

# Speech Recognition API

Understanding what your users say

Session 509

Henry Mason Siri Speech

# Speech Recognition

What is it?

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What is it?

Highly accurate

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State of the art

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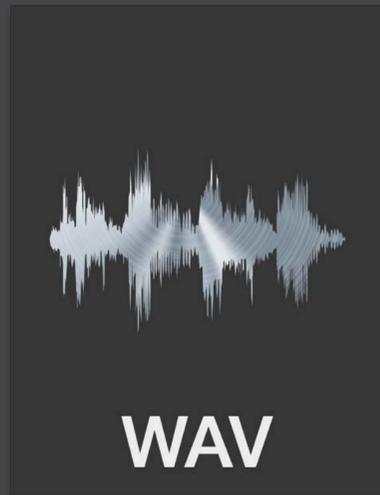
Many languages

Respects user privacy

# Speech Recognition

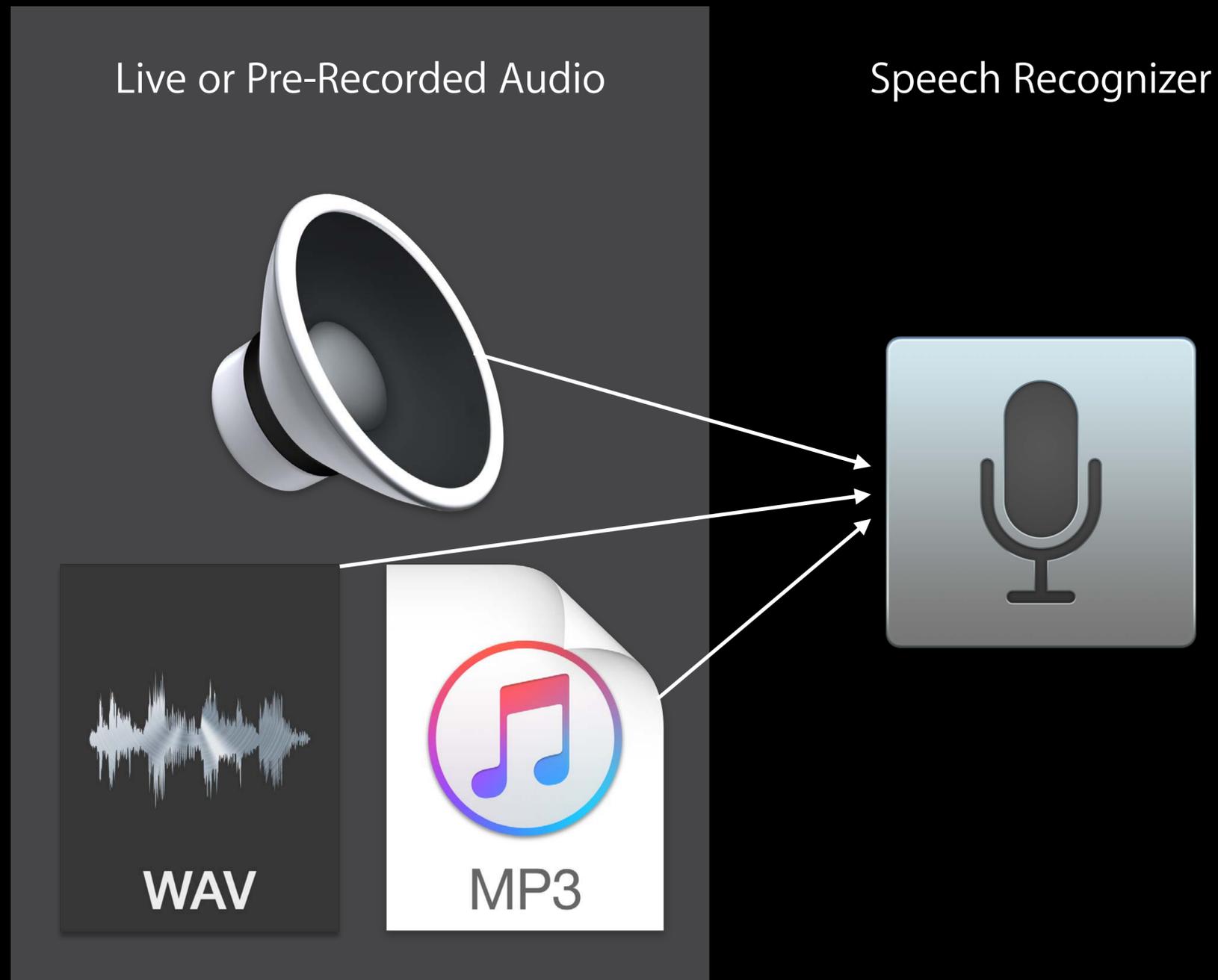
What is it?

Live or Pre-Recorded Audio



# Speech Recognition

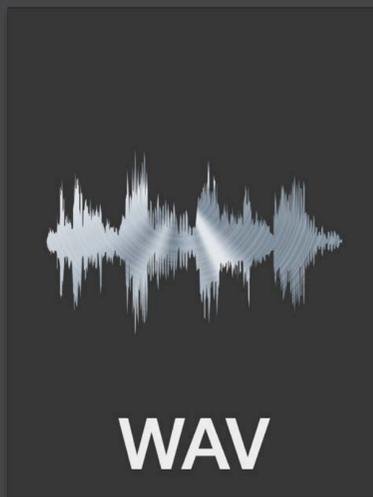
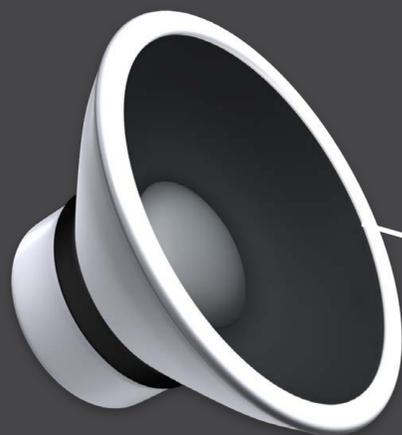
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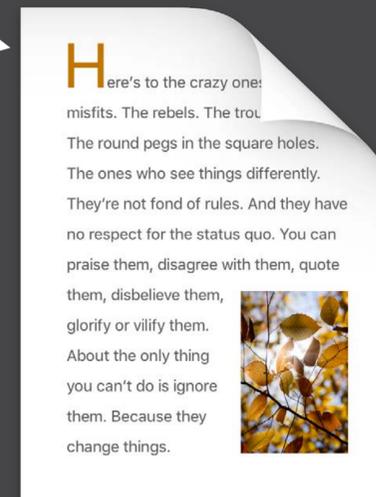
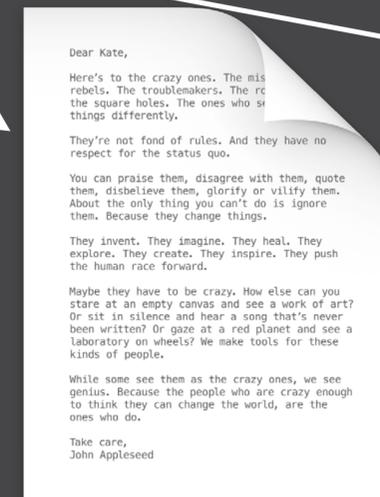
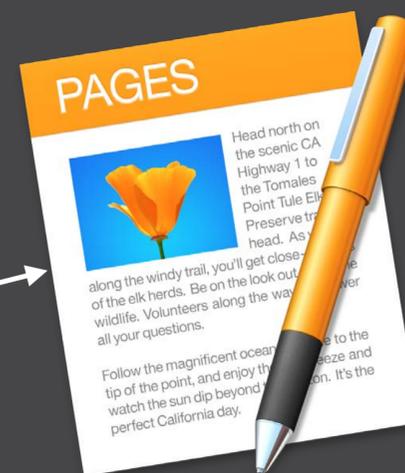
Live or Pre-Recorded Audio



Speech Recognizer

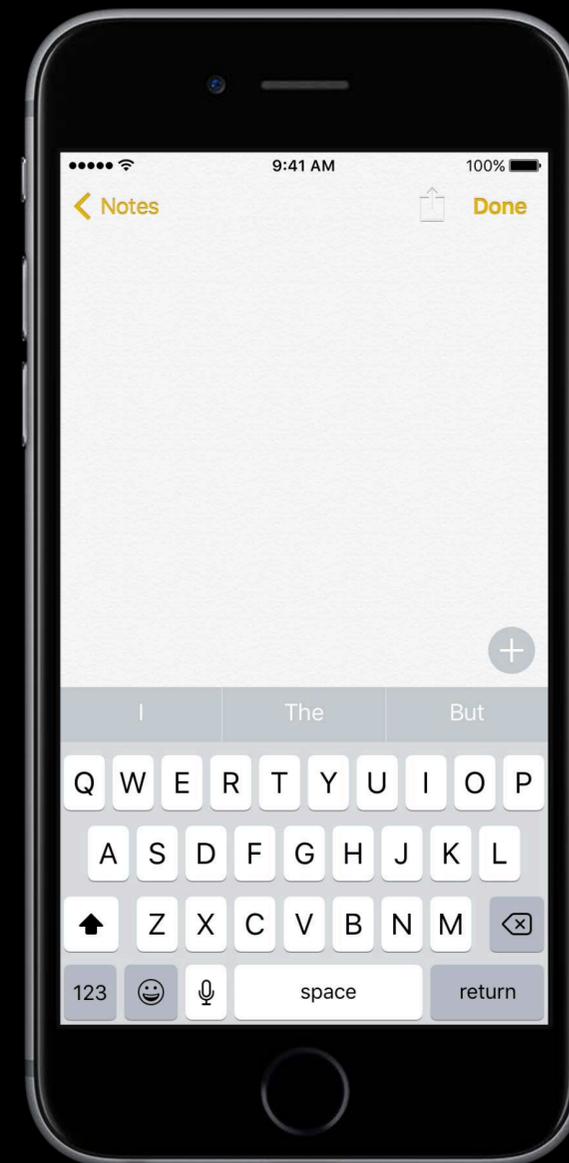


Transcribed Text



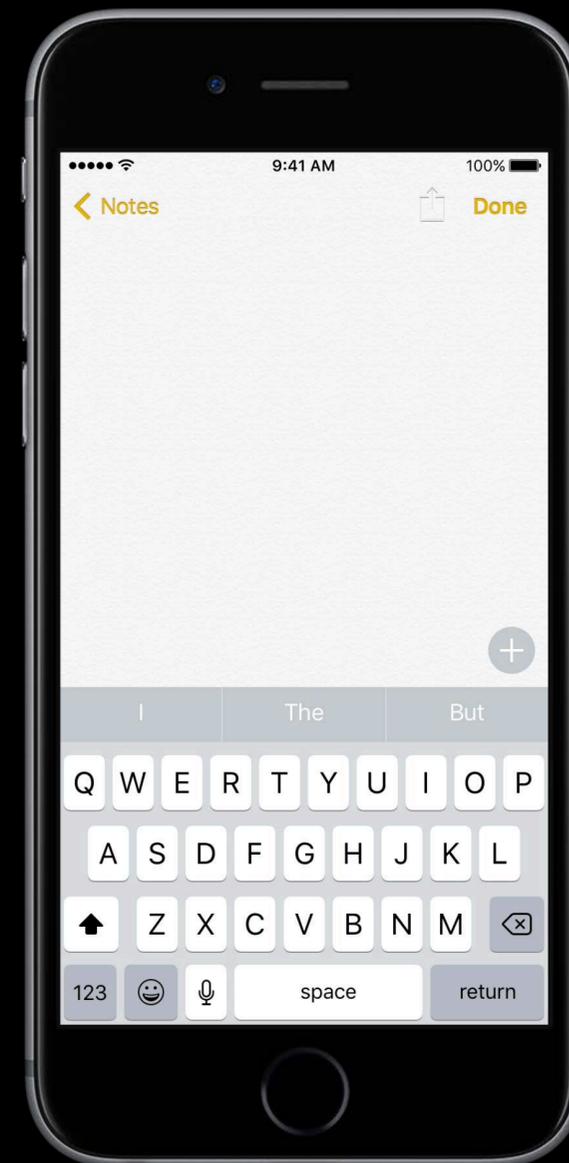
# iOS Keyboard Dictation

Available since 2011



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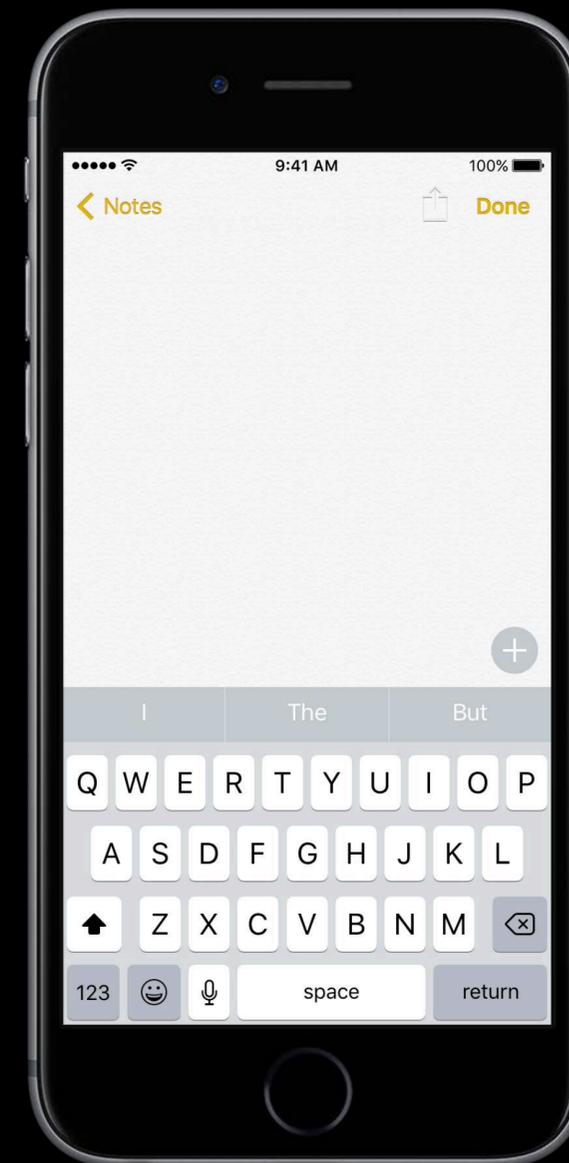
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Widely used

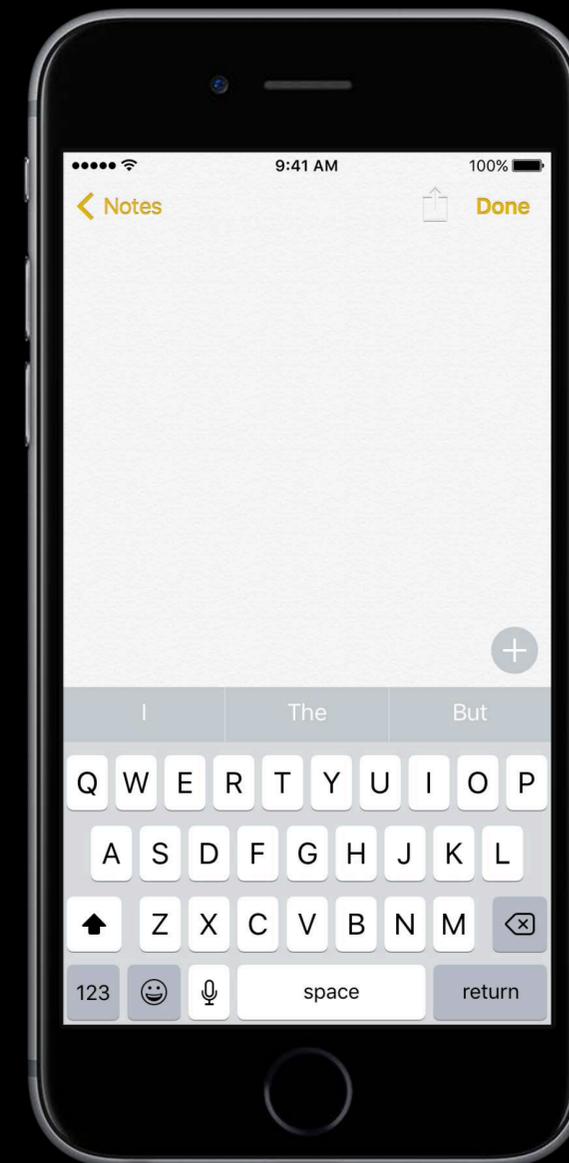


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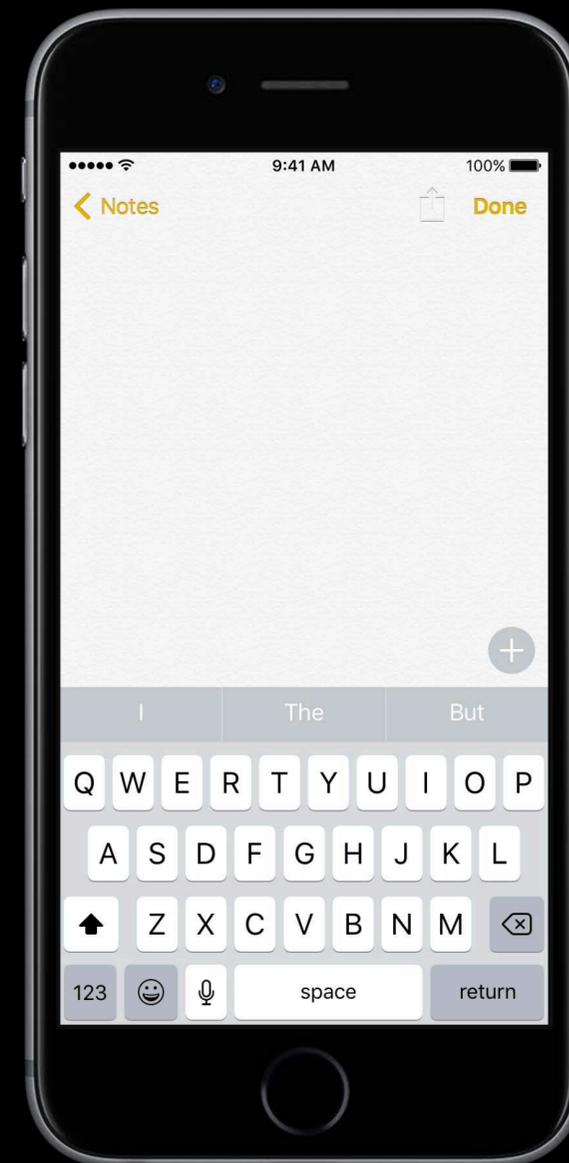


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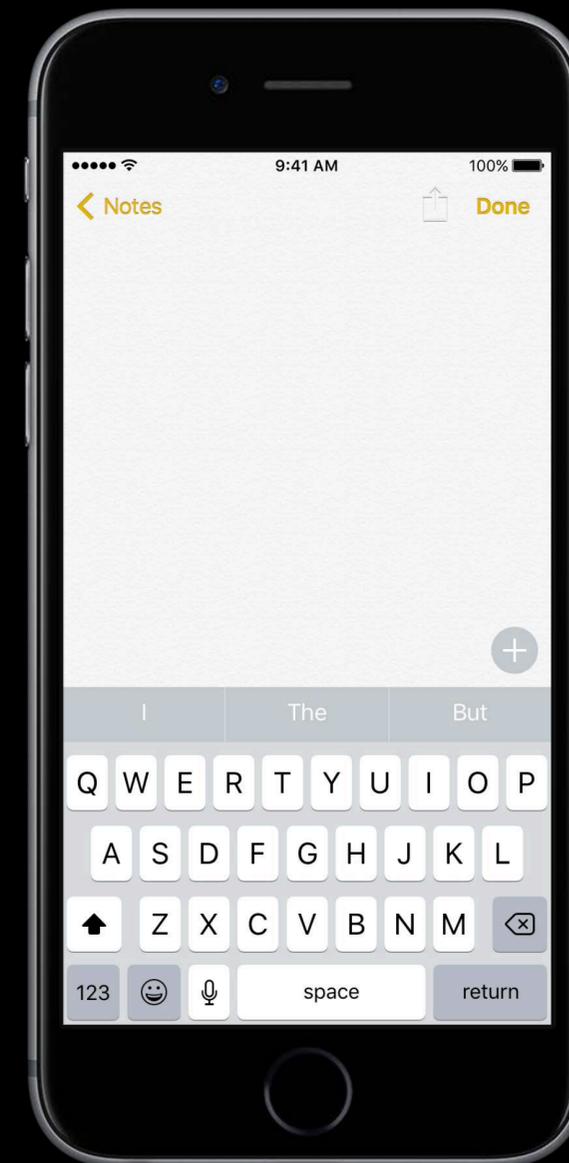
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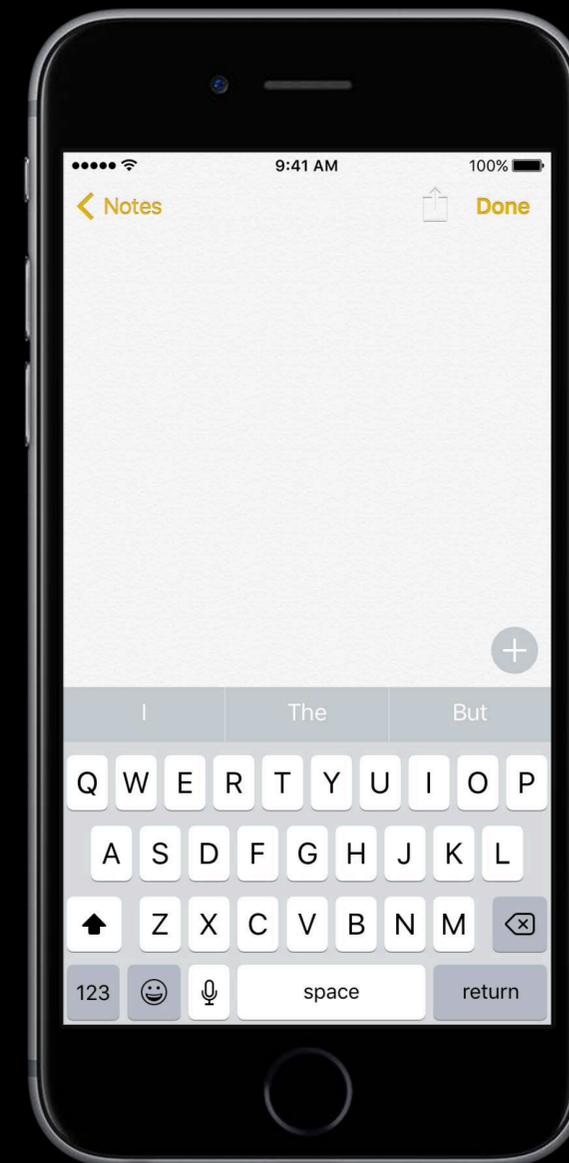
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- Available since iOS 5



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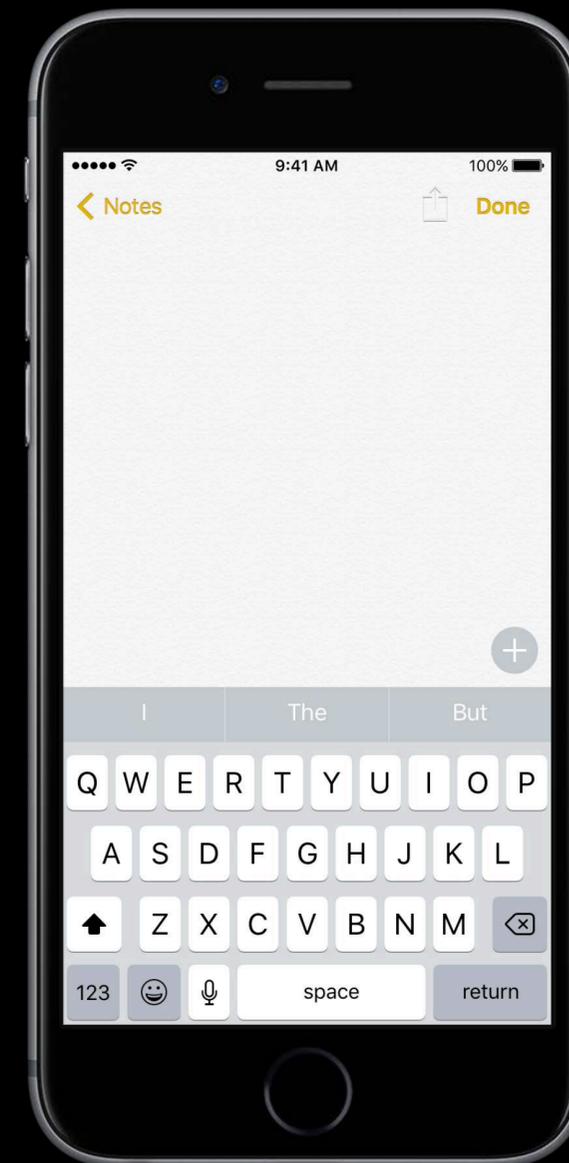
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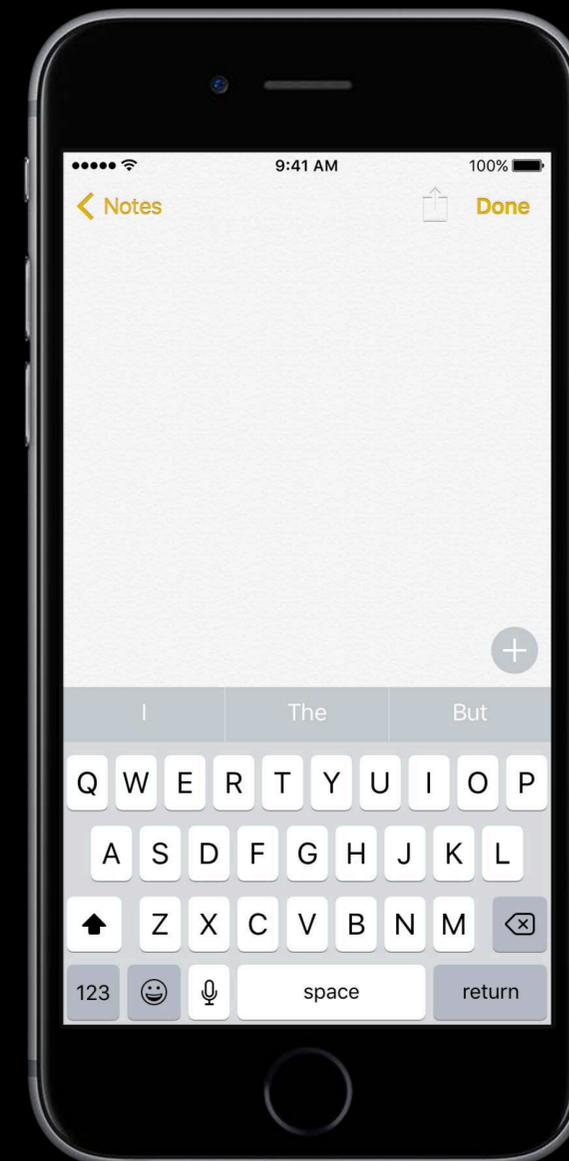
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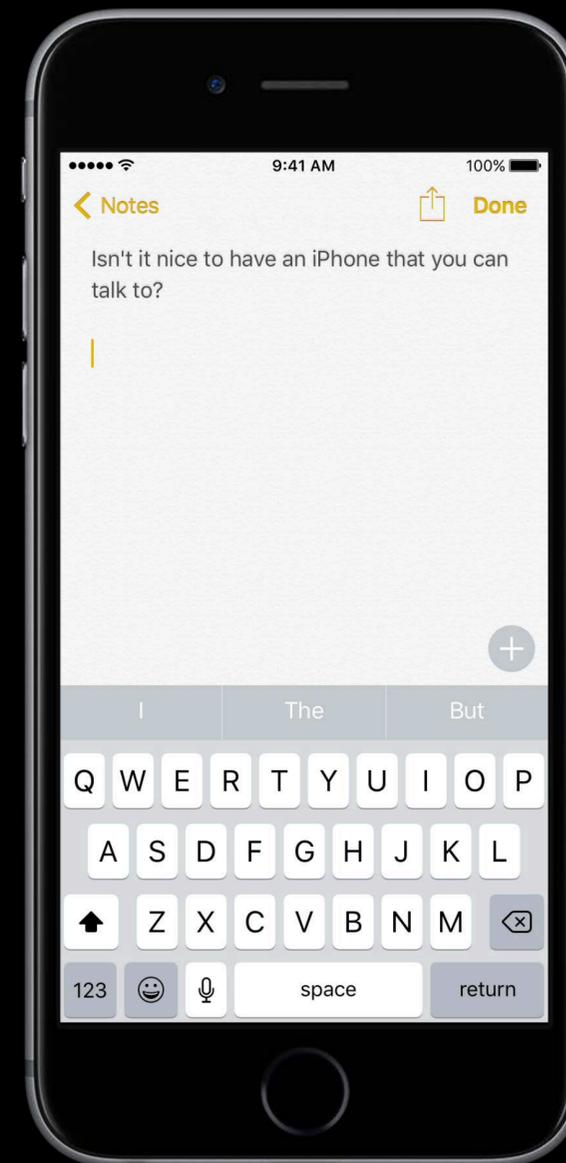
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- Available since iOS 5
- Handles audio recording
- No need for special permissions



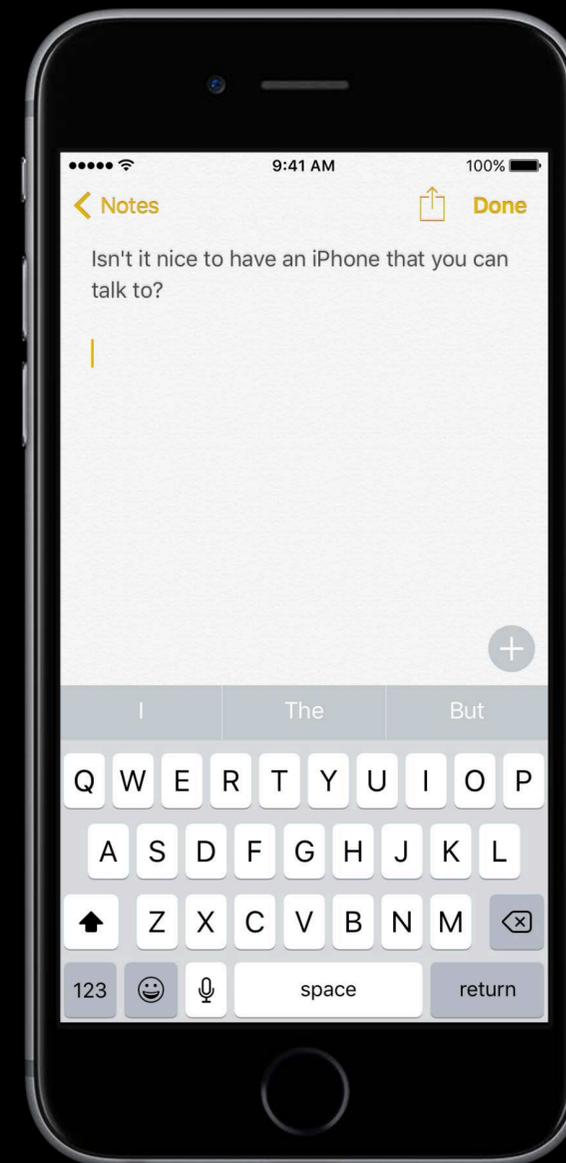
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...but limited



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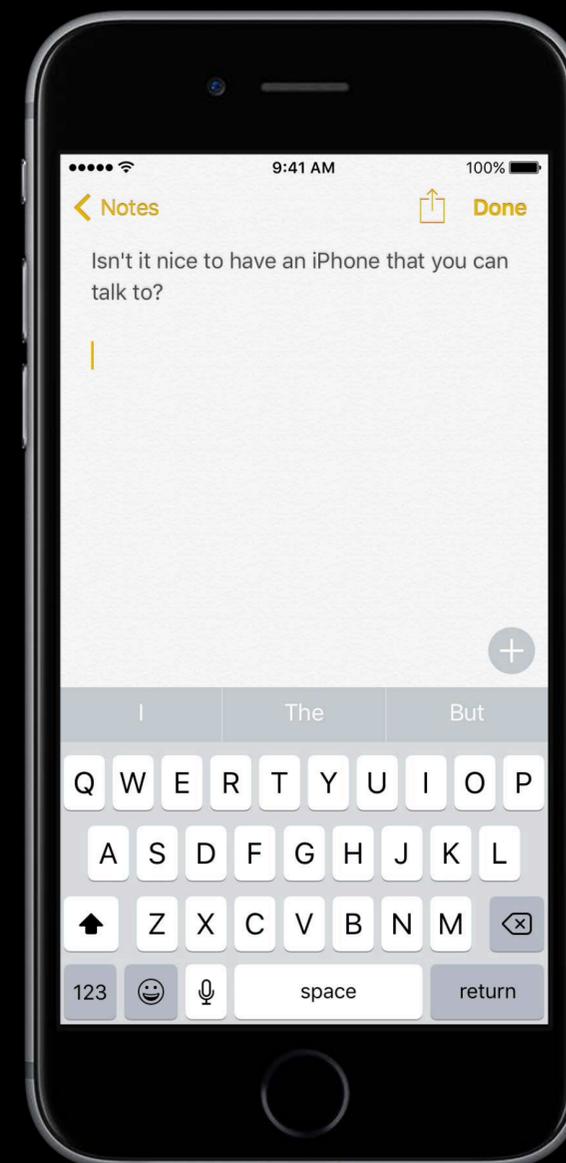
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Limitations

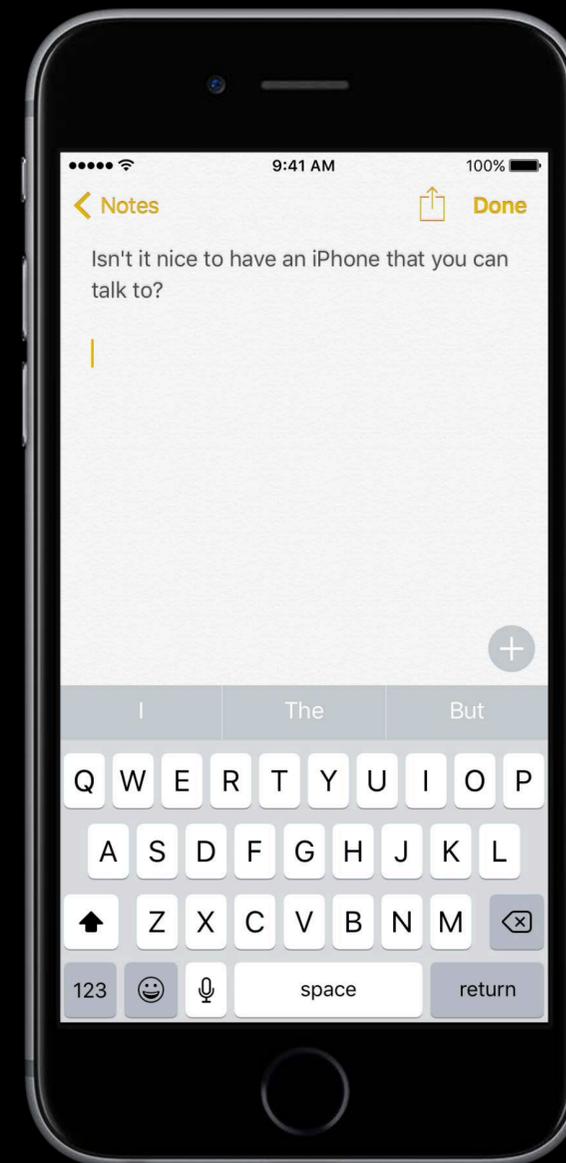


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## Limitations

- Requires presenting a keyboard

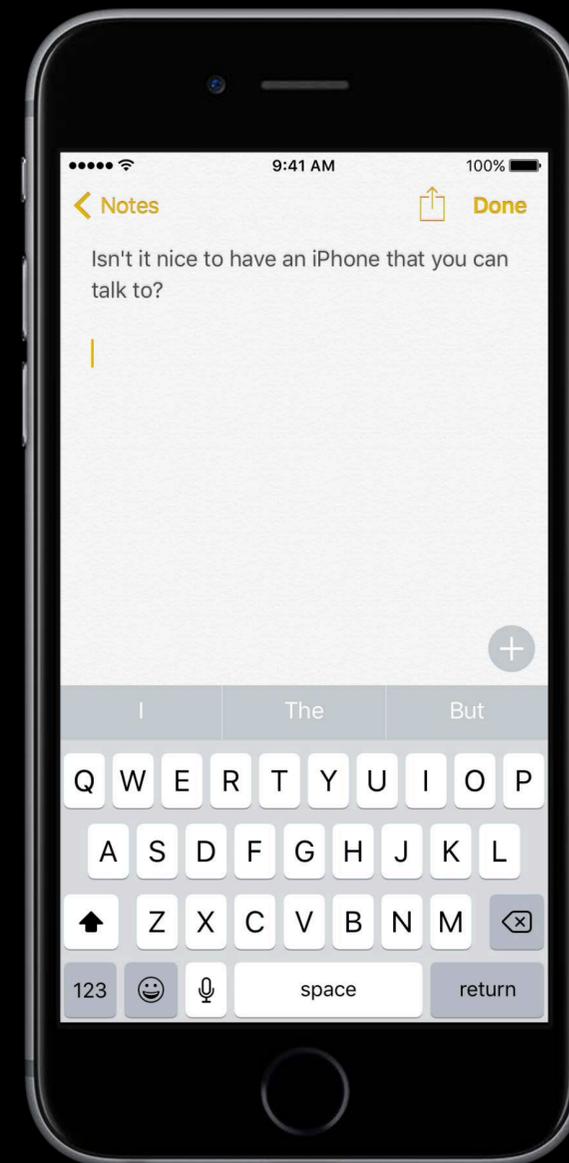


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...but limited

## Limitations

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- Live audio input only

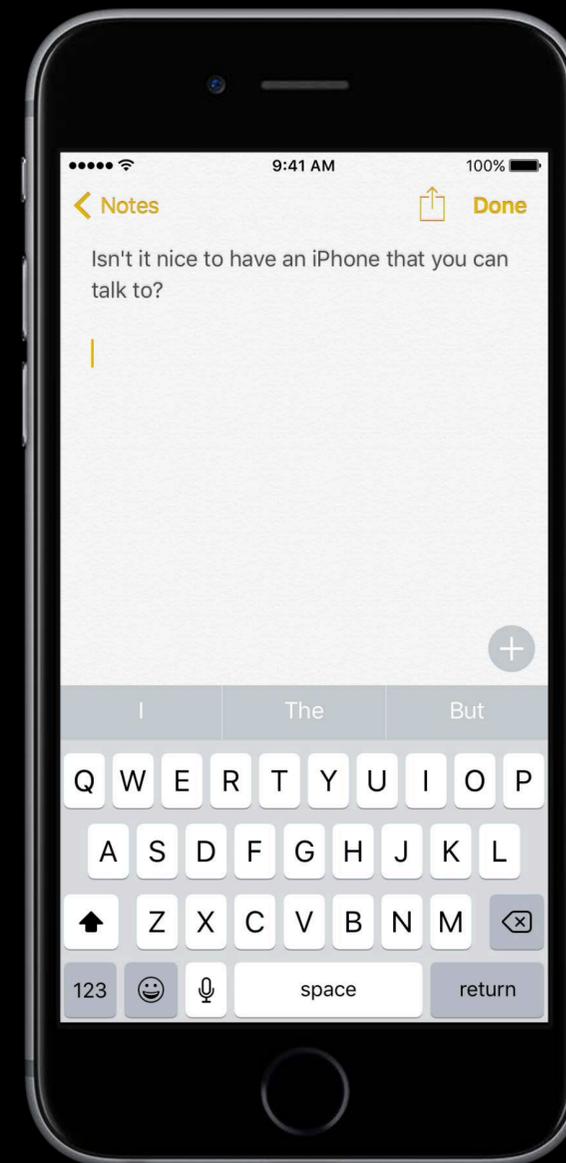


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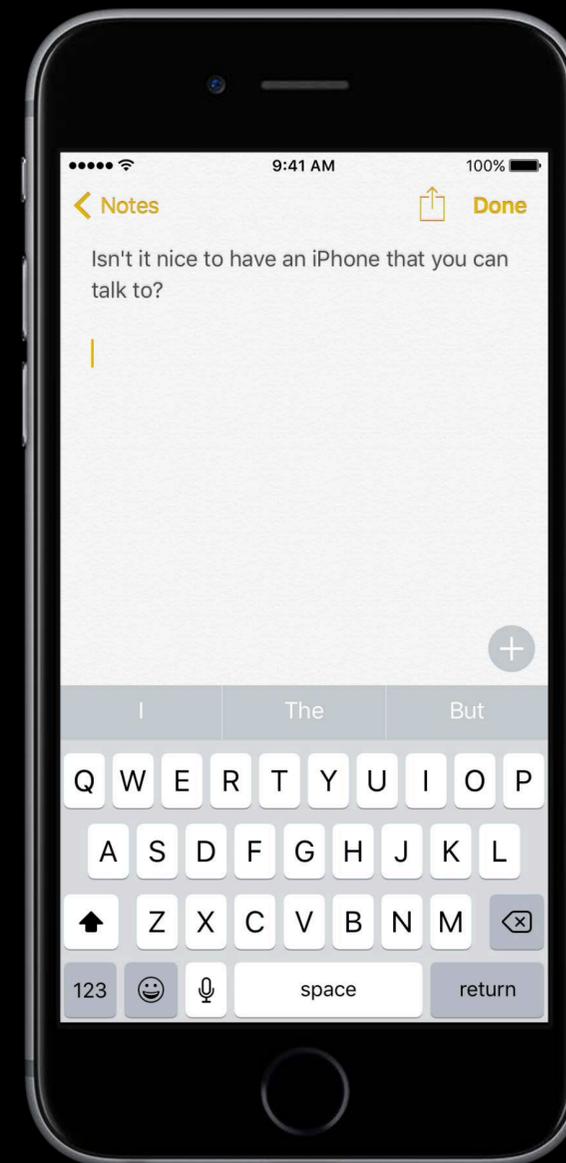


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## Limitations

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- No way to tell availability

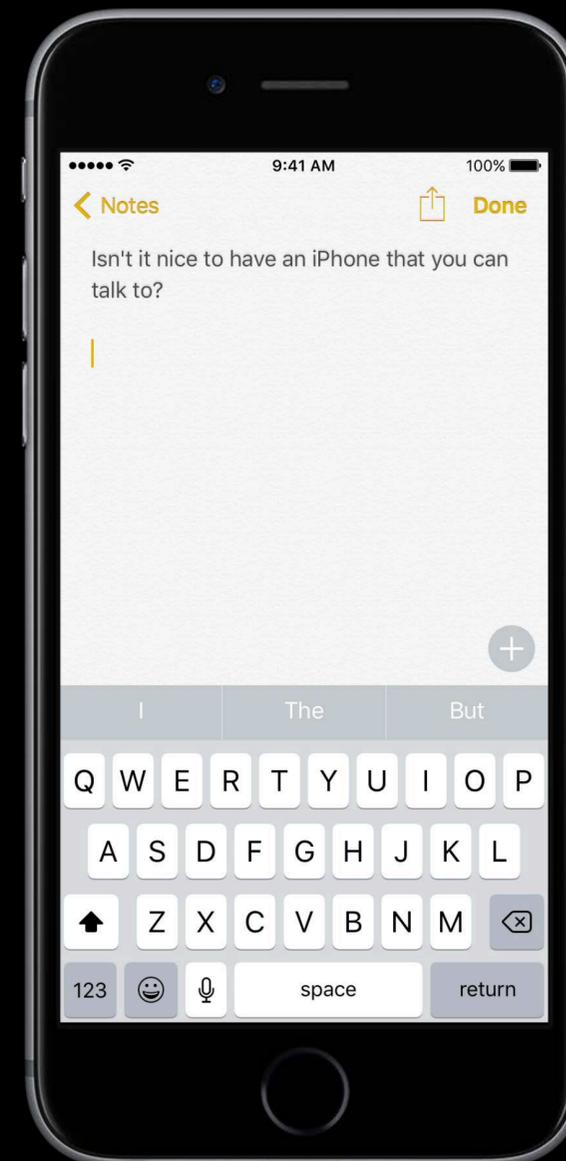


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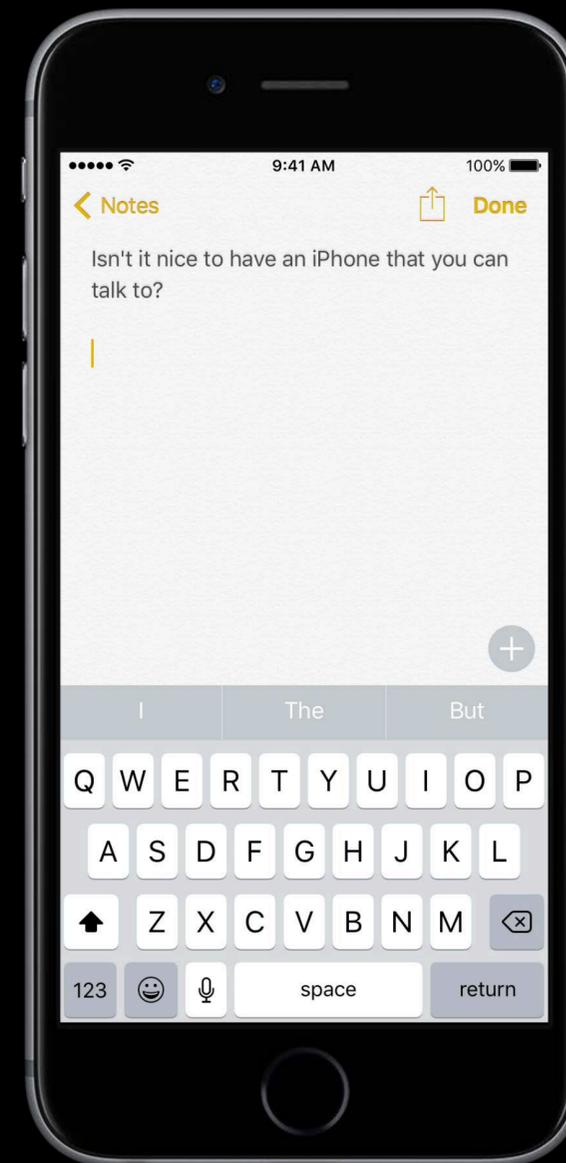


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- No way to tell availability
- Can't customize audio recording
- “Shallow” results—no timing or confidence information





Speech Recognition API

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More power

NEW

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New framework for iOS

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Rich transcriptions

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Rich transcriptions

Flexible—recording and pre-recorded audio

# Speech Recognition API Availability

Far and wide, with permission

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Over 50 languages and dialects

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*Always* requires user permission

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Explain, authorize, request

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Explain why in your Info.plist

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Give Request to Recognizer

- Optionally hold onto `SFSpeechRecognitionTask`

```
// Asking Permission

import Speech
import UIKit

public class MyViewController: UIViewController {

    public func askPermission() {
        SFSpeechRecognizer.requestAuthorization { (authStatus) in
            NSOperationQueue.main().addOperation {
                switch authStatus {
                case .authorized:
                    // Good to go
                    break
                case .denied:
                    // User said no
                    break
                case .restricted:
                    // Device isn't permitted
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        break  
    case .restricted:  
        // Device isn't permitted  
        break  
    case .notDetermined:  
        // Don't know yet  
        break
```

```
    }
```

```
  }
```

```
}
```

```
}
```

```
// Recognizing pre-recorded audio

import Speech

func recognizeFile(url: NSURL) {
    guard let recognizer = SFSpeechRecognizer() else {
        // Not supported for device's locale
        return
    }
    if !recognizer.isAvailable {
        // Not available right now
        return
    }
    let request = SFSpeechURLRecognitionRequest(url: url)
    recognizer.recognitionTask(with: request) { (result, error) in
        guard let result = result else {
            // handle error
            return
        }
    }
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```

```
// Recognizing live audio

import AVFoundation
import Speech

let audioEngine = AVAudioEngine()
let speechRecognizer = SFSpeechRecognizer()!
let request = SFSpeechAudioBufferRecognitionRequest()
var recognitionTask: SFSpeechRecognitionTask?

func startRecording() throws {
    // Setup Audio Session
    let node = audioEngine.inputNode!
    let recordingFormat = node.outputFormat(forBus: 0)
    node.installTap(onBus: 0, bufferSize: 1024, format: recordingFormat) { (buffer, _) in
        recognitionRequest.append(buffer)
    }

    audioEngine.prepare()
    try audioEngine.start()
    recognitionTask = speechRecognizer.recognitionTask(with: request) { /* ... */ }
```

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}

func stopRecording() {
    audioEngine.stop()
    request.endAudio()
}

func cancelRecording() {
    audioEngine.stop()
    recognitionTask?.cancel()
}
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# Best Practices

# Resources

Be responsible



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- Per-devices, per day recognition limits



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- Per-devices, per day recognition limits
- Per-app limits



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- Per-devices, per day recognition limits
- Per-app limits
- Be prepared to handle failures



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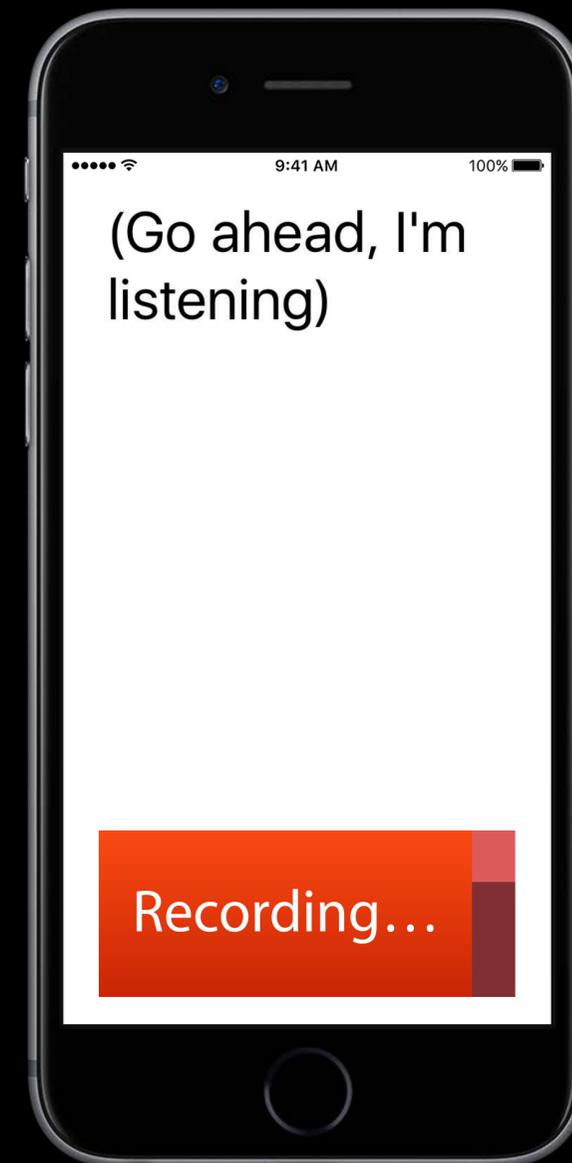
Speech recognition isn't cheap

- Requires power and data
- Maximum utterance duration—  
about one minute



# Privacy and Usability

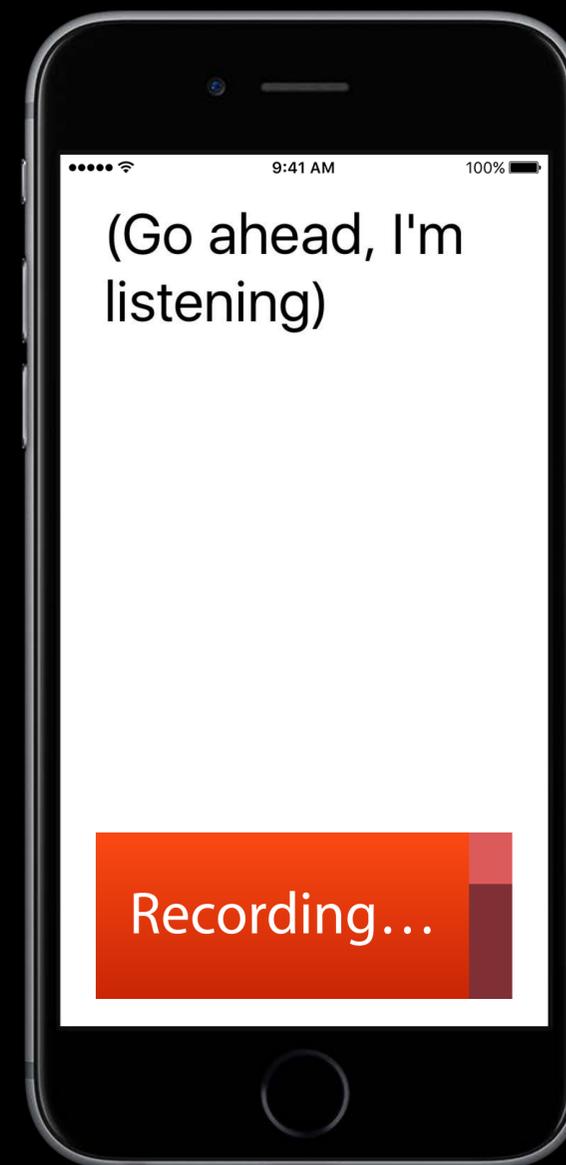
Transparency



# Privacy and Usability

## Transparency

- ✔ Make sure users know they're being recorded
  - Show something in your UI



# Privacy and Usability

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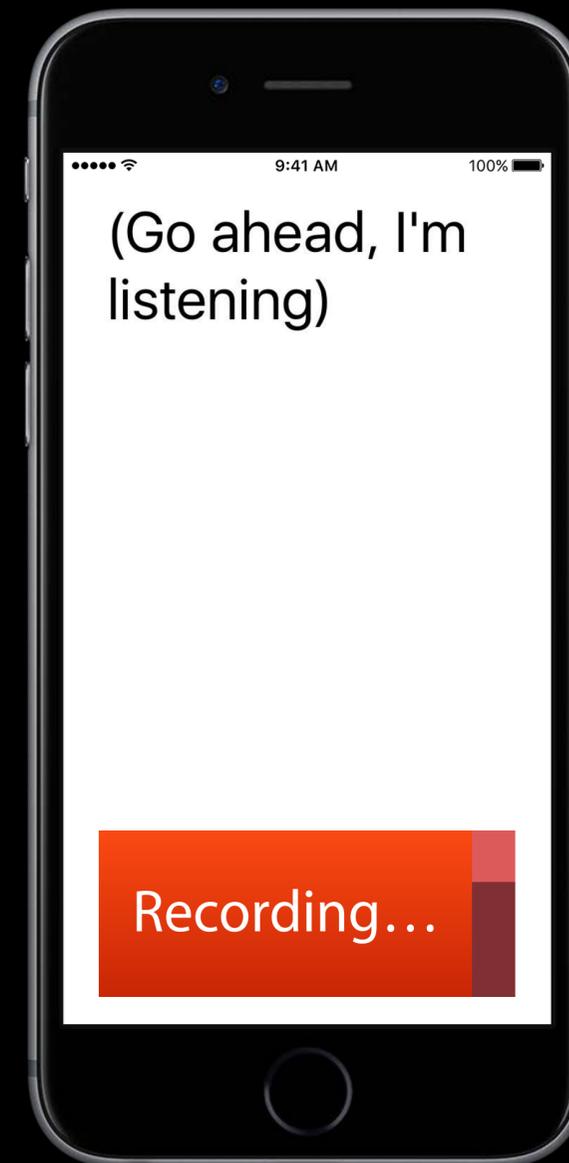
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# Privacy and Usability

## Transparency

- ✓ Make sure users know they're being recorded
  - Show something in your UI
- ✗ Some speech is not appropriate for recognition
  - Passwords
  - Sensitive speech
- ✓ Show recognition results to the user before acting on them
  - Helps users deal with recognition errors



# Summary

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As will all user-facing features, show the user what your app is doing

We can't wait to see what you do with this!

More Information

<https://developer.apple.com/wwdc16/509>

# Related Sessions

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Introducing SiriKit

Presidio

Wednesday 6:00PM

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Extending Your Apps with SiriKit

Nob Hill

Thursday 1:40PM

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# Labs

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Speech Recognition Lab

Graphics, Games,  
and Media Lab D

Wednesday 1:00PM

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Speech Recognition Lab

Graphics, Games,  
and Media Lab D

Friday 1:00PM

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SiriKit Lab

Location

Thursday 3:00PM

---

SiriKit Lab

Location

Friday 9:00AM

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WWDC 16 