#WWDC18

Creating Audio Apps for watchOS

Session 504

Neil Desai, watchOS Frameworks Engineer


Music
10:09
MUSIC
New Music
Mix
New Music Mix


iPhone
10:09
Bluff
Kelela—Take Me Apar


3 of 26
10:09
The Martian (Unab...
-11:27
30
30


Pandora
10:09
In My Blood
Shawn Mendes

Native controls

Getting content

Local playback

Audio experience

Native controls

Getting content

Local playback

Audio experience

Native controls

Getting content

Local playback

Audio experience

Native controls

Getting content

Local playback

Audio experience

Native controls

Getting content

Local playback

Audio experience

Native Controls

Native Controls

NEW

Native Controls

NEW

Native Controls

NEW


10:09
00:00.34
0 ACTIVE CAL
0 TOTAL CAL
--BPM


10:09
00:00.34
0 ACTIVE CAL
0 TOTAL CAL
--BPM

Native Controls

Now playing view

Native Controls

Now playing view

Digital Crown controls volume

Native Controls

Now playing view

Digital Crown controls volume

Place in non-scrolling controller

Native Controls

Now playing view

Digital Crown controls volume

Place in non-scrolling controller

Automatically switches sources

Native Controls

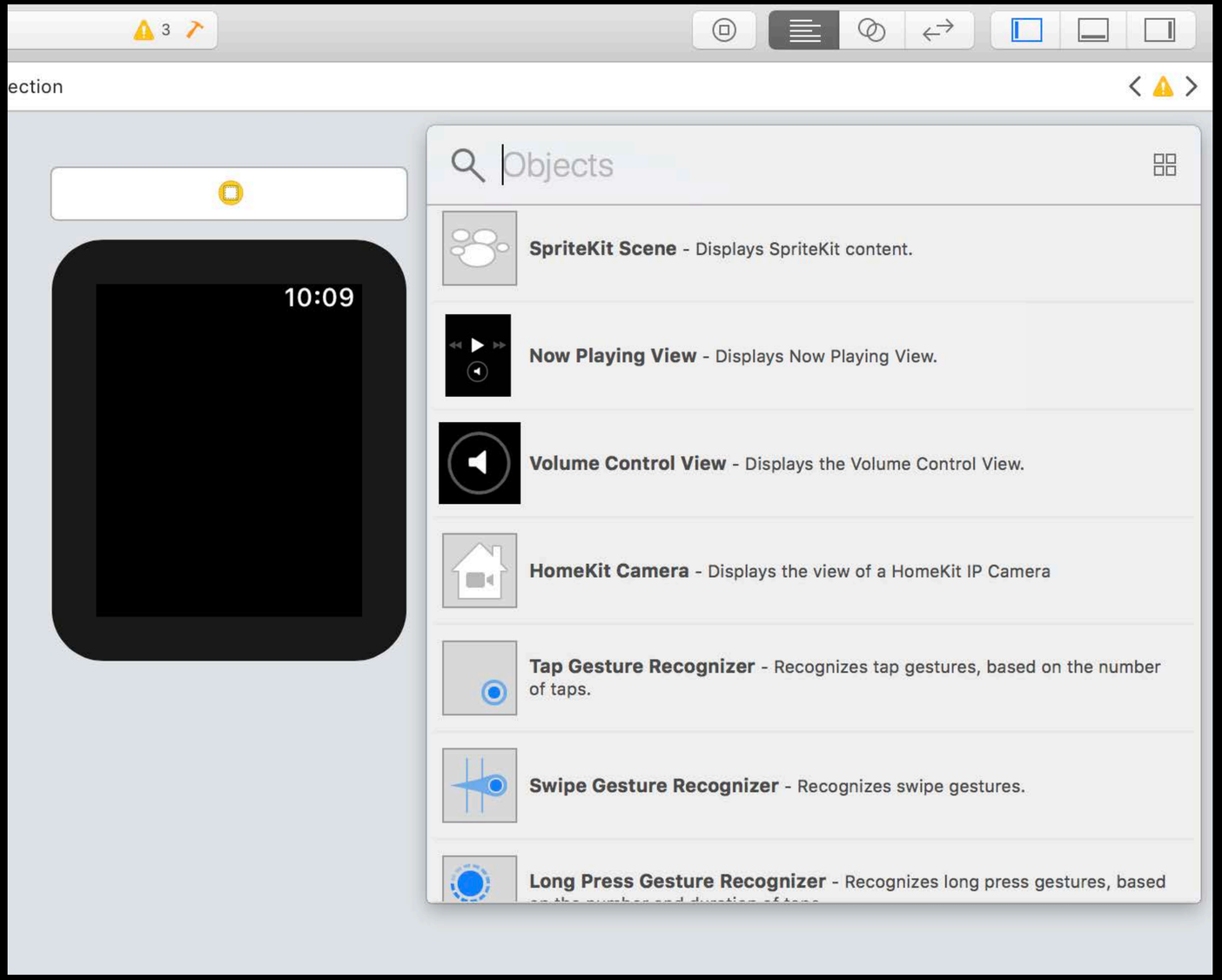
Now playing view

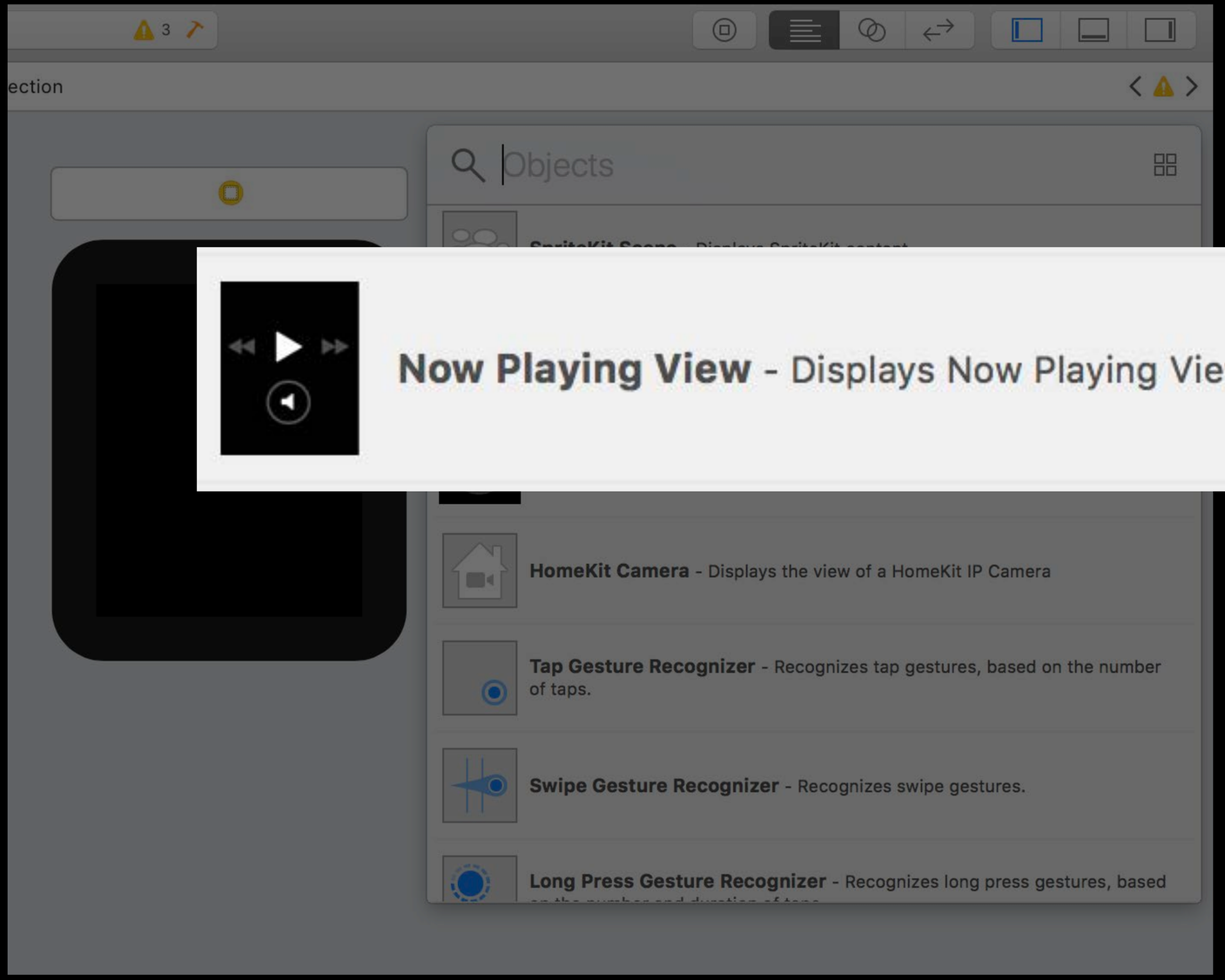
Digital Crown controls volume

Place in non-scrolling controller

Automatically switches sources

Application tint color


3
ection
10:09
Objects
SpriteKit Scene - Displays SpriteKit content.
Now Playing View - Displays Now Playing View.
Volume Control View - Displays the Volume Control View.
HomeKit Camera - Displays the view of a HomeKit IP Camera
Tap Gesture Recognizer - Recognizes tap gestures, based on the number of taps.
Swipe Gesture Recognizer - Recognizes swipe gestures.
Long Press Gesture Recognizer - Recognizes long press gestures, based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Native Controls

Volume control

Controls iPhone or local volume

Native Controls

Volume control

Controls iPhone or local volume

Application tint color

Native Controls

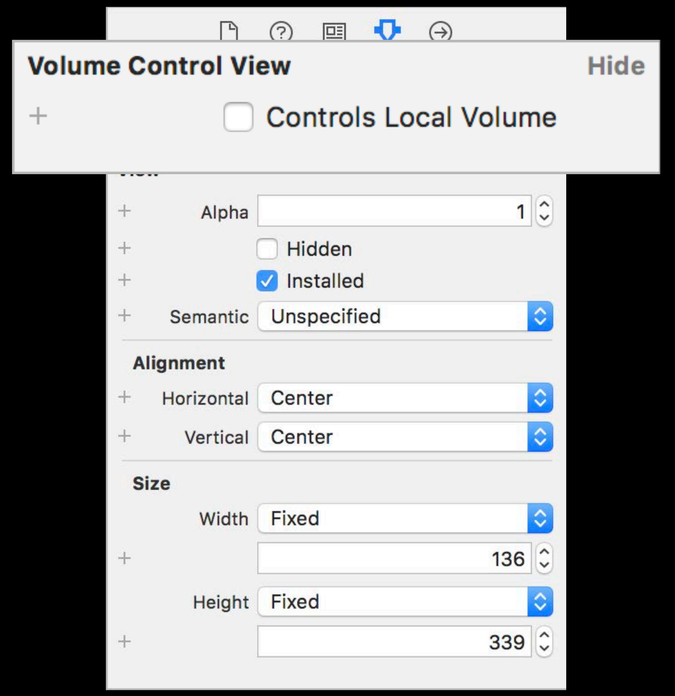
Volume control

Controls iPhone or local volume

Application tint color

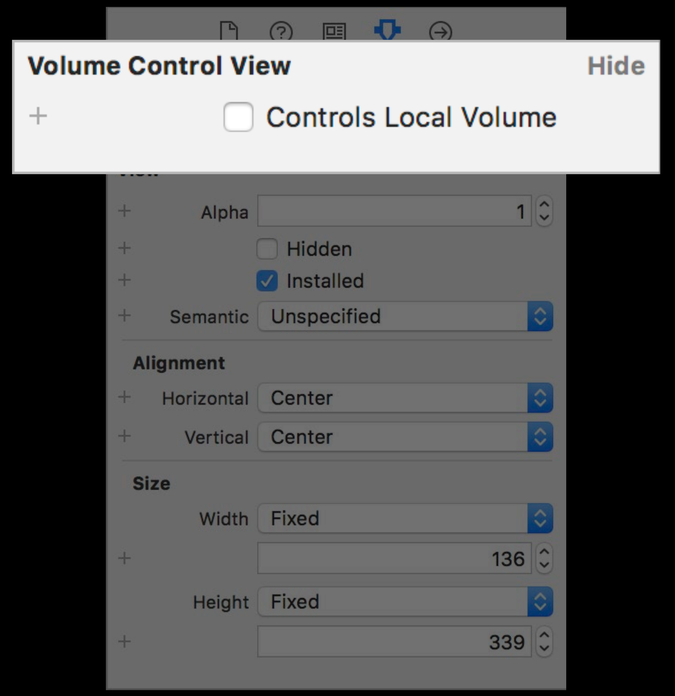
Native Controls

Volume control



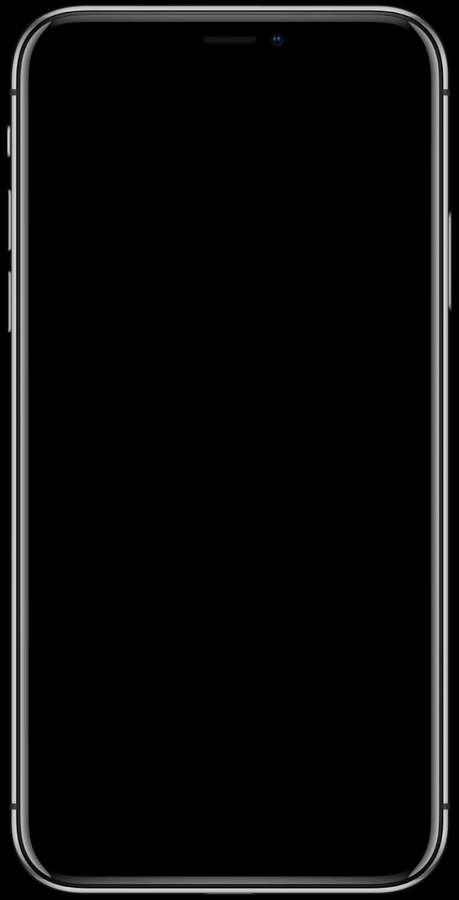
Native Controls

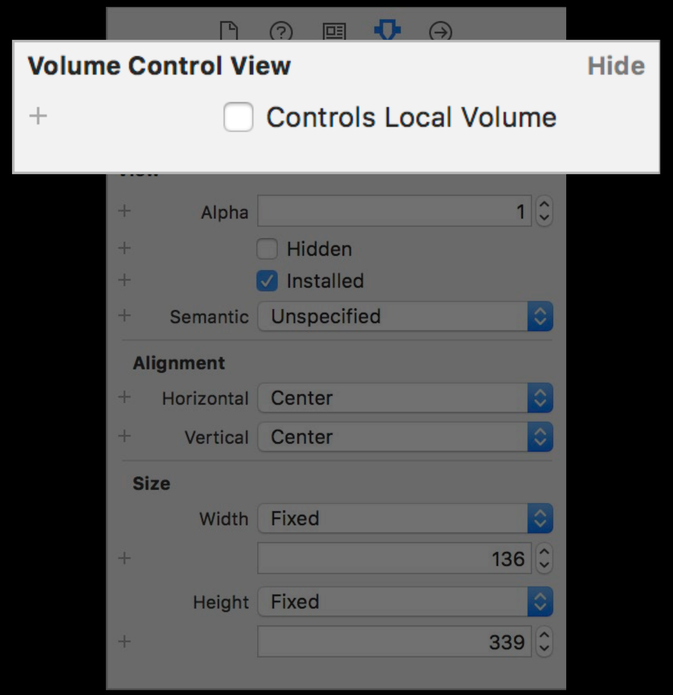
Volume control



Native Controls

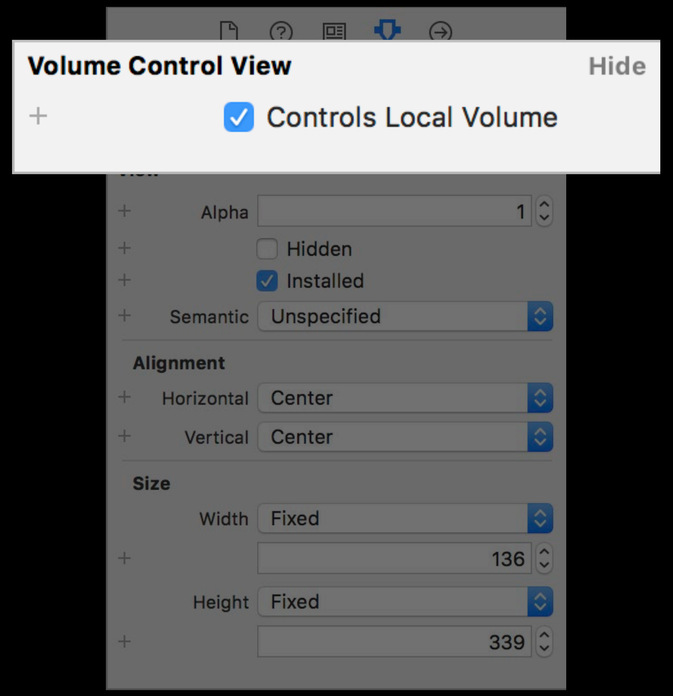
Volume control





Native Controls

Volume control

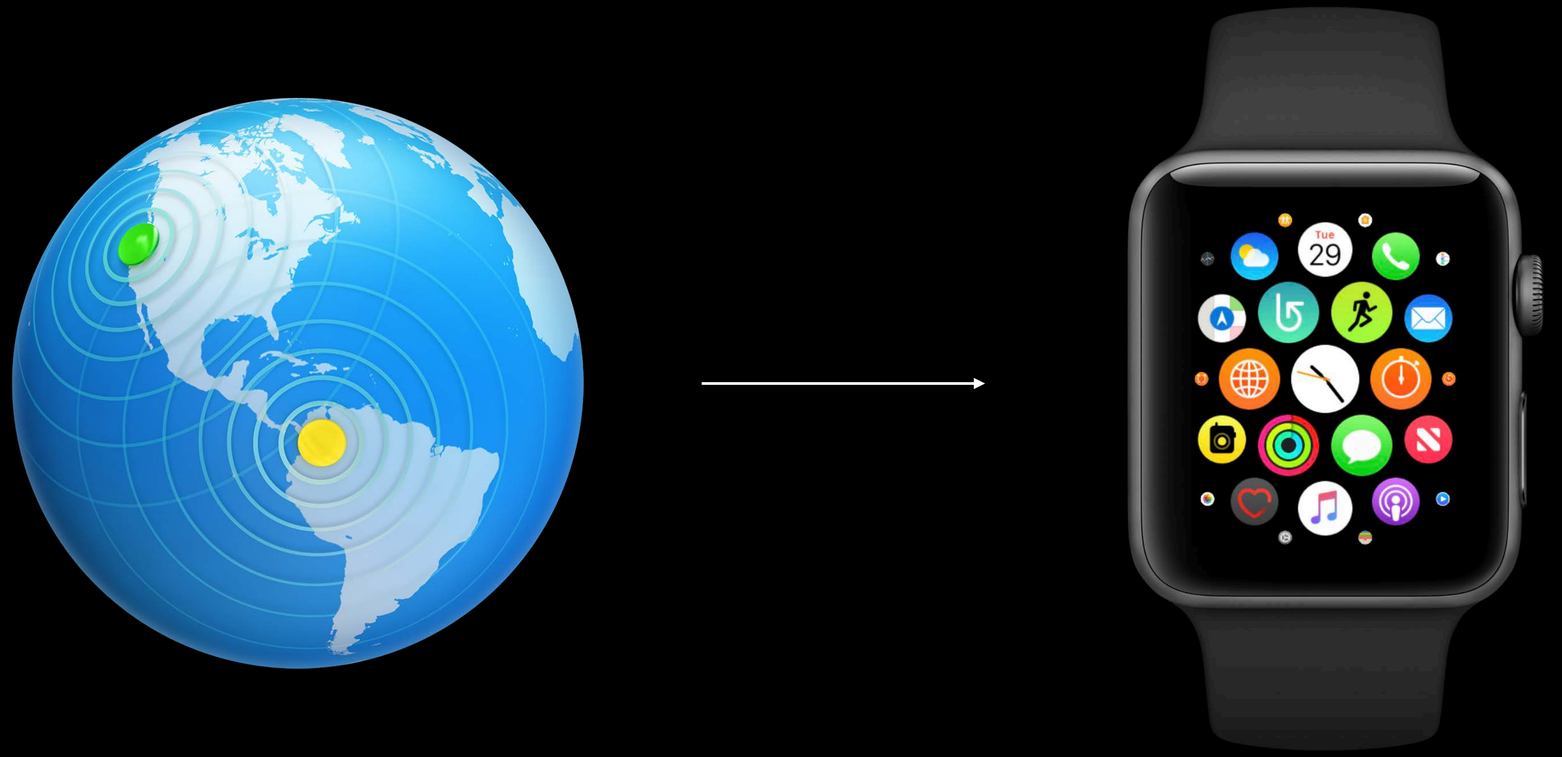


Getting Content


10:09
Matisse
Dali
Richter

Getting Content

Getting Content



```
//User initiated download

@IBAction func userPressedDownload() {
    WKExtension.shared().isFrontmostTimeoutExtended = true
    let session = MyNSURLSessionDelegate.backgroundSession
    let task = session.downloadTask(with: contentURL)
    task.resume()
}
```

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```

```
class DownloadManager : NSObject, URLSessionTaskDelegate, URLSessionDownloadDelegate {
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask, didWriteData
         bytesWritten: Int64, totalBytesWritten: Int64, totalBytesExpectedToWrite: Int64) {
        if totalBytesExpectedToWrite > 0 {
            let progress = Float(totalBytesWritten) / Float(totalBytesExpectedToWrite)
            // Update UI showing progress
        }
    }
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask,
         didFinishDownloadingTo location: URL) {
        // Manage file
        // Post notification alerting user of playback opportunity
    }
   func urlSession(_ session: URLSession, task: URLSessionTask, didCompleteWithError error:
         Error?) {  // Clean up state, handle errors if there are any }
}
```

```swift
class DownloadManager : NSObject, URLSessionTaskDelegate, URLSessionDownloadDelegate {
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```
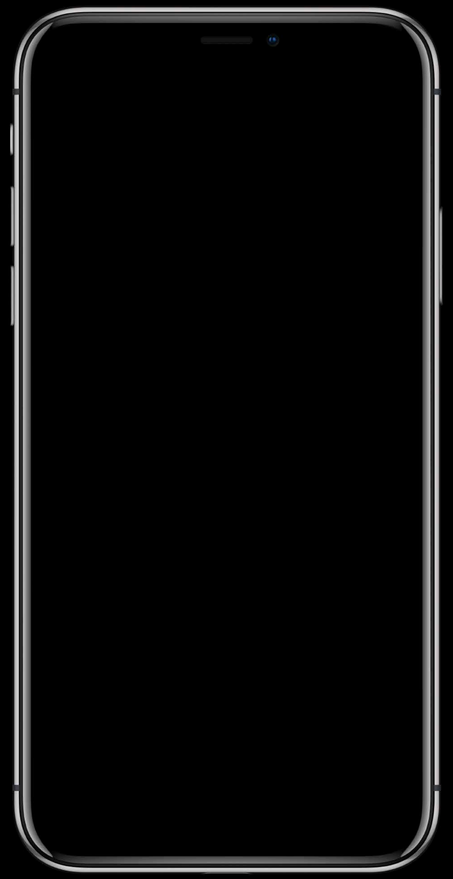
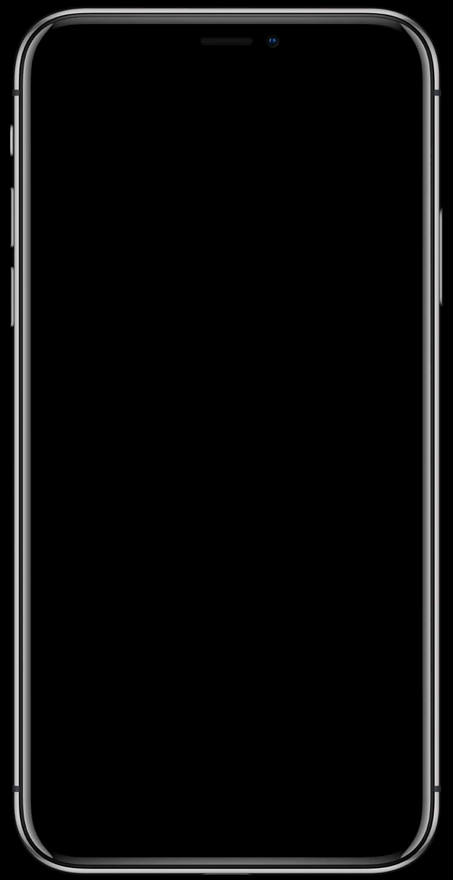

Getting Content



Getting Content



WatchConnectivity

WatchConnectivity

WatchConnectivity

Transfer file API

WatchConnectivity

Transfer file API

Progress

```swift
// Progress property

open class WCSessionFileTransfer : NSObject {

    open var file: WCSessionFile { get }

    @available(iOS 12.0, *)
    open var progress: Progress { get }

    open var isTransferring: Bool { get }

    open func cancel()
}
```

NEW

```
// Progress property

open class WCSessionFileTransfer : NSObject {

    open var file: WCSessionFile { get }

    @available(iOS 12.0, *)
    open var progress: Progress { get }

    open var isTransferring: Bool { get }

    open func cancel()
}
```

```
// User initiated download

if let transfer: WCSessionFileTransfer = fileTransfer {
   transferProgressView.observedProgress = transfer.progress
}
```

```
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```

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```

Which one do we use?

URLSession

URLSession

User initiated on Apple Watch

URLSession

User initiated on Apple Watch

Use `waitsForConnectivity` instead of SCNetworkReachability

URLSession

User initiated on Apple Watch

Use `waitsForConnectivity` instead of SCNetworkReachability

Requests are proxied through iPhone, when in range

URLSession

User initiated on Apple Watch

Use `waitsForConnectivity` instead of SCNetworkReachability

Requests are proxied through iPhone, when in range

WatchConnectivity

WatchConnectivity

Initiated on iPhone

WatchConnectivity

Initiated on iPhone

No need to request from your server again

Set Expectations

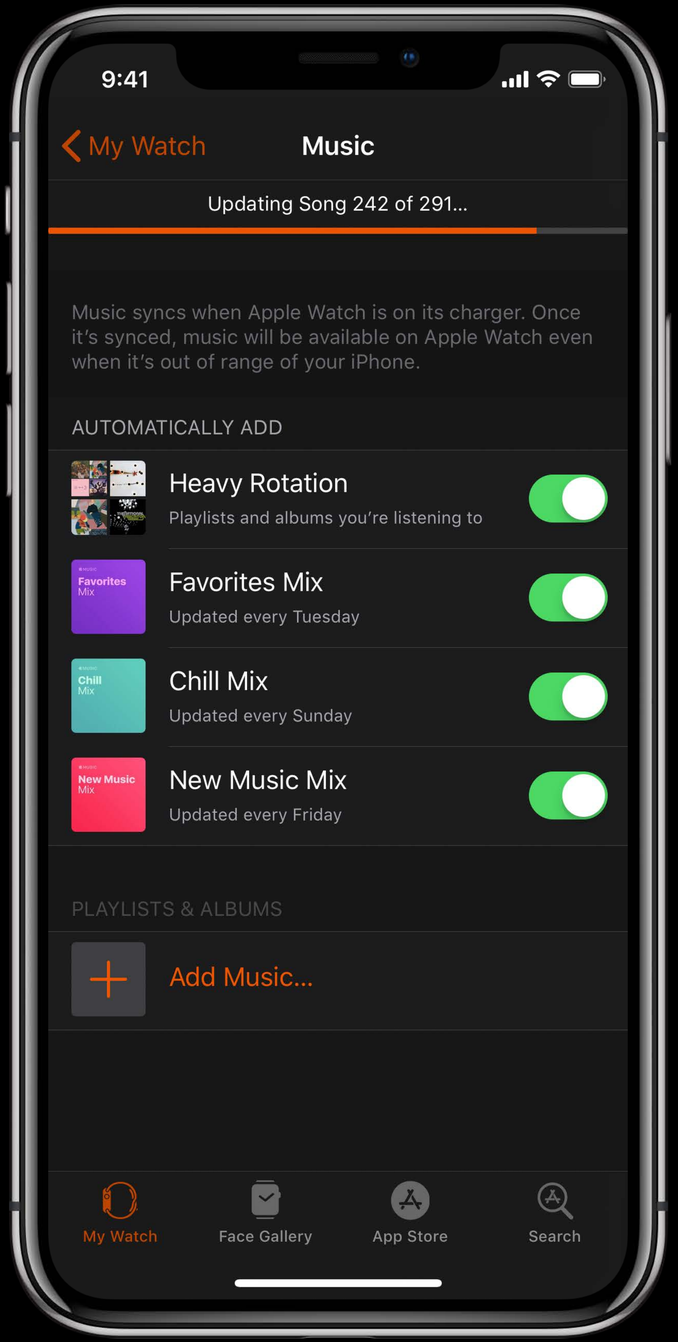
Set Expectations

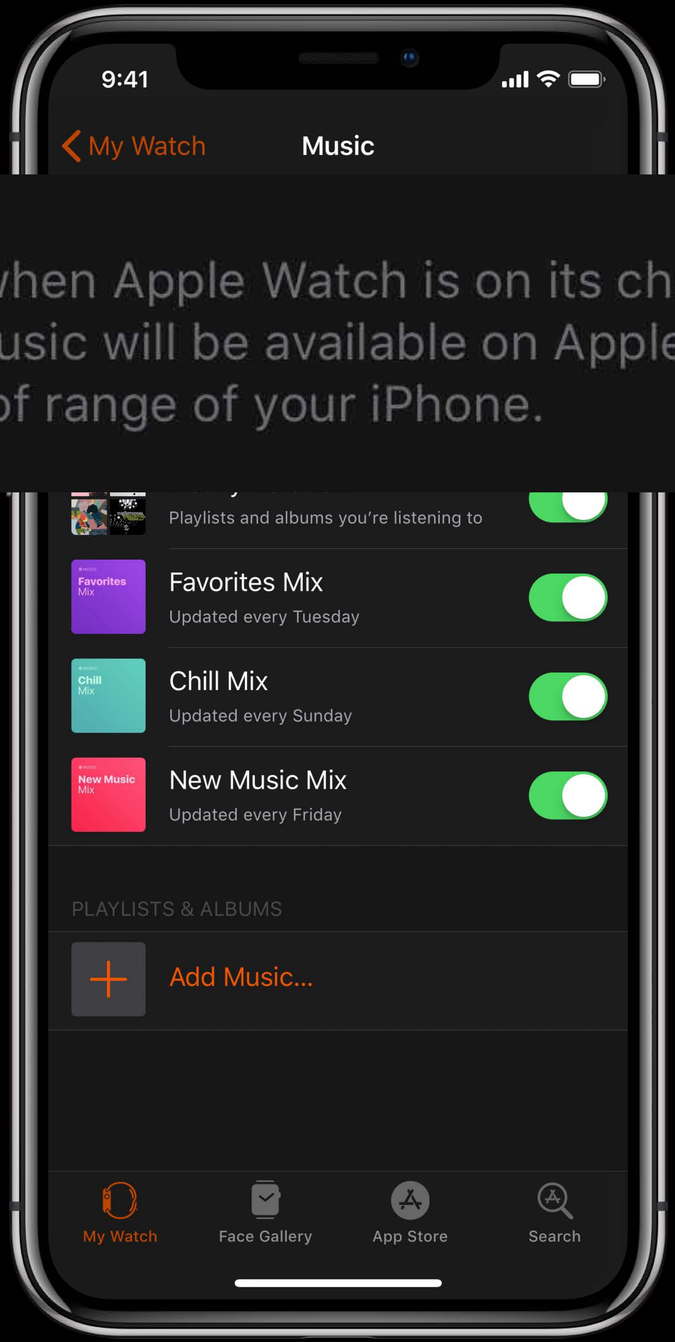
Instruct your user

Set Expectations

Instruct your user

On the magnetic charger


9:41
My Watch
Music
Updating Song 242 of 291...
Music syncs when Apple Watch is on its charger. Once it's synced, music will be available on Apple Watch even when it's out of range of your iPhone.
AUTOMATICALLY ADD
Heavy Rotation
Playlists and albums you're listening to
Favorites Mix
Updated every Tuesday
Chill Mix
Updated every Sunday
New Music Mix
Updated every Friday
PLAYLISTS & ALBUMS
Add Music...
My Watch
Face Gallery
App Store
Search



Music syncs when Apple Watch is on its charger. Once it's synced, music will be available on Apple Watch even when it's out of range of your iPhone.

Local Playback

WatchKit

WatchKit

```
presentMediaPlayerController(with:
options:completion:)
```

WatchKit

```
presentMediaPlayerController(with:
options:completion:)
```

WKAudioFileQueuePlayer

WatchKit

```
presentMediaPlayerController(with:
options:completion:)
```

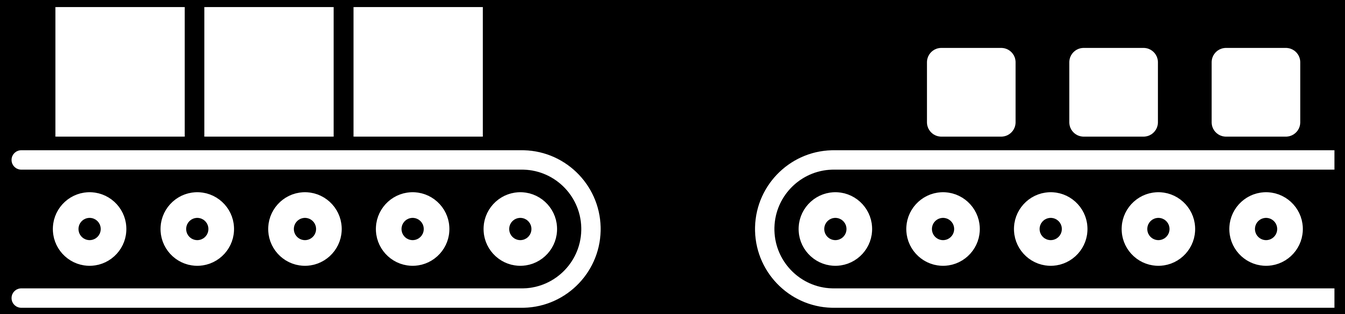
WKAudioFileQueuePlayer

- WKAudioFilePlayerItem


Done
−2:32
5
5

Playback

WKAudioFileQueuePlayer



AVFoundation

AVFoundation

AVAudioPlayer

AVFoundation

AVAudioPlayer

AVAudioEngine

AVFoundation

AVAudioPlayer

AVAudioEngine

Playback

- Background run mode
- Foreground, screen on


Run
10:09
END OF DAY RUN WITH HEADSPACE
25 Min • Run
with Andy Puddicom...

NEW

Audio Playback Background Mode

Background Playback

NEW

Background Playback

NEW

AVFoundation

Background Playback

NEW

AVFoundation

Route picking

Background Playback

NEW

AVFoundation

Route picking

MediaPlayer.framework

Background Playback

NEW

AVFoundation

Route picking

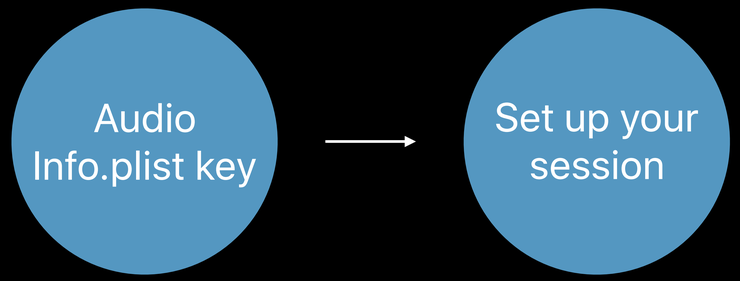
MediaPlayer.framework

Restricted to Bluetooth routes just like Music, Podcasts, and Radio

Background Playback

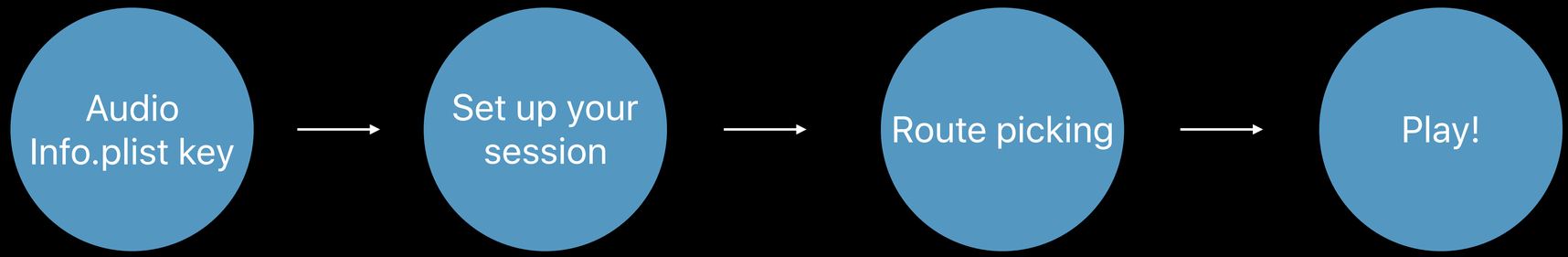
Background Playback

Background Playback

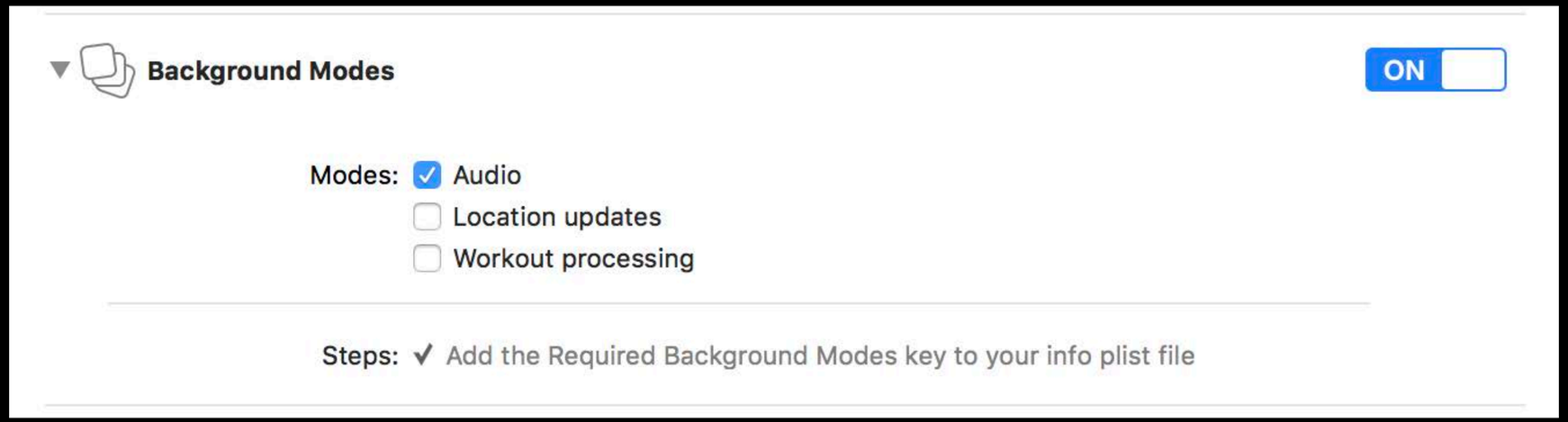


Background Playback

Background Playback



Background Playback


Background Modes
ON
Modes:
Audio
Location updates
Workout processing
Steps:
Add the Required Background Modes key to your info plist file

Local Playback

Local Playback

Set `routeSharingPolicy` to `longForm` on AVAudioSession

Local Playback

Set `routeSharingPolicy` to `longForm` on AVAudioSession

Call new `activate(withOptions:completion:)` method on AVAudioSession

Local Playback

Set `routeSharingPolicy` to `longForm` on AVAudioSession

Call new `activate(withOptions:completion:)` method on AVAudioSession

- On completion, call `play()`


Cancel
Choose where to play music:
Neil’s AirPods
Neil’s Beats Studio³

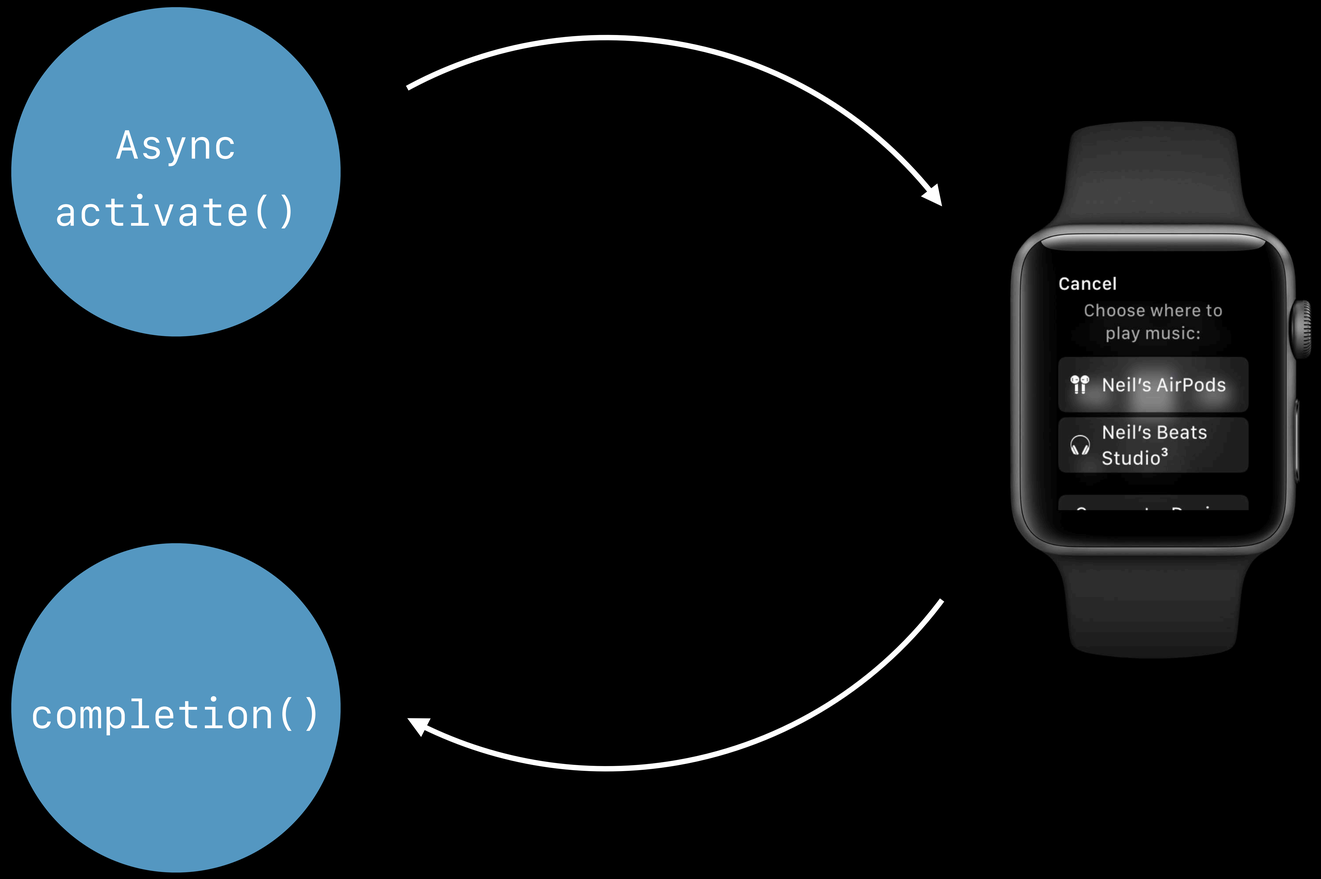
Route Picker

Route Picker

Route Picker

Async
activate()

Route Picker



```swift
// Setup AVAudioSession

func setupAudioSession() throws {
    try AVAudioSession.sharedInstance().setCategory(
        AVAudioSessionCategoryPlayback,
        mode: AVAudioSessionModeDefault,
        routeSharingPolicy: .longForm,
        options: []
    )
}
```

```swift
// Setup AVAudioSession

func setupAudioSession() throws {
    try AVAudioSession.sharedInstance().setCategory(
        AVAudioSessionCategoryPlayback,
        mode: AVAudioSessionModeDefault,
        routeSharingPolicy: .longForm,
        options: []
    )
}
```

```
// Activate session, display route picker, play!

@IBAction func userPressedPlay() {
    AVAudioSession.sharedInstance().activate(options: []) { (error: Error?) in
        if let error = error {
            print(error)
        } else {
            self.player?.play()
        }
    }
}
```

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// Activate session, display route picker, play!

@IBAction func userPressedPlay() {
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        }
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}
```

Background Playback

Routes

Background Playback

Routes

Apple wireless chip, W1

Background Playback

Routes

Apple wireless chip, W1

Bluetooth headphones

Background Playback

Route picker

Route picker details

Background Playback

Route picker

Route picker details

- If user has an active route, the route picker will select that automatically on your behalf

Background Playback

Route picker

Route picker details

- If user has an active route, the route picker will select that automatically on your behalf
- Takes active W1 route from iPhone

Background Playback

Route picker

Route picker details

- If user has an active route, the route picker will select that automatically on your behalf
- Takes active W1 route from iPhone
  - Unless iPhone has more priority

Background Playback

Route picker

Route picker details

- If user has an active route, the route picker will select that automatically on your behalf
- Takes active W1 route from iPhone
  - Unless iPhone has more priority
- If no active routes, route picker will appear

Background Playback

Playback

Playback

- AVAudioPlayer
- AVAudioEngine

Formats supported

AAC-LC, AAC-ELD, HE-AAC, HE-AACv2, MP3 (decoding only), Opus

Background Playback

Power

Only play audio when necessary

AVAudioEngine

- autoShutdownEnabled on by default

Background Playback

MediaPlayer.framework

Background Playback

MediaPlayer.framework

Provide Now Playing information

Background Playback

MediaPlayer.framework

Provide Now Playing information

Now Playing UI will update

Background Playback

MediaPlayer.framework

Provide Now Playing information

Now Playing UI will update

Handle events

```
// Providing Now Playing information

fileprivate let nowPlayingInfoCenter = MPNowPlayingInfoCenter.default()

var nowPlayingInfo = [String: Any]()
let image = UIImage(data: artworkData) ?? UIImage()
let artwork = MPMediaItemArtwork(boundsSize: image.size, requestHandler: {  (_) -> UIImage in
    return image
})

nowPlayingInfo[MPMediaItemPropertyTitle] = title
nowPlayingInfo[MPMediaItemPropertyAlbumTitle] = album
nowPlayingInfo[MPMediaItemPropertyArtwork] = artwork

nowPlayingInfoCenter.nowPlayingInfo = nowPlayingInfo
```

```swift
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```


Watch
10:09
Lights in the Sky
Nine Inch Nails—The


10:09:30
206
23
09
LIGHTS IN THE SKY

Background Playback

Media remote

Use MediaPlayer.framework

Handle commands however you wish

```
//Setup

@objc class RemoteCommandManager: NSObject {
    // Reference of `MPRemoteCommandCenter` used to configure and
    // setup remote control events in the application.
    fileprivate let remoteCommandCenter = MPRemoteCommandCenter.shared()
}
```

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@objc class RemoteCommandManager: NSObject {
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}
```

```swift
// Example providing a MediaRemote command

func enableSkipForwardCommand(interval: Int = 15) {
    remoteCommandCenter.skipForwardCommand.preferredIntervals = [NSNumber(value: interval)]
    remoteCommandCenter.skipForwardCommand.addTarget(self, action:
                            #selector(RemoteCommandManager.
                                handleSkipForwardCommandEvent(event:)))
    remoteCommandCenter.skipForwardCommand.isEnabled = true
}
```

```swift
// Example providing a MediaRemote command

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                          #selector(RemoteCommandManager.
                              handleSkipForwardCommandEvent(event:)))
    remoteCommandCenter.skipForwardCommand.isEnabled = true
}
```


Watch
10:09
Lights in the Sky
Nine Inch Nails—The
15
15

Audio Experience

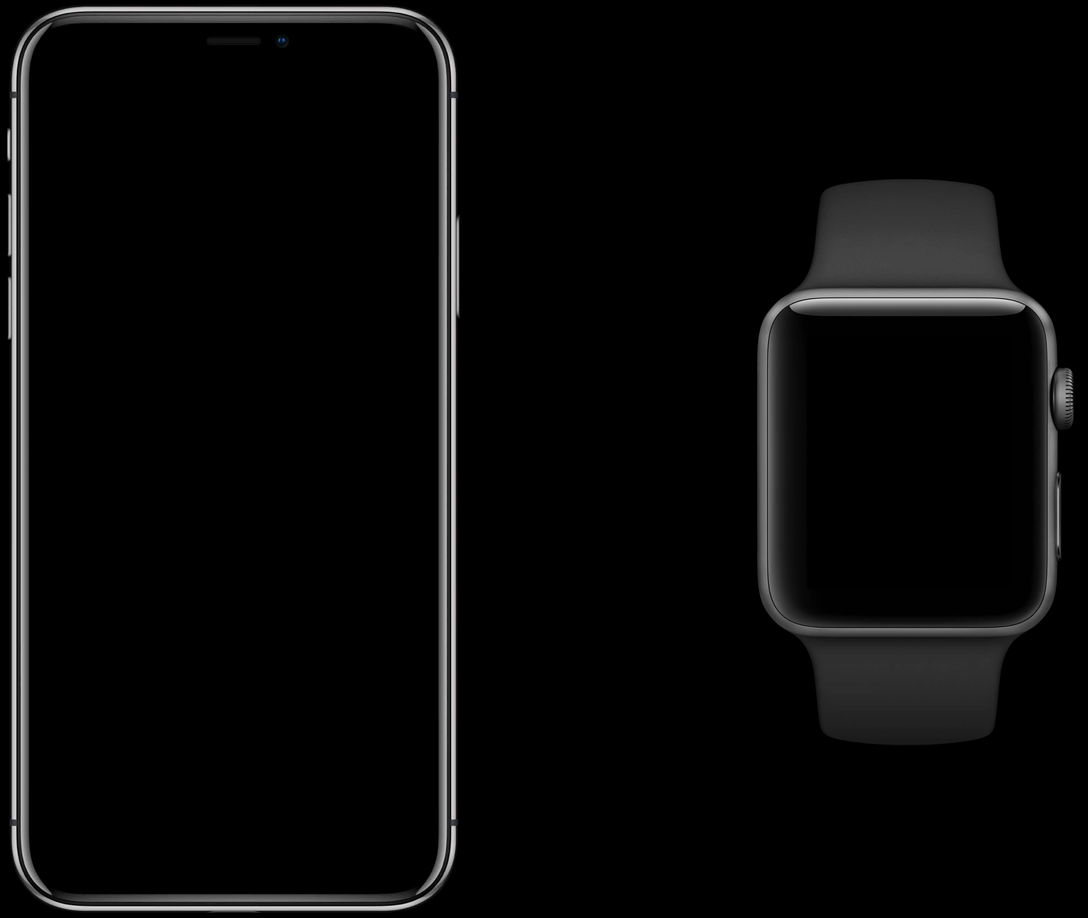
Audio Experience

Auto launch

Frontmost App state

Notifications

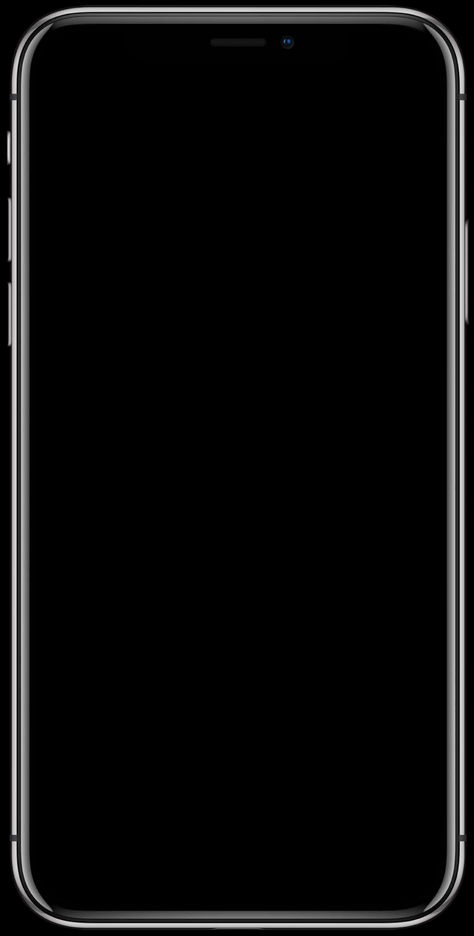
Shortcuts




MUSIC


MUSIC


iPhone
10:09
Bluff
Kelela—Take Me Apar




10:09
Matisse
Dali
Richter

Auto Launch

Auto Launch

Auto launch Audio Apps

Auto Launch

Auto launch Audio Apps

Now Playing session on iPhone brings Apple Watch app frontmost

Auto Launch

Auto launch Audio Apps

Now Playing session on iPhone brings Apple Watch app frontmost

Stays frontmost for duration of the session

Auto Launch

Now Playing session API

Auto Launch

Now Playing session API

You will know when you’re launched for a Now Playing session on iPhone

Auto Launch

Now Playing session API

You will know when you’re launched for a Now Playing session on iPhone

Take your user directly to the view

Auto Launch

Now Playing session API

You will know when you’re launched for a Now Playing session on iPhone

Take your user directly to the view

Use `handleRemoteNowPlayingActivity()` on WKExtensionDelegate

```
class ExtensionDelegate: NSObject, WKExtensionDelegate {
    func handleRemoteNowPlayingActivity() {
        // Get visible controller
        let visibleController = WKExtension.shared().visibleInterfaceController
        if (visibleController?.isKind(of: RemoteControlInterfaceController.self) ?? false {
            // User is already at our NowPlaying UI. Log this condition
        } else {
            WKInterfaceController.reloadRootPageControllers(
                withNames: [“remoteControlInterfaceController"],
                contexts: nil,
                orientation: .horizontal,
                pageIndex: 0)
        }
    }
}
```

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Auto Launch

Opt out

Auto Launch

Opt out

App can opt out

Auto Launch

Opt out

App can opt out

Do the right thing

Auto Launch

Opt out

App can opt out

Do the right thing

Info.plist key

Auto Launch

Opt out

App can opt out

Do the right thing

Info.plist key

Now Playing app will show if you have opted out

Active


10:09
Matisse
Dali
Richter

Frontmost

Frontmost

Background

Frontmost App State

Frontmost App State

WatchConnectivity resumes

Frontmost App State

WatchConnectivity resumes

URLSession resumes

Frontmost App State

WatchConnectivity resumes

URLSession resumes

Frontmost notification

Frontmost App State

WatchConnectivity resumes

URLSession resumes

Frontmost notification

Haptics

Frontmost App State

WatchConnectivity resumes

URLSession resumes

Frontmost notification

Haptics


Timer
10:09
01:59
Reset
Resume


Timer
10:09
02:00
Reset
Pause

Audio Experience

Frontmost

Audio Experience

Frontmost

Kept frontmost while playing audio

Audio Experience

Frontmost

Kept frontmost while playing audio

User navigates away

Audio Experience

Frontmost

Kept frontmost while playing audio

User navigates away

- Background playback still occurs

Audio Experience

Frontmost

Kept frontmost while playing audio

User navigates away

- Background playback still occurs

Properly handle background events

Audio Experience

Notifications

Audio Experience

Notifications

Content available local notification

Audio Experience

Notifications

Content available local notification

Play option as the primary action

Audio Experience

Notifications

Content available local notification

Play option as the primary action

Configuration step

Audio Experience

Notifications

Content available local notification

Play option as the primary action

Configuration step

```
class DownloadManager : NSObject, URLSessionTaskDelegate, URLSessionDownloadDelegate {
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask, didWriteData
         bytesWritten: Int64, totalBytesWritten: Int64, totalBytesExpectedToWrite: Int64) {
        if totalBytesExpectedToWrite > 0 {
            let progress = Float(totalBytesWritten) / Float(totalBytesExpectedToWrite)
            // Update UI showing progress
        }
    }
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask,
         didFinishDownloadingTo location: URL) {
        // Manage file
        // Post notification alerting user of playback opportunity
    }
   func urlSession(_ session: URLSession, task: URLSessionTask, didCompleteWithError error:
         Error?) {  // Clean up state, handle errors if there are any }
}
```

```
class DownloadManager : NSObject, URLSessionTaskDelegate, URLSessionDownloadDelegate {
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask, didWriteData
         bytesWritten: Int64, totalBytesWritten: Int64, totalBytesExpectedToWrite: Int64) {
        if totalBytesExpectedToWrite > 0 {
            let progress = Float(totalBytesWritten) / Float(totalBytesExpectedToWrite)
            // Update UI showing progress
        }
    }
    func urlSession(_ session: URLSession, downloadTask: URLSessionDownloadTask,
         didFinishDownloadingTo location: URL) {
        // Manage file
        // Post notification alerting user of playback opportunity
    }
   func urlSession(_ session: URLSession, task: URLSessionTask, didCompleteWithError error:
         Error?) {  // Clean up state, handle errors if there are any }
}
```

Audio Experience

Frontmost notifications

Audio Experience

Frontmost notifications

```
func userNotificationCenter(_ center: UNUserNotificationCenter, willPresent
notification: UNNotification, withCompletionHandler completionHandler:
@escaping (UNNotificationPresentationOptions) -> Void)
```

Audio Experience

Frontmost notifications

```
func userNotificationCenter(_ center: UNUserNotificationCenter, willPresent
notification: UNNotification, withCompletionHandler completionHandler:
@escaping (UNNotificationPresentationOptions) -> Void)
```

Play haptic

Audio Experience

Frontmost notifications

```
func userNotificationCenter(_ center: UNUserNotificationCenter, willPresent
notification: UNNotification, withCompletionHandler completionHandler:
@escaping (UNNotificationPresentationOptions) -> Void)
```

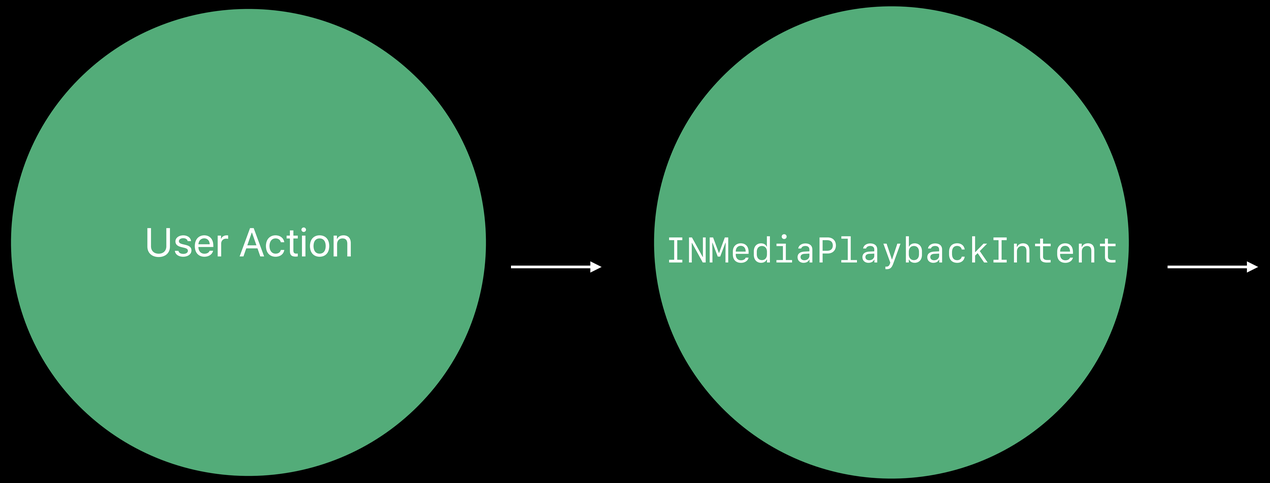
Play haptic


WED 6
10:09
Recipes
Chicken Parmesan
Space News
New Planets Found


WED 6
10:09
Audible
Resume
The Martian
Space News
New Planets
Found

Donations

User Action




Hey Siri
museum tour

Making a Great Experience

Glanceable Information

Tappable Actions

Audio Experience

Shortcuts

Audio Experience

Shortcuts

Donate `INMediaPlaybackIntent`

Audio Experience

Shortcuts

Donate `INMediaPlaybackIntent`

Relevant shortcut API

Audio Experience

Shortcuts

Donate `INMediaPlaybackIntent`

Relevant shortcut API

Shortcut phrases

Audio Experience

Shortcuts

Donate `INMediaPlaybackIntent`

Relevant shortcut API

Shortcut phrases

Introduction to Siri Shortcuts	WWDC 2018
Building for Voice with Siri Shortcuts	WWDC 2018
Shortcuts on the Siri Watch Face	WWDC 2018

Summary

Summary

Native controls

Summary

Native controls

Background playback

Summary

Native controls

Background playback

Progress

More Information

https://developer.apple.com/wwdc2018/504

watchOS Runtime and Connectivity Lab	Technology Lab 9	Thursday 12:00PM


WWDC18