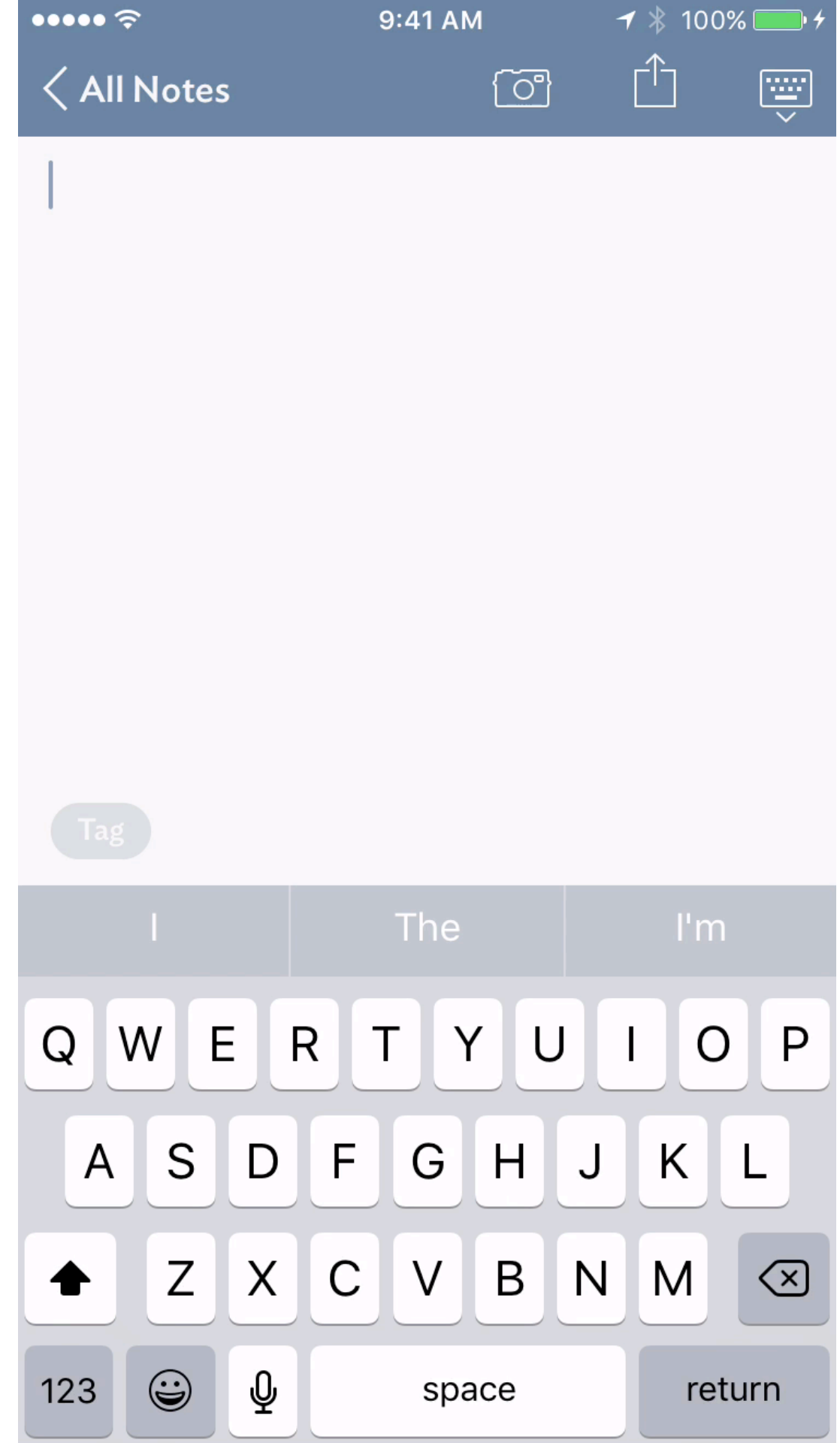
→ iOS 8

→ 🍏: "The essential function of a custom keyboard is simple: **Respond to taps, gestures, or other input events and provide text**, in the form of an unattributed NSString object, at the text insertion point of the current text input object."

installation



- Settings
- General
- Keyboard
- Keyboards
- Add New Keyboard...
- SwiftKey
- Go into SwiftKey
- Allow Full Access
- Allow
- 🎉



under the hood

**App Extension  
Target Template**



Custom  
Keyboard

**Xcode Project**

**Containing App**

Custom Keyboard Target

**Running Keyboard**

UIInputViewController

view

Next Keyboard

Hello

UIButton

Text Input Object

Lorem ipsum dolor sit amet,  
consectetur adipisicing elit,  
sed do eiusmod tempor  
incididunt ut labore et dolore  
magna aliqua.  
Maecenas **hello**

insertText:



**App Extension  
Target Template**



Custom  
Keyboard

**Xcode Project**

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UIInputViewController

view

Next Keyboard

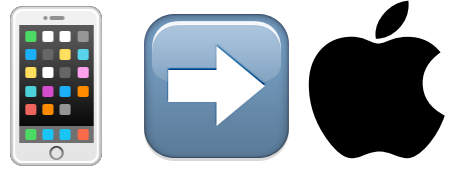
Hello

UIButton

Text Input Object

Lorem ipsum dolor sit amet,  
consectetur adipisicing elit,  
sed do eiusmod tempor  
incididunt ut labore et dolore  
magna aliqua.  
Maecenas **hello**

insertText:



→ `insertText(text: String)`

→ `deleteBackward()`

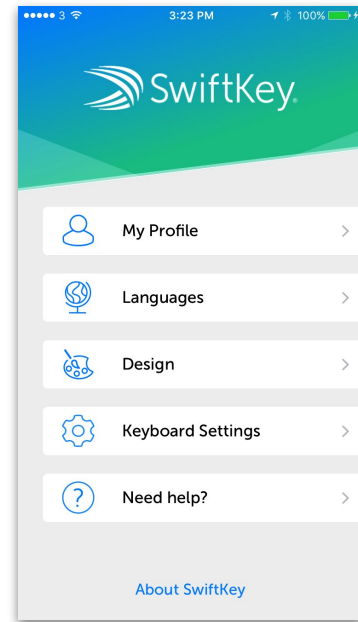
→ `advanceToNextInputMode()`



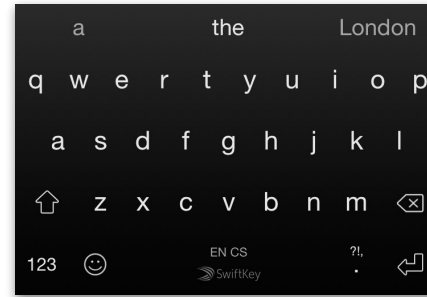
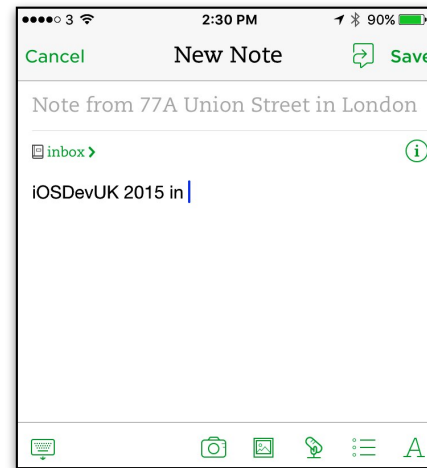
→ `textDidChange(textInput: UITextInput?)`

→ `documentContextBeforeInput`

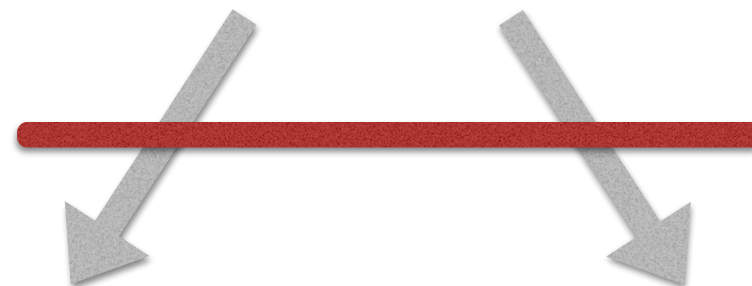
Container App



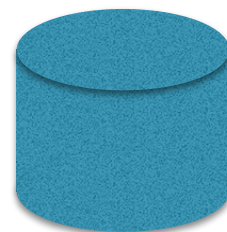
Host App



Keyboard Extension



No Full Access

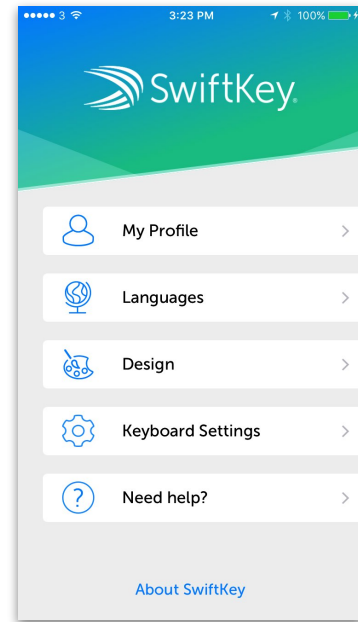


Shared Container

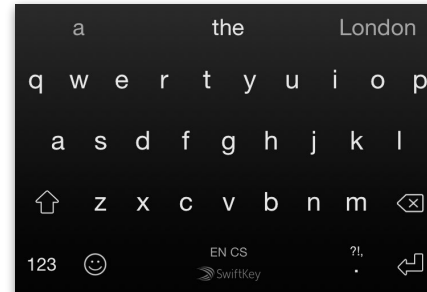
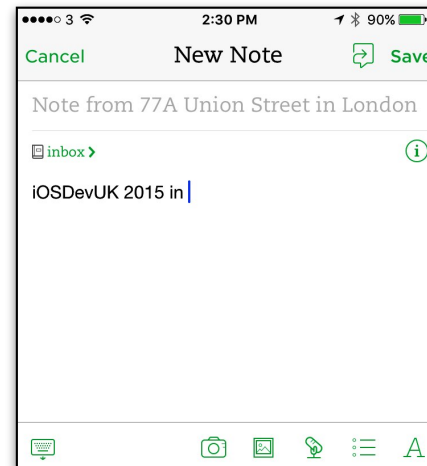


Internet

Container App

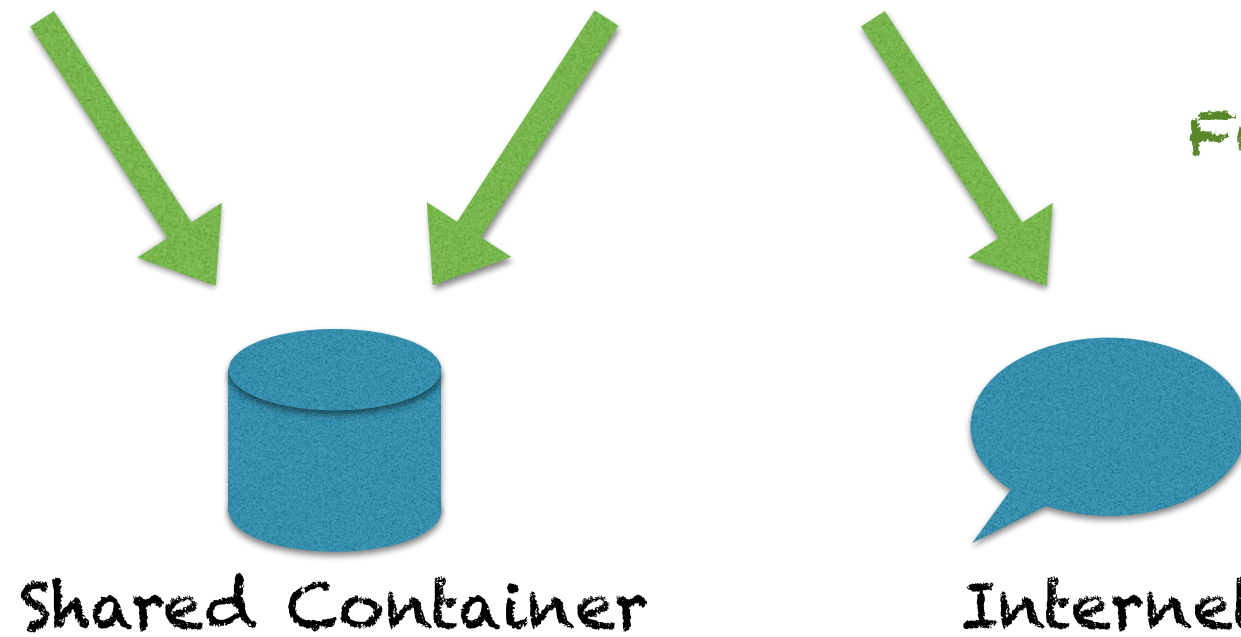


Host App



Keyboard Extension

Full Access





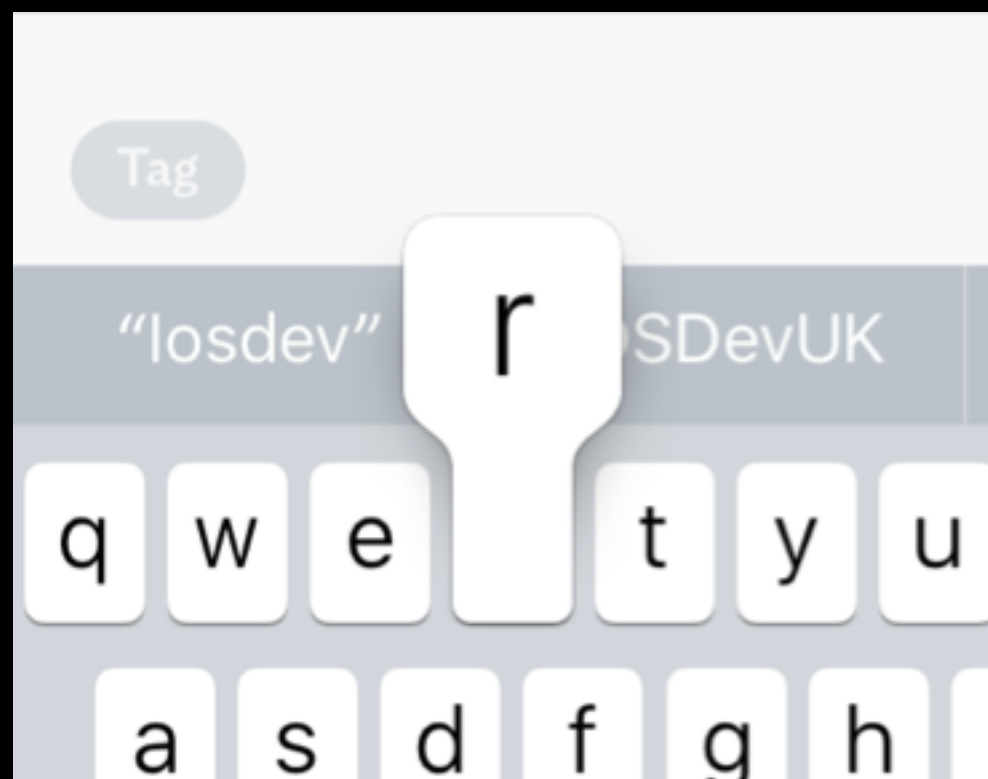
shared container

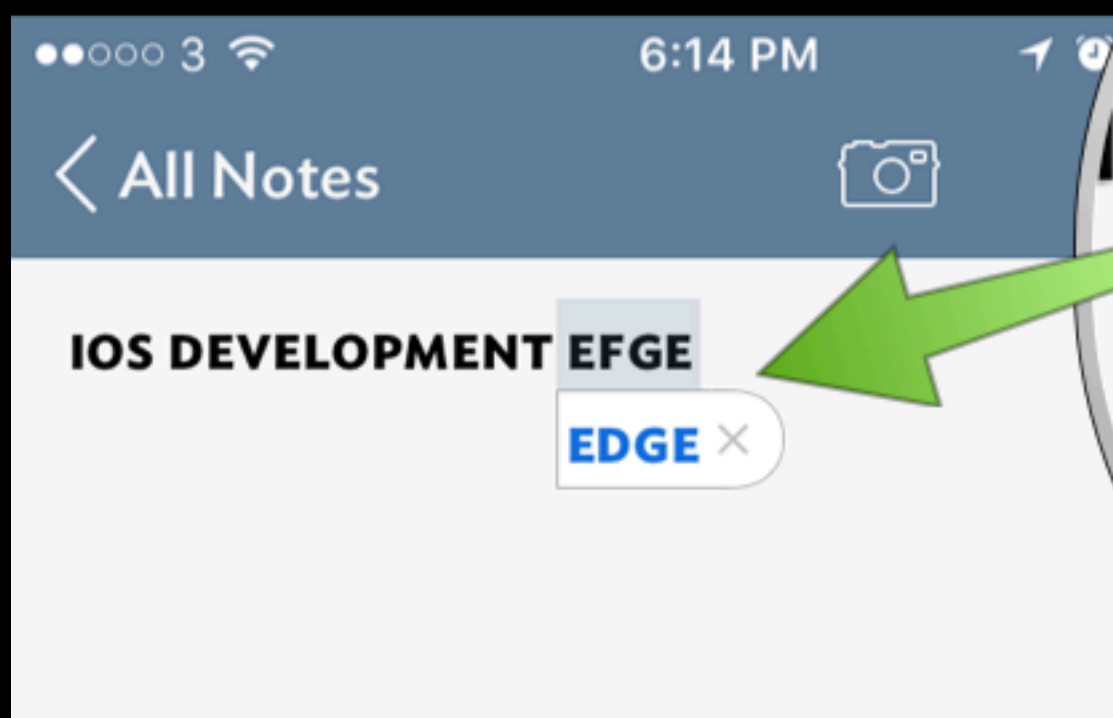
# darwin notifications

```
CFNotificationCenterRef const center = CFNotificationCenterGetDarwinNotifyCenter();  
CFDictionaryRef const userInfo = NULL;  
BOOL const deliverImmediately = YES;  
CFStringRef str = (__bridge CFStringRef)@"iosdevuk.message.fun";  
CFNotificationCenterPostNotification(center, str, NULL, userInfo, deliverImmediately);
```

# limitations

- not presented in certain scenarios
  - secure text fields (passwords)
  - apps disallowing 3rd party keyboards
  - lock screen when passcode is enabled







# existing issues with custom keyboard API

- `revert ("this isn't my keyboard!")`
- `hang ("... where is my keyboard?")`
- ...

# interesting challenges

- memory limit
- unavailability of many standard APIs (UIApplication, ...)



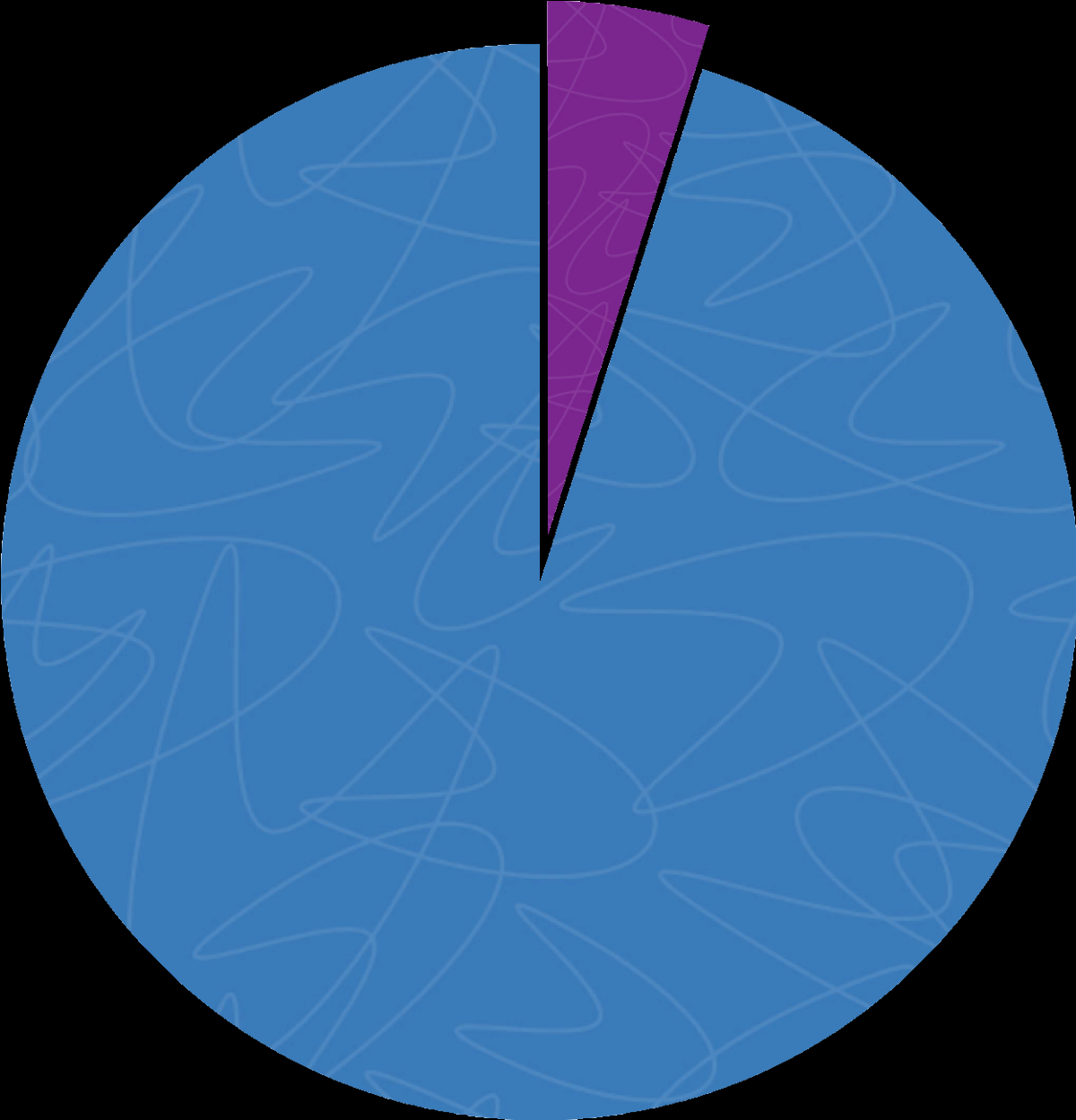
# memory limit

---

<50MB



> 50MB



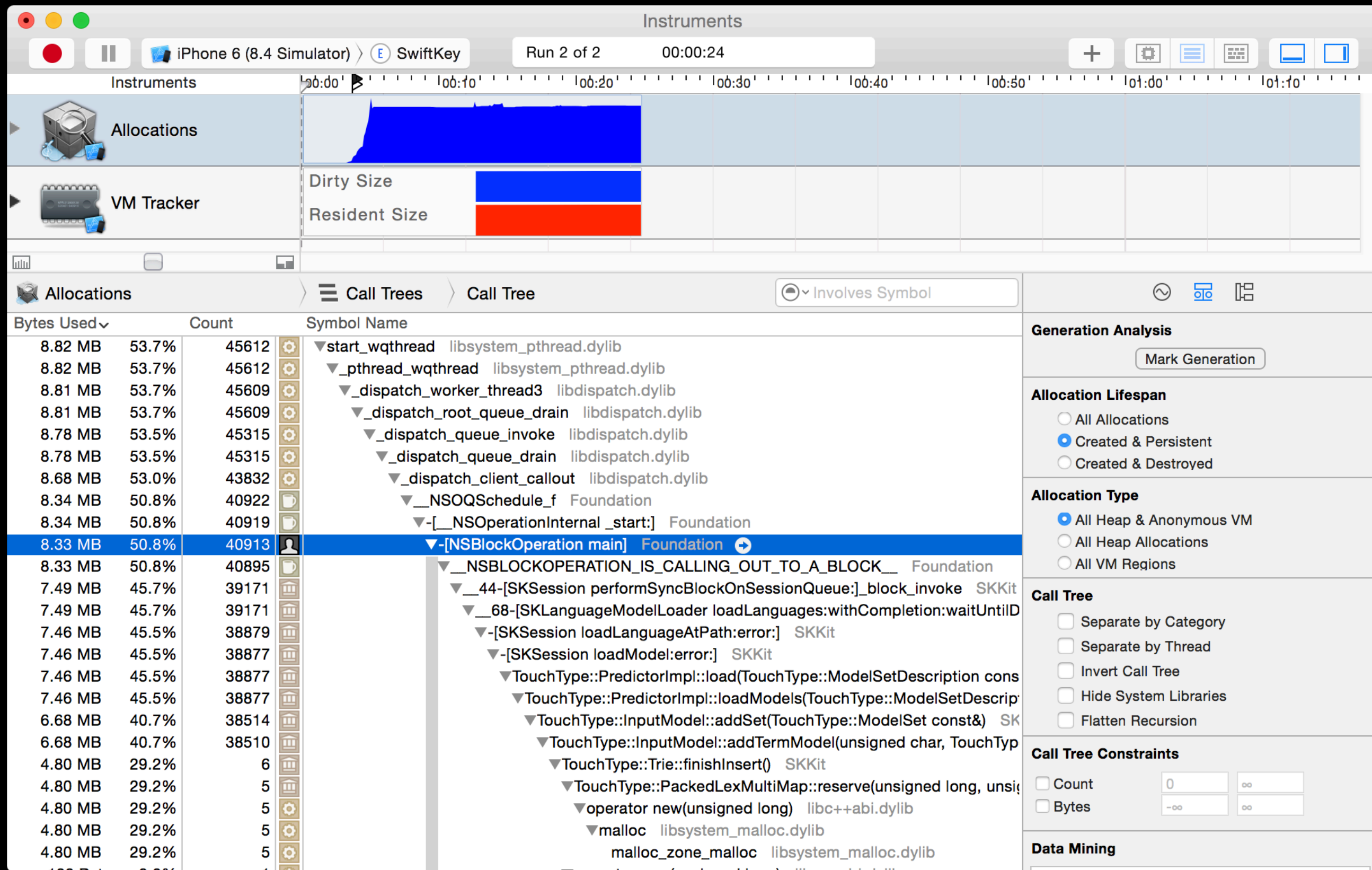
# memory limit workarounds

- memory mapping 👍
- caching views
- no Core Data
- stay under 30MB
- watch out for spikes

# instruments

→ Allocations

→ VM Tracker



# testing

- no testing bundle for keyboards
- test code in a Embedded Framework, don't put code exclusively into the keyboard
- hacky: measure "resident size" tests with a live extension
- pixel-perfect testing of rendering code

# recap

- great opportunity
- most used piece of software on everyone's phone
- not just a utility
- hard problems still to be solved
- innovation, not one clear answer



# SwiftKey is hiring

- iOS Developer
- great team
- hard, original problems (bye bye StackOverflow)
- opportunity to build the single most used app of millions of people

Thank you for 👂 ing.

# questions?

- name: honza dvorsky
- site: honzadvorsky.com
- twitter: @czechboy0
- work at: SwiftKey

# links

[honzadvorsky.com](http://honzadvorsky.com)

[Job: iOS Developer at SwiftKey](#)

[SwiftKey](#)

[Custom Keyboard Guide](#) **Recommended Reading**

[The Verge: Best iPhone keyboard](#)

[Image used from documentation](#)