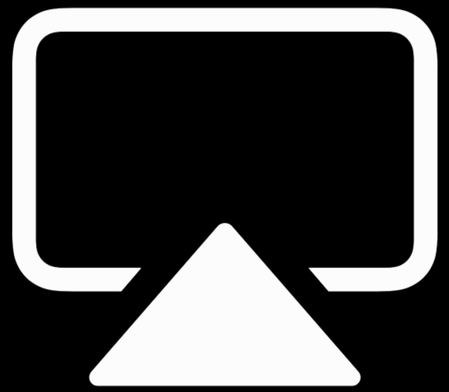
#WWDC19

Reaching the Big Screen with AirPlay 2

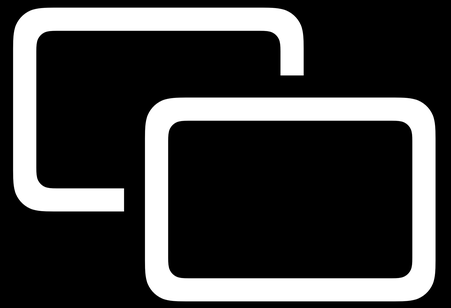
Jonathan Bennett, Connected Media
Marty Pye, AVKit

AirPlay Overview



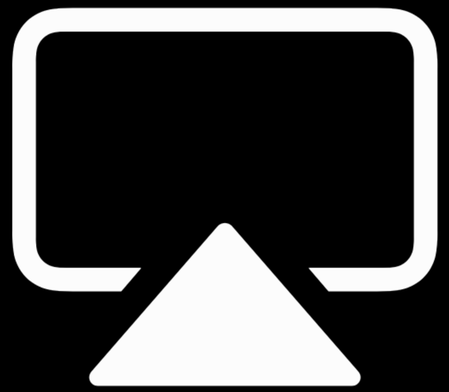
Watch

Listen



Share

AirPlay Overview



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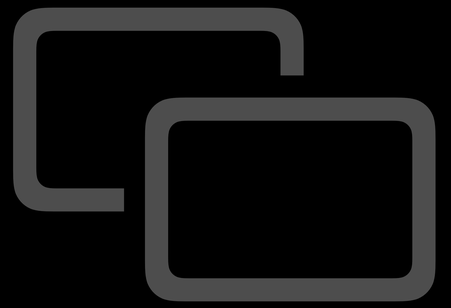
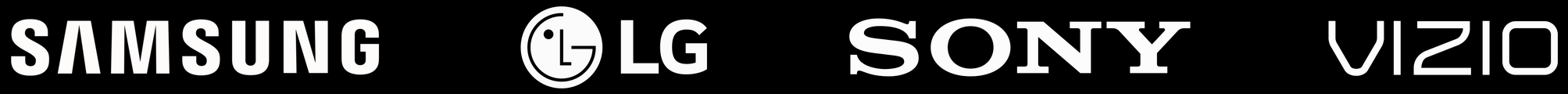
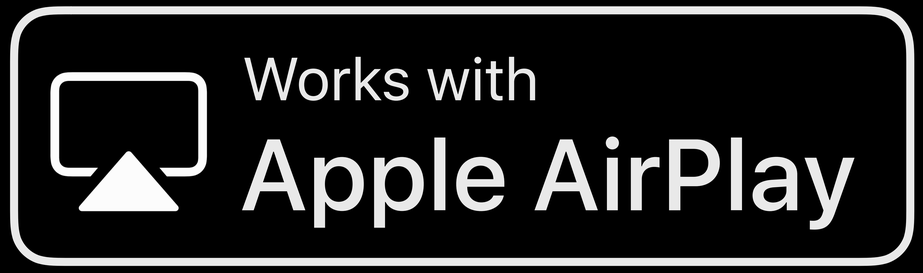
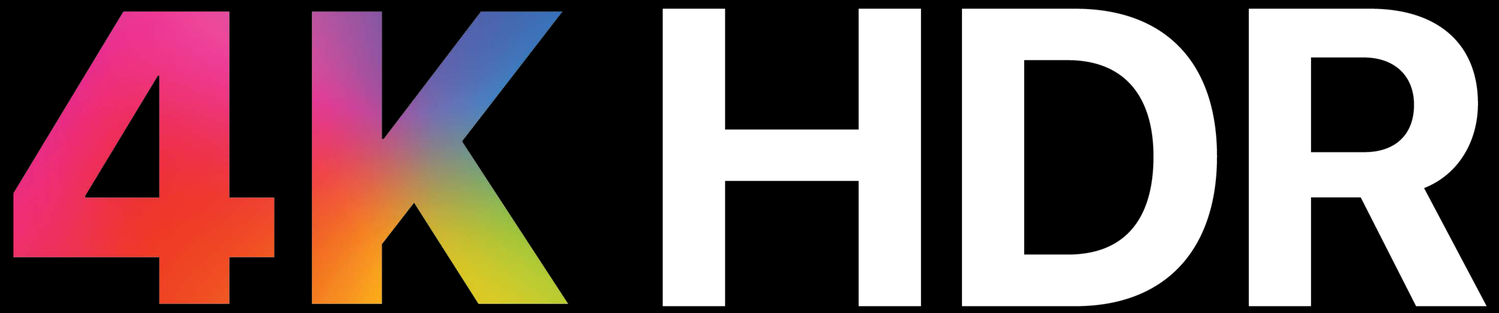


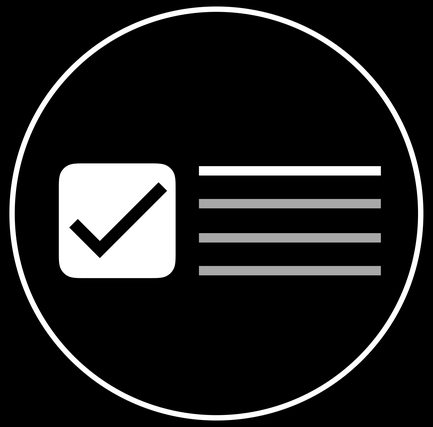
Share

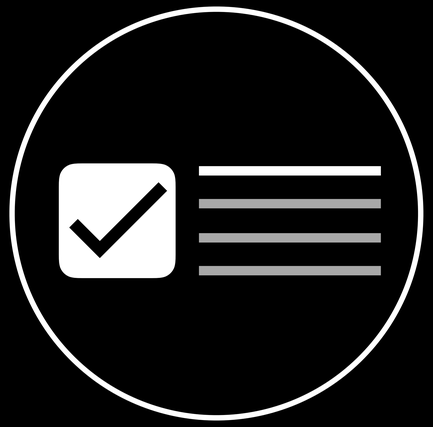

tv

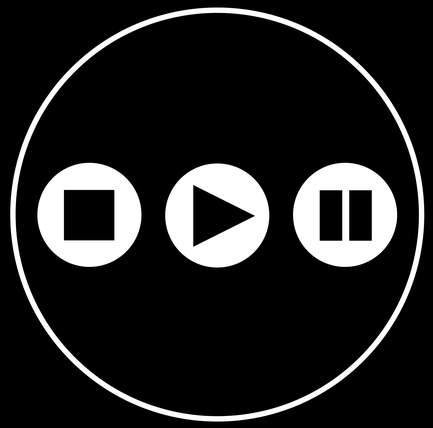

SAMSUNG
LG
SONY
VIZIO

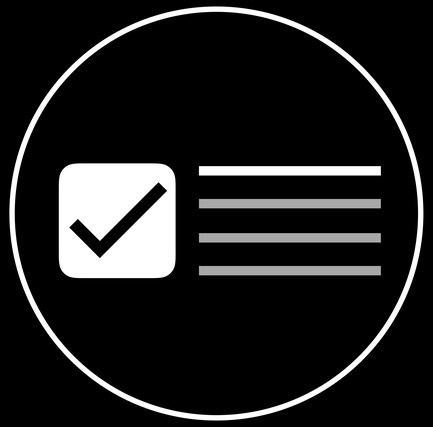

Works with
Apple AirPlay

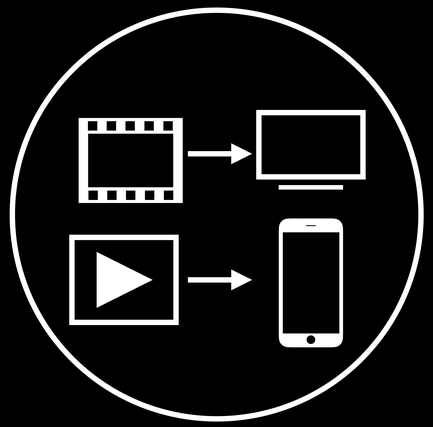

4K HDR

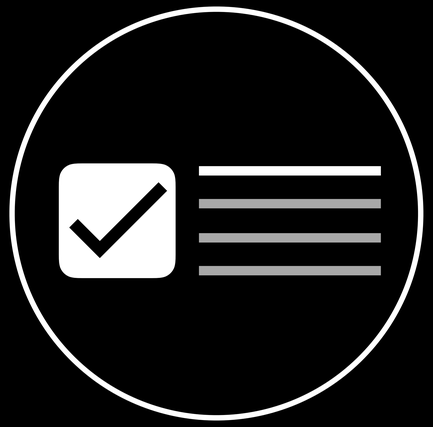


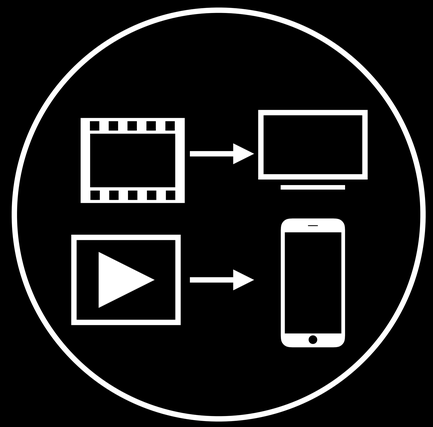












Best quality video

Best quality video

AirPlay picker

Best quality video

AirPlay picker

Remote controls

Best quality video

AirPlay picker

Remote controls

AirPlay multitasking

Best quality video

AirPlay picker

Remote controls

AirPlay multitasking

Long-form video apps

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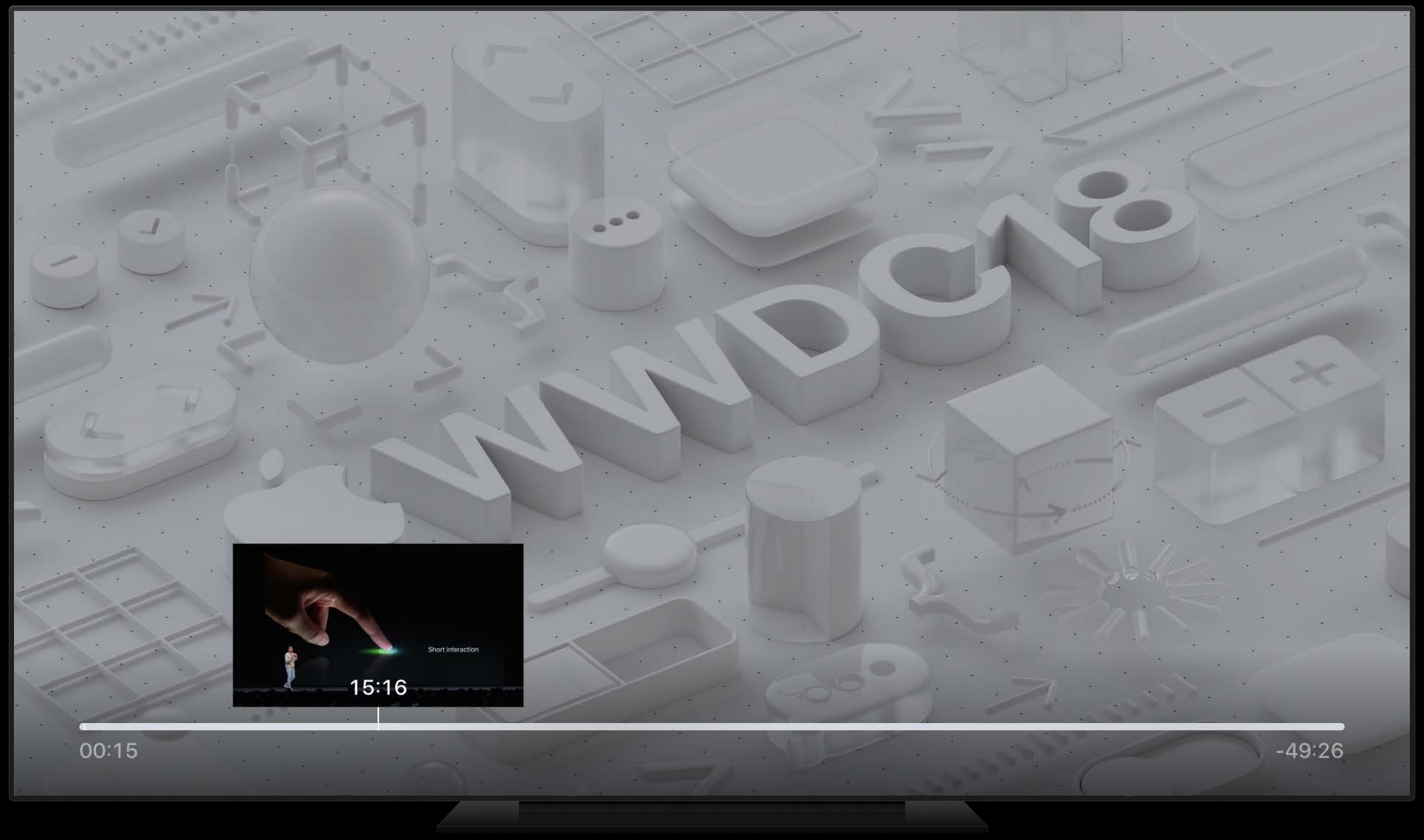
Best Quality Video

HTTP Live Streaming

- Include 4K + HDR + surround sound variants
- Full range of variants per codec


WWDC18
Short interaction
15:16
00:15
-49:26

Best Quality Video

HTTP Live Streaming

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- Provide I-frame variants for smooth seeking

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HTTP Live Streaming

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FairPlay Streaming

Smooth Playback

HTTP Live Streaming `EXT-X-DISCONTINUITY` tag

- Avoid switching video formats

Smooth Playback

HTTP Live Streaming `EXT-X-DISCONTINUITY` tag

- Avoid switching video formats

AVQueuePlayer

Smooth Playback

HTTP Live Streaming `EXT-X-DISCONTINUITY` tag

- Avoid switching video formats

AVQueuePlayer

AVPlayer.replaceCurrentItem(with item:)

Best quality video

AirPlay picker

Remote controls

AirPlay multitasking

Long-form video apps

AirPlay Picker

Add a picker to your app

Decide how to order AirPlay destinations

Recommended API

AVRoutePickerView

Available iOS 11 / macOS 10.15

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AVRoutePickerView

Available iOS 11 / macOS 10.15

MPVolumeView

Route Button properties deprecated

Add a Picker

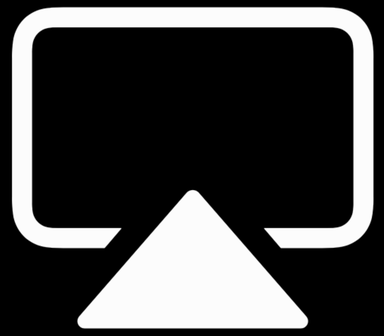
```
let routePickerView = AVRoutePickerView()
```

Prioritize Video Devices

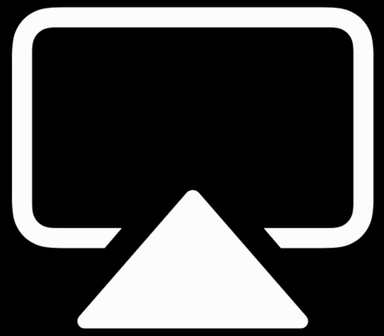
NEW

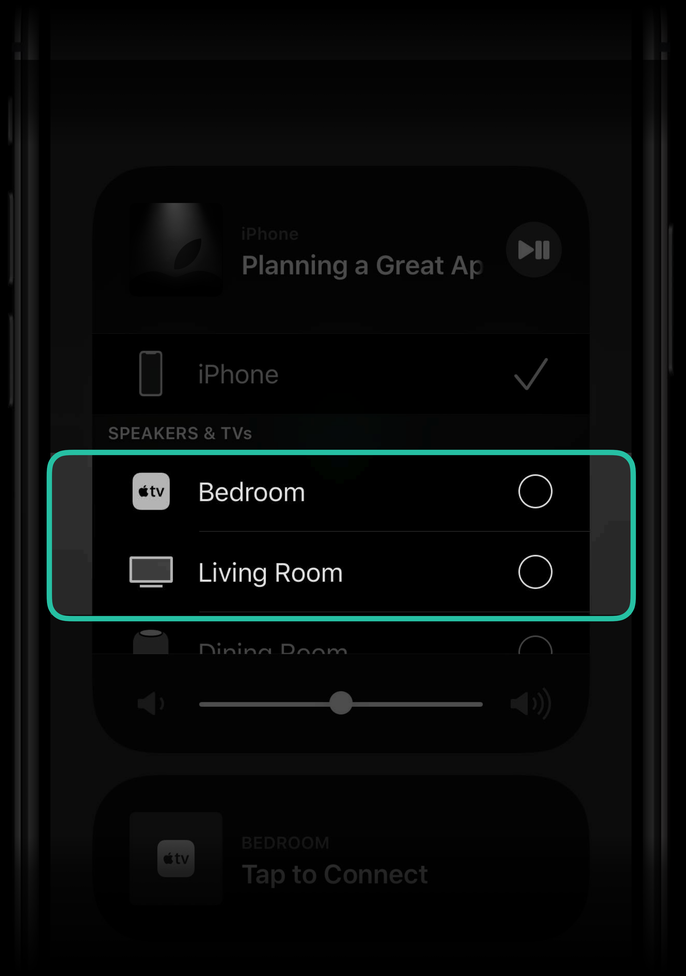
```
let routePickerView = AVRoutePickerView()
routePickerView.prioritizesVideoDevices = true
```

Prioritize Video Devices



Prioritize Video Devices





Best quality video

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Remote controls

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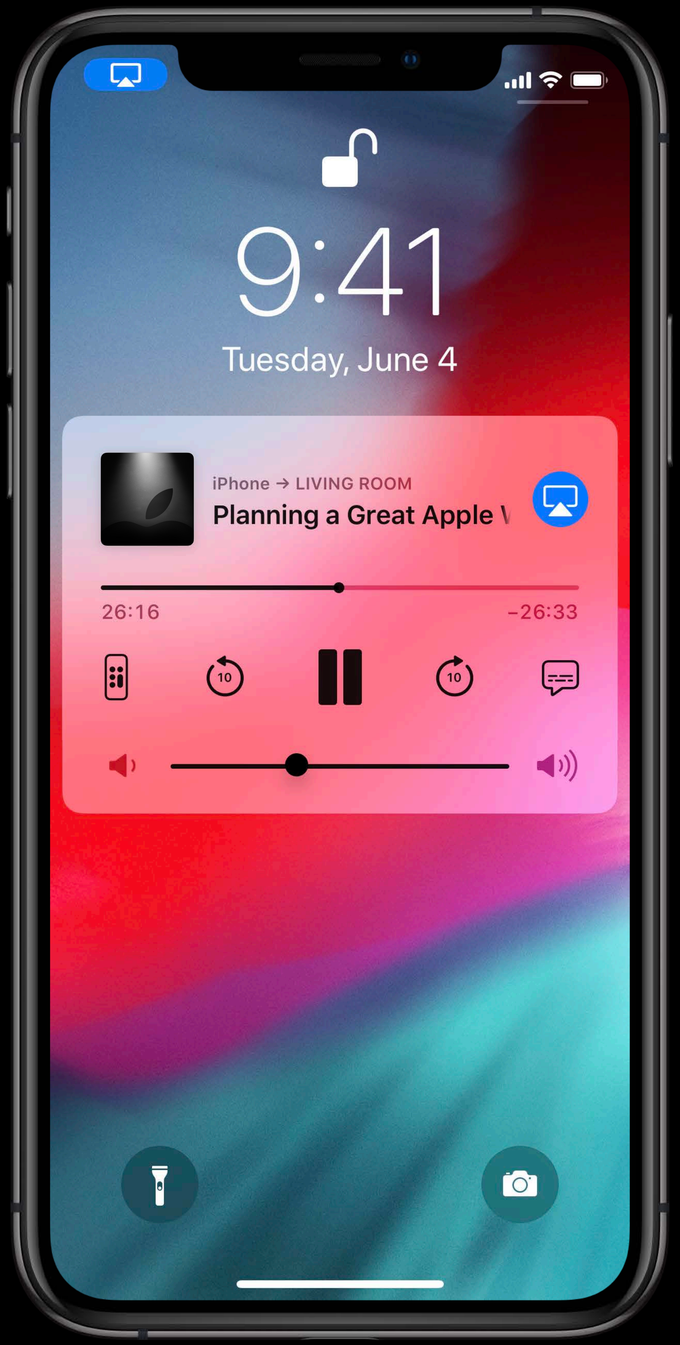
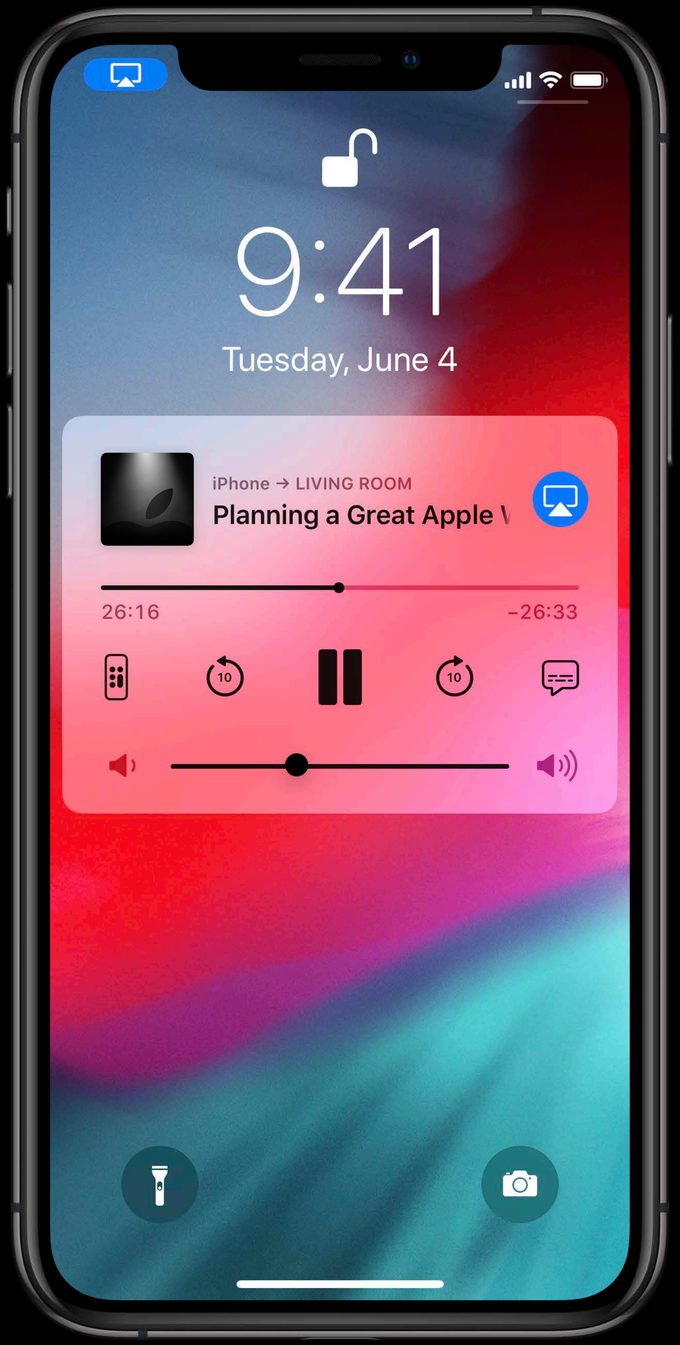
Long-form video apps


9:41
Tuesday, June 4
iPhone → LIVING ROOM
Planning a Great Apple
26:16
-26:33
10
10


9:41
Tuesday, June 4
iPhone → LIVING ROOM
Planning a Great Apple
26:16
-26:33


9:41
Pause the living room
Tap to Edit
OK, paused.
iPhone → LIVING ROOM
Designing Fluid Interfaces
16:04
-48:37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Tap to Edit
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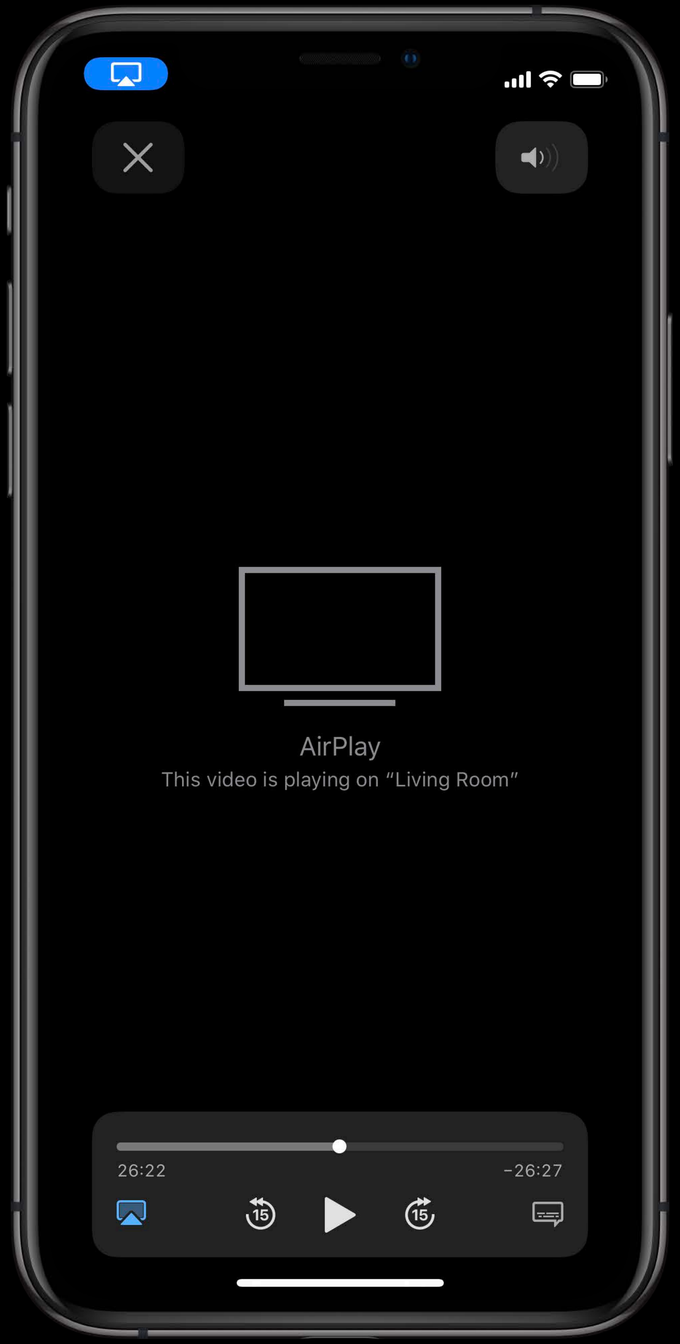
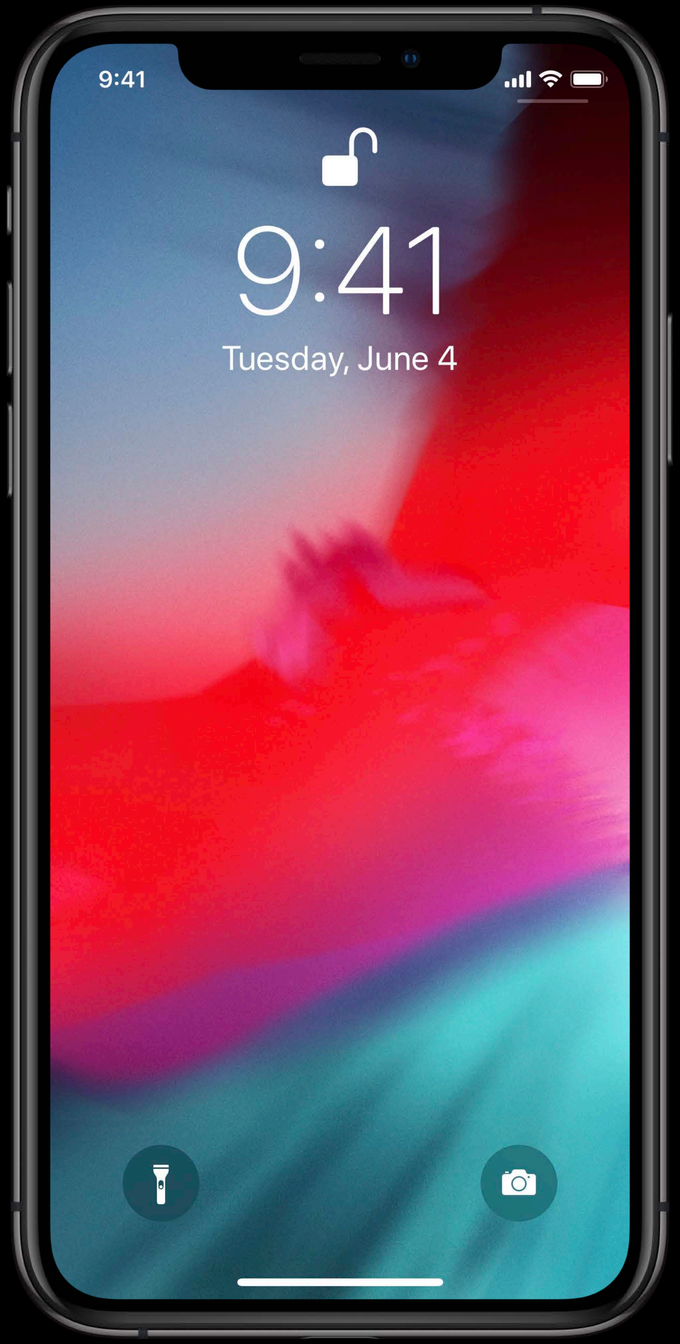
iPhone
Cassius
BEDROOM
Designing Fluid Inte
18:02
-46:39
DINING ROOM → KITCHEN
Keep Rocking
Caleb


AirPlay
This video is playing on “Living Room”
26:22
-26:27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Becoming the Now Playing App

Support remote controls

Initiate playback

Becoming the Now Playing App

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- **iOS:** Activate with a non-mixable `AVAudioSession` category
  - Example: `.playback` category

Becoming the Now Playing App

Support remote controls

Initiate playback

- **iOS:** Activate with a non-mixable `AVAudioSession` category
  - Example: `.playback` category
- **macOS:** Set `MPNowPlayingInfoCenter.playbackState`

Supporting Remote Controls

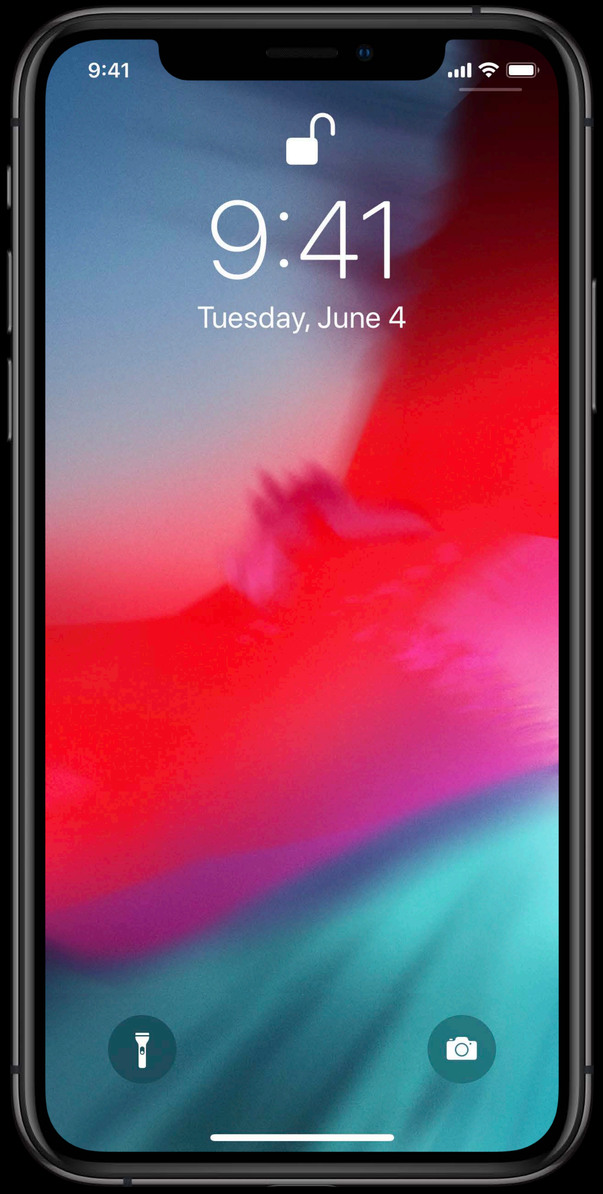
AVPlayerViewController handles remote controls

Supporting Remote Controls

AVPlayerViewController handles remote controls

MPRemoteCommandCenter and MPNowPlayingInfoCenter

Register for Remote Controls



Register for Remote Controls

```swift
func setupRemoteTransportControls() {
    let commandCenter = MPRemoteCommandCenter.shared()

    // Add handler for play command
    commandCenter.playCommand.addTarget { [unowned self] event in
        if self.player.rate == 0.0 {
            self.player.play()
            return .success
        }
        return .commandFailed
    }

    // Add handler for pause & toggle playback Commands
    commandCenter.pauseCommand.addTarget { /* … */ }
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Provide Now Playing Media Info

Provide Now Playing Media Info

Provide Now Playing Media Info

Provide Now Playing Media Info

Item metadata

Playback state

Provide Now Playing Media Info

Item metadata

Playback state

Provide Now Playing Media Info

- Item metadata
- Playback state

```swift
// Update all Now Playing info When AVPlayerItem changes
func handleItemChanged(item: AVPlayerItem, metadata: NowPlayableStaticMetadata) {









}

// Update playback state Now Playing info for significant events like rate changes and seeks
func handlePlaybackStateChanged(metadata: NowPlayableDynamicMetadata) {

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```
// Update all Now Playing info When AVPlayerItem changes
func handleItemChanged(item: AVPlayerItem, metadata: NowPlayableStaticMetadata) {
    // Update static info like title, artist, etc
    updateNowPlayingMetadata(metadata)

    // Update playback metadata, if available
    if let playbackMetadata = playbackMetadata(for: item) {
        updateNowPlayingPlaybackInfo(playbackMetadata)
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func handlePlaybackStateChanged(metadata: NowPlayableDynamicMetadata) {
    updateNowPlayingPlaybackInfo(metadata)
}
```

```swift
func updateNowPlayingMetadata(_ metadata: NowPlayableStaticMetadata) {
  let nowPlayingInfoCenter = MPNowPlayingInfoCenter.default()
  var nowPlayingInfo = nowPlayingInfoCenter.nowPlayingInfo ?? [String: Any]()

  nowPlayingInfo[MPMediaItemPropertyTitle] = metadata.title
  nowPlayingInfo[MPMediaItemPropertyArtwork] = metadata.artwork

  nowPlayingInfoCenter.nowPlayingInfo = nowPlayingInfo
}
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  var nowPlayingInfo = nowPlayingInfoCenter.nowPlayingInfo ?? [String: Any]()

  nowPlayingInfo[MPMediaItemPropertyPlaybackDuration] = metadata.duration
  nowPlayingInfo[MPNowPlayingInfoPropertyElapsedPlaybackTime] = metadata.position
  nowPlayingInfo[MPNowPlayingInfoPropertyPlaybackRate] = metadata.rate

  nowPlayingInfoCenter.nowPlayingInfo = nowPlayingInfo
}
```

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func updateNowPlayingPlaybackInfo(_ metadata: NowPlayableDynamicMetadata) {
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Handle Skips and Seeks

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```swift
func setupRemoteTransportControls() {
  let commandCenter = MPRemoteCommandCenter.shared()
  /* … register for play/pause/toggle commands … */

  commandCenter.skipForwardCommand.preferredIntervals = [15.0]
  commandCenter.skipForwardCommand.addTarget { [unowned self] event in
    guard let event = event as? MPSkipIntervalCommandEvent else { return .commandFailed }
    self.player.skipForward(by: event.interval)
    return .success
  }

  // Add handler for other skip and seek commands
  commandCenter.skipBackwardCommand.addTarget { /* … */ }
  commandCenter.changePlaybackPositionCommand.addTarget { /* … */ }
}
```

```
func setupRemoteTransportControls() {
  let commandCenter = MPRemoteCommandCenter.shared()
  /* … register for play/pause/toggle commands … */

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    return .success
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  // Add handler for other skip and seek commands
  commandCenter.skipBackwardCommand.addTarget { /* … */ }
  commandCenter.changePlaybackPositionCommand.addTarget { /* … */ }
}
```

```swift
func setupRemoteTransportControls() {
  let commandCenter = MPRemoteCommandCenter.shared()
  /* … register for play/pause/toggle commands … */

  commandCenter.skipForwardCommand.preferredIntervals = [15.0]
  commandCenter.skipForwardCommand.addTarget { [unowned self] event in
    guard let event = event as? MPSkipIntervalCommandEvent else { return .commandFailed }
    self.player.skipForward(by: event.interval)
    return .success
  }

  // Add handler for other skip and seek commands
  commandCenter.skipBackwardCommand.addTarget { /* … */ }
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func setupRemoteTransportControls() {
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  /* … register for play/pause/toggle commands … */

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  let commandCenter = MPRemoteCommandCenter.shared()
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  commandCenter.skipBackwardCommand.addTarget { /* … */ }
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}
```

Temporarily Disabling Commands

Use MPRemoteCommand's `isEnabled`

Do not remove the target handler

Temporarily Disabling Commands

Use MPRemoteCommand's `isEnabled`

Do not remove the target handler

Temporarily Disabling Commands

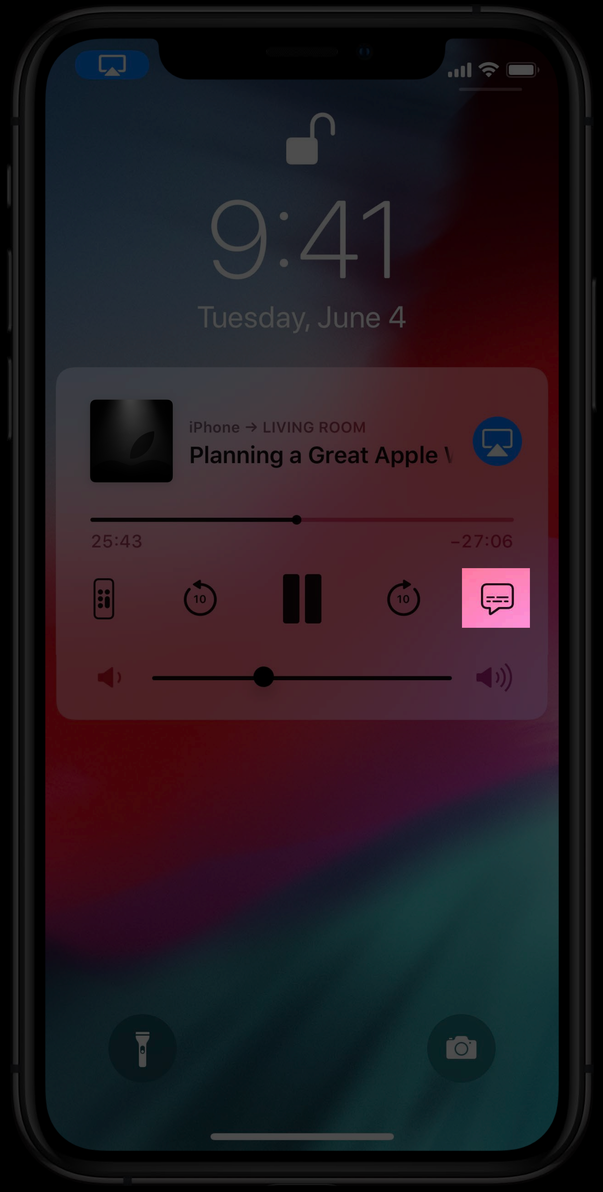
Use MPRemoteCommand's `isEnabled`

Do not remove the target handler

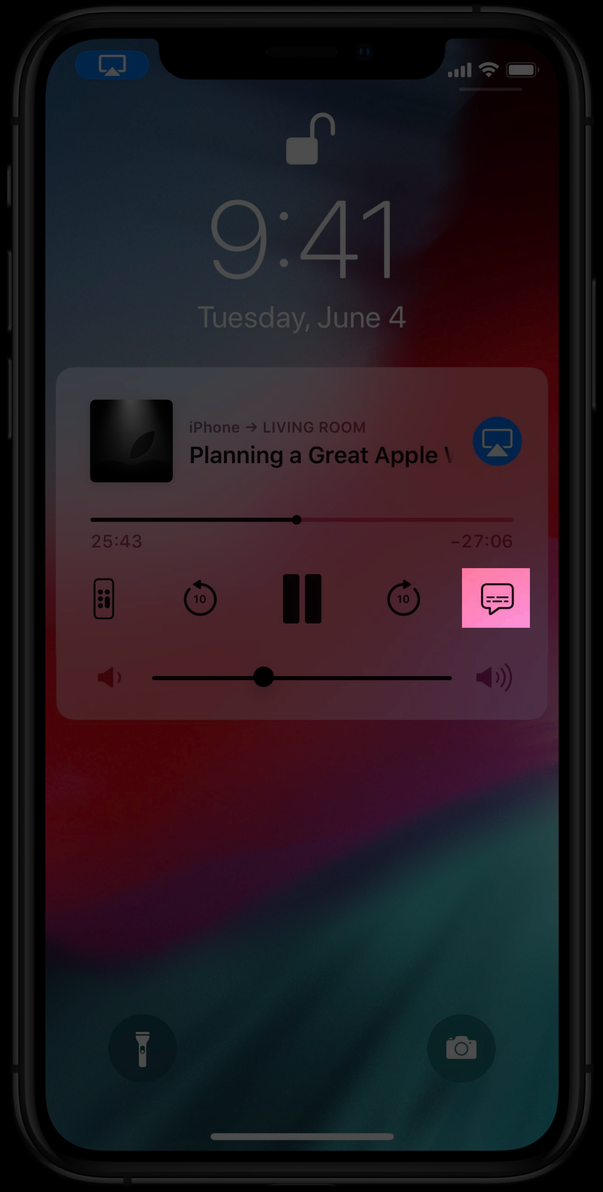
Audio Languages and Subtitles

Audio Languages and Subtitles

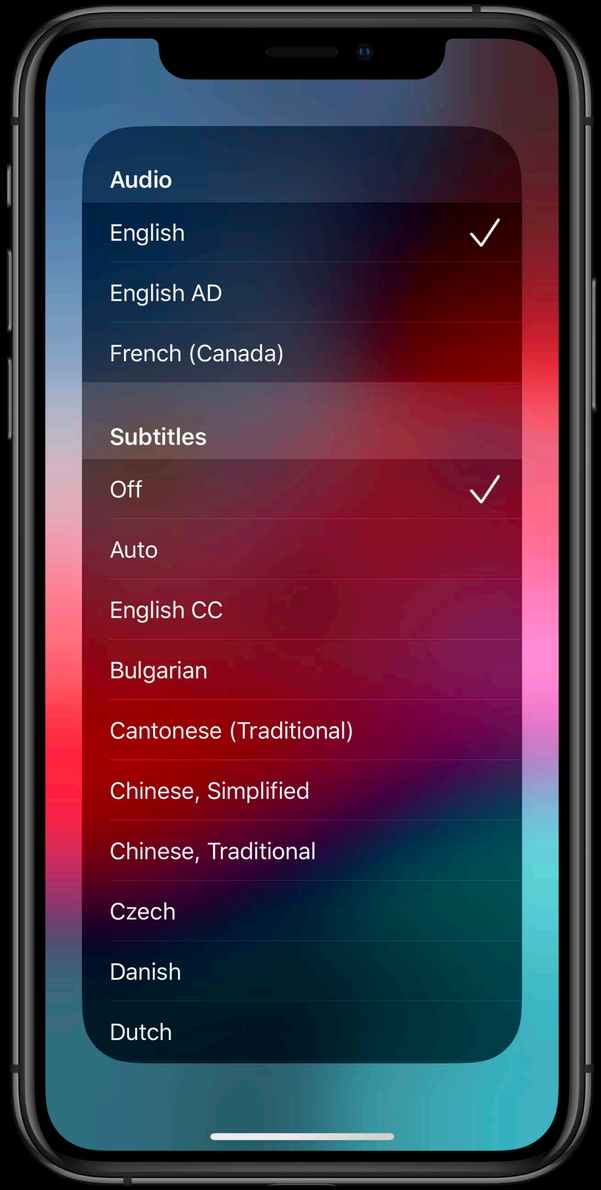
Audio Languages and Subtitles



Audio Languages and Subtitles



Audio Languages and Subtitles

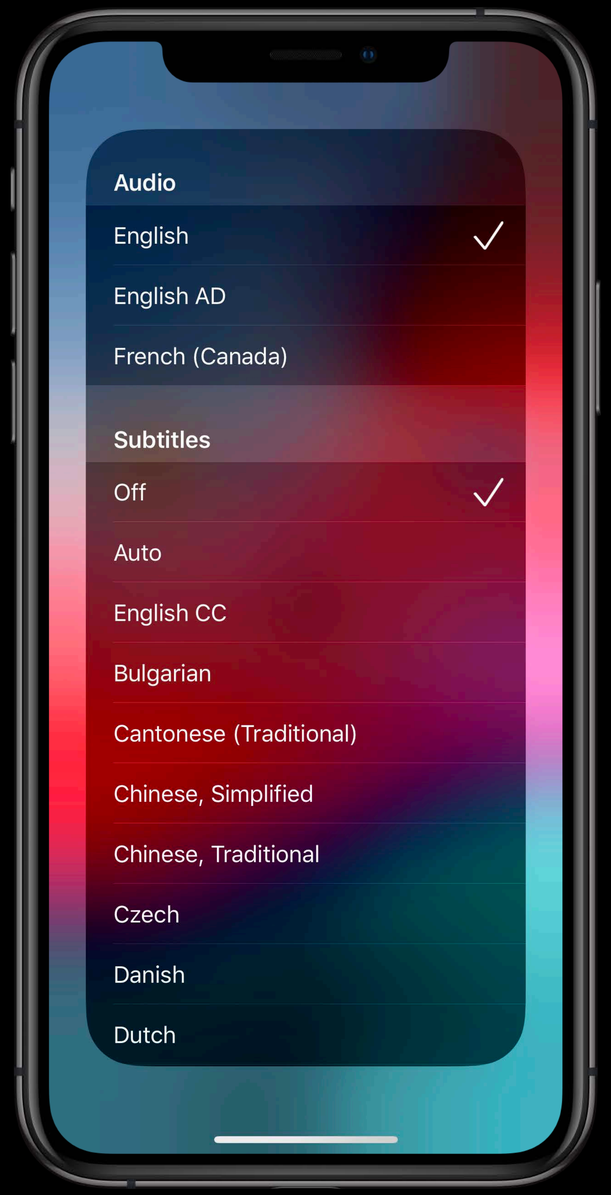


Audio Languages and Subtitles

Provide audible and legible language options

Identify current selections

Handle option enable/disable commands



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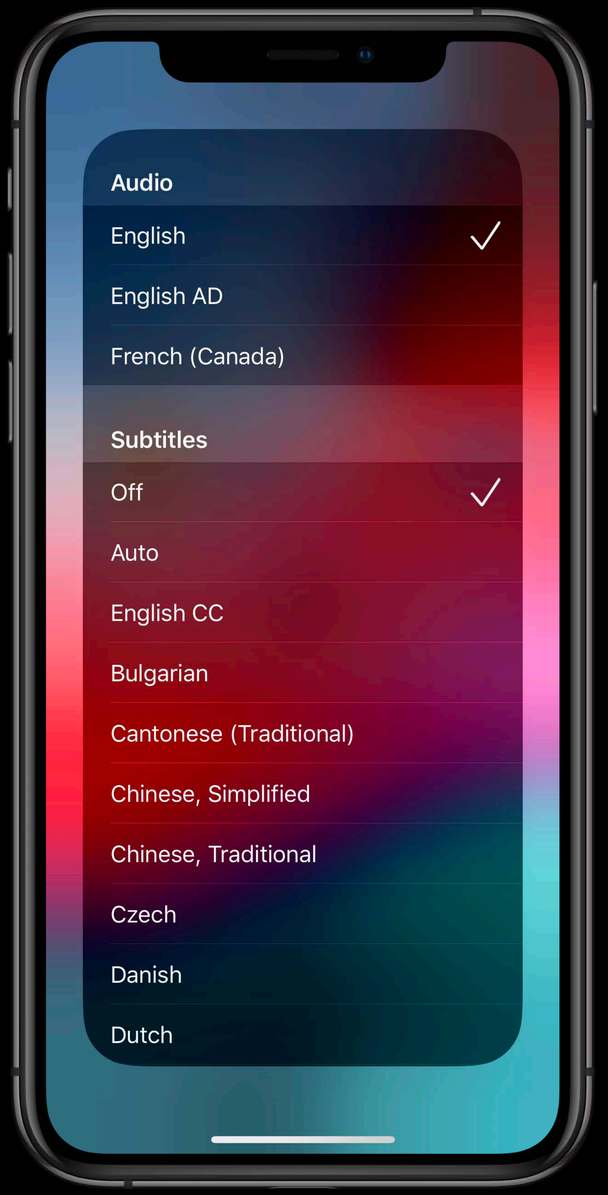

Mapping AVAsset Media Selections

Load `AVAsset`'s audible and legible `AVMediaSelectionGroup`'s and options

Create a mapping between these and `MPNowPlayingInfoLanguageOptionGroup`

- Use convenience methods like `makeNowPlayingInfoLanguageOptionGroup()`

```swift
func updateNowPlayingPlaybackInfo(_ metadata: NowPlayableDynamicMetadata) {
  let nowPlayingInfoCenter = MPNowPlayingInfoCenter.default()
  var nowPlayingInfo = nowPlayingInfoCenter.nowPlayingInfo ?? [String: Any]()

  /* … set playback duration, time, rate, etc … */

  nowPlayingInfo[MPNowPlayingInfoPropertyAvailableLanguageOptions] = metadata.optionGroups
  nowPlayingInfo[MPNowPlayingInfoPropertyCurrentLanguageOptions] = metadata.currentOptions

  nowPlayingInfoCenter.nowPlayingInfo = nowPlayingInfo
}
```

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Audio Languages and Subtitles

Provide audible and legible language options

Identify current selections

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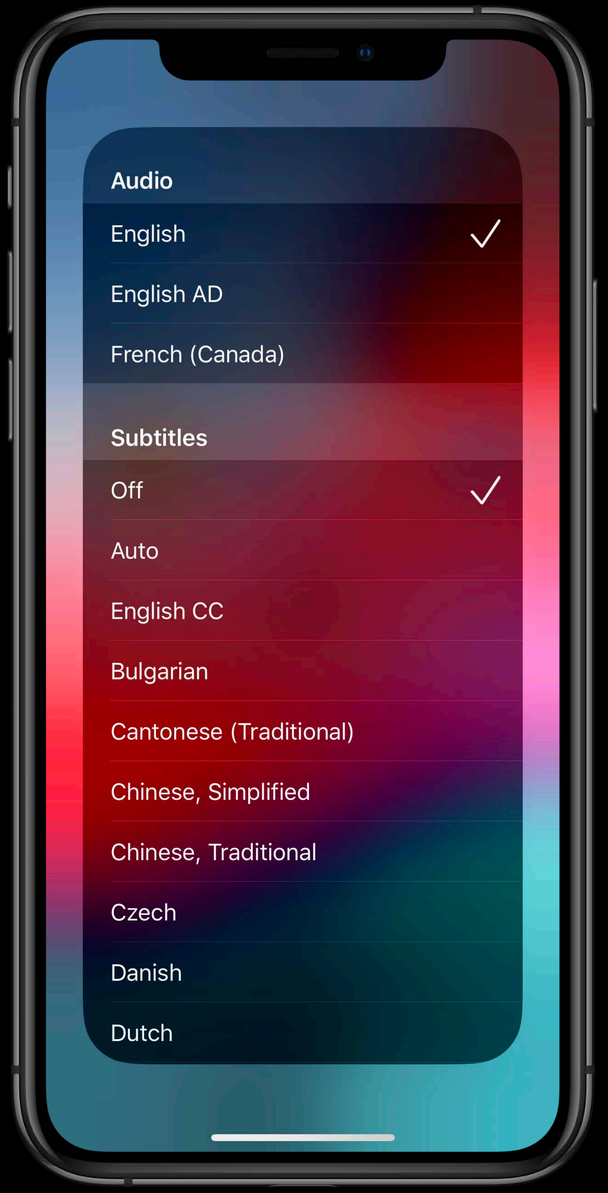

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  let commandCenter = MPRemoteCommandCenter.shared()
  /* … register for other commands … */

  commandCenter.enableLanguageOptionCommand.addTarget { [unowned self] event in
    guard let event = event as? MPChangeLanguageOptionCommandEvent else {
      return .commandFailed
    }
    guard let currentItem = player.currentItem else { return .noActionableNowPlayingItem }

    // Get the AVFoundation option & group to which the MediaPlayer language option references
    guard let (mediaSelectionOption, mediaSelectionGroup) =
              mediaSelectionOptionAndGroup(for: languageOption) else { return .commandFailed }

    currentItem.select(mediaSelectionOption, in: mediaSelectionGroup)
    handlePlaybackChange()
    return .success
  }
}
```

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    }
    guard let currentItem = player.currentItem else { return .noActionableNowPlayingItem }

    // Get the AVFoundation group to which the MediaPlayer language option references
    guard let group = mediaSelectionGroup(for: languageOption) else { return .commandFailed }

    guard mediaSelectionGroup.allowsEmptySelection else { return .commandFailed }
    currentItem.select(nil, in: mediaSelectionGroup)
    handlePlaybackChange()
    return .success
  }
}
```

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func setupRemoteTransportControls() {
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    guard let group = mediaSelectionGroup(for: languageOption) else { return .commandFailed }

    guard mediaSelectionGroup.allowsEmptySelection else { return .commandFailed }
    currentItem.select(nil, in: mediaSelectionGroup)
    handlePlaybackChange()
    return .success
  }
}
```


9:41
Tuesday, June 4
iPhone → LIVING ROOM
Planning a Great Apple
26:16
-26:33

When to Register for Remote Controls

Register:

- User selected content

Deregister:

- No content available to control
- Clear out `nowPlayingInfo` when you no longer have an item to display

tvOS and Remote Controls

Sample Code

NowPlayable

Best quality video

AirPlay picker

Remote controls

AirPlay multitasking

Long-form video apps

AirPlay Multitasking

Keep your content playing

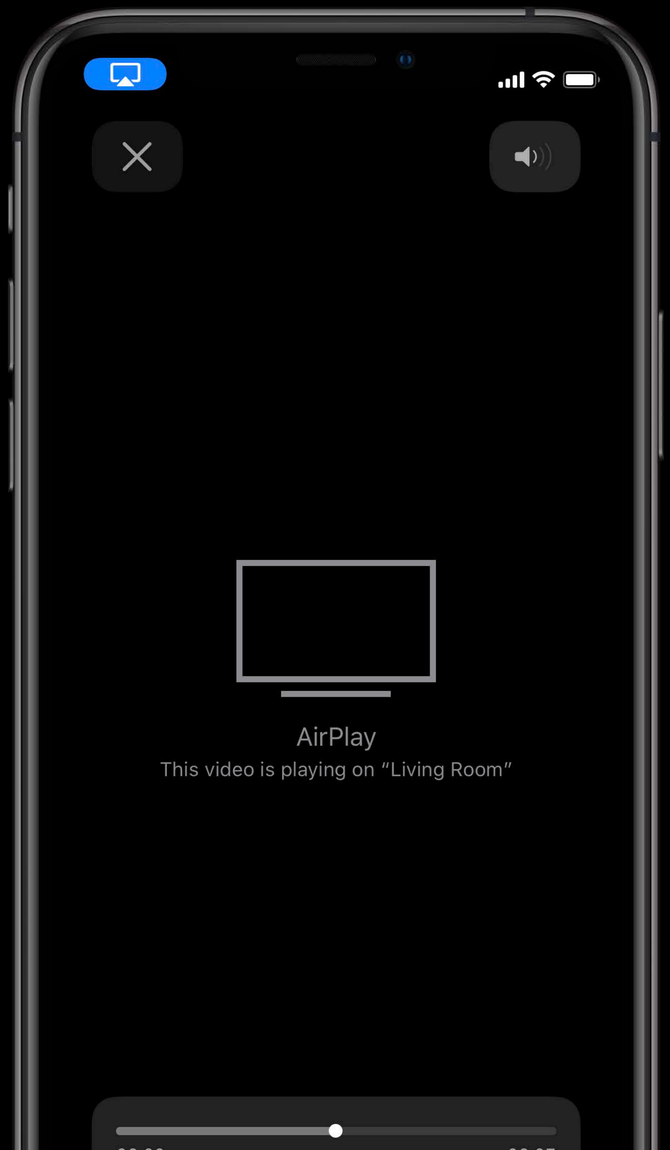
Don’t accidentally interrupt other apps

AirPlay Multitasking

Keep your content playing

Don’t accidentally interrupt other apps

AirPlay Multitasking

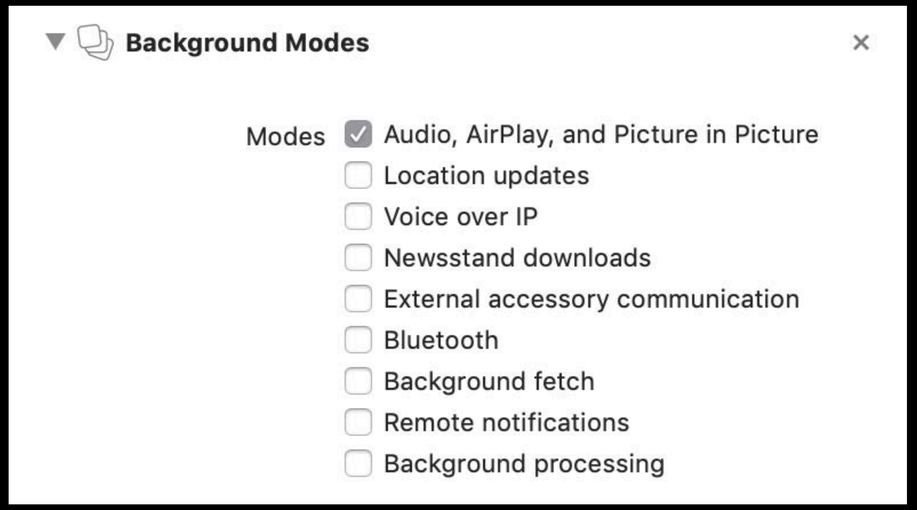


AirPlay Multitasking

Keep Content Playing in the Background

Set `UIBackgroundMode` to include `audio`

Configure `AVAudioSession`



Audio Session Handling for Video Apps

Use `.playback` category

Audio Session Handling for Video Apps

Use `.playback` category

Go active when user presses “play” button

Audio Session Handling for Video Apps

Use `.playback` category

Go active when user presses “play” button

Stay active, unless interrupted

Audio Session Handling for Video Apps

Use `.playback` category

Go active when user presses “play” button

Stay active, unless interrupted

Handle interruptions

- Begin — Update UI and internal state
- End — Honor `AVAudioSessionInterruptionOptionShouldResume`

AirPlay Multitasking

Keep your content playing

Don’t accidentally interrupt other apps

Do Not Accidentally Interrupt Others

Some videos should never AirPlay

- App launch videos
- Auto-playing visual flourish

Set `AVPlayer.allowsExternalPlayback = false`

Do Not Accidentally Interrupt Others

Some videos should never AirPlay

- App launch videos
- Auto-playing visual flourish

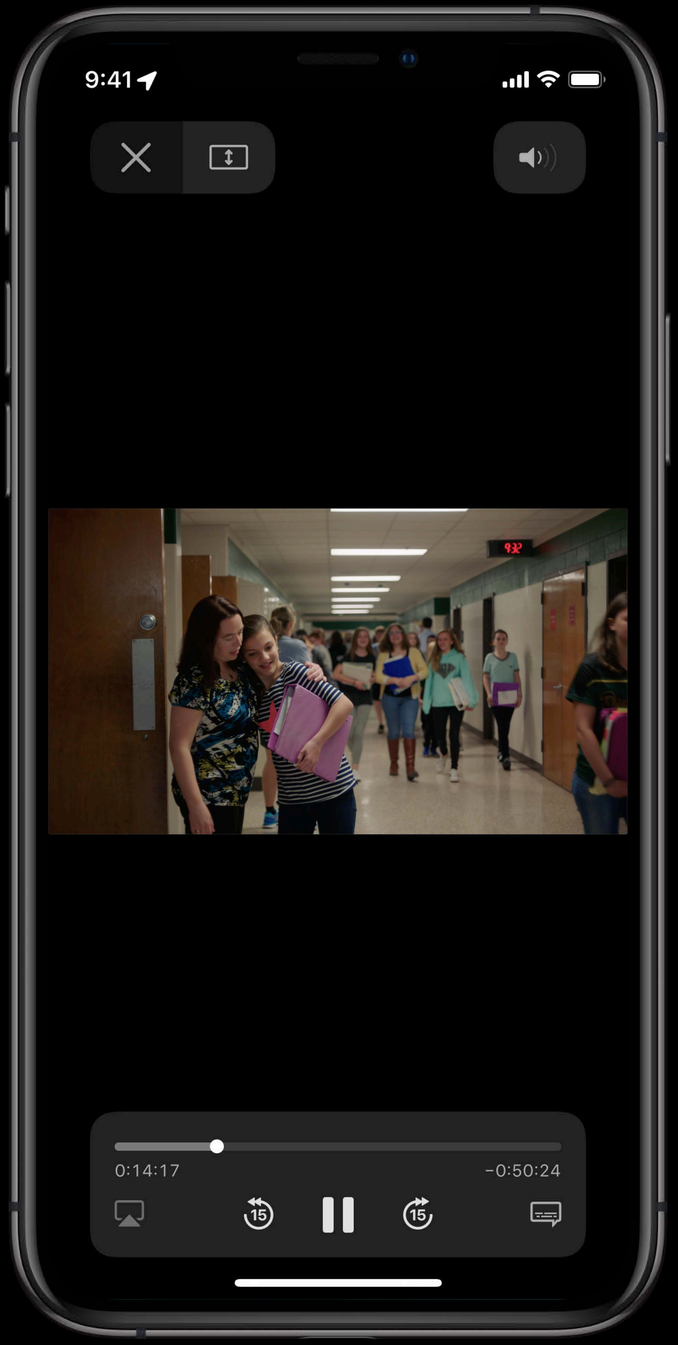
Set `AVPlayer.allowsExternalPlayback = false`

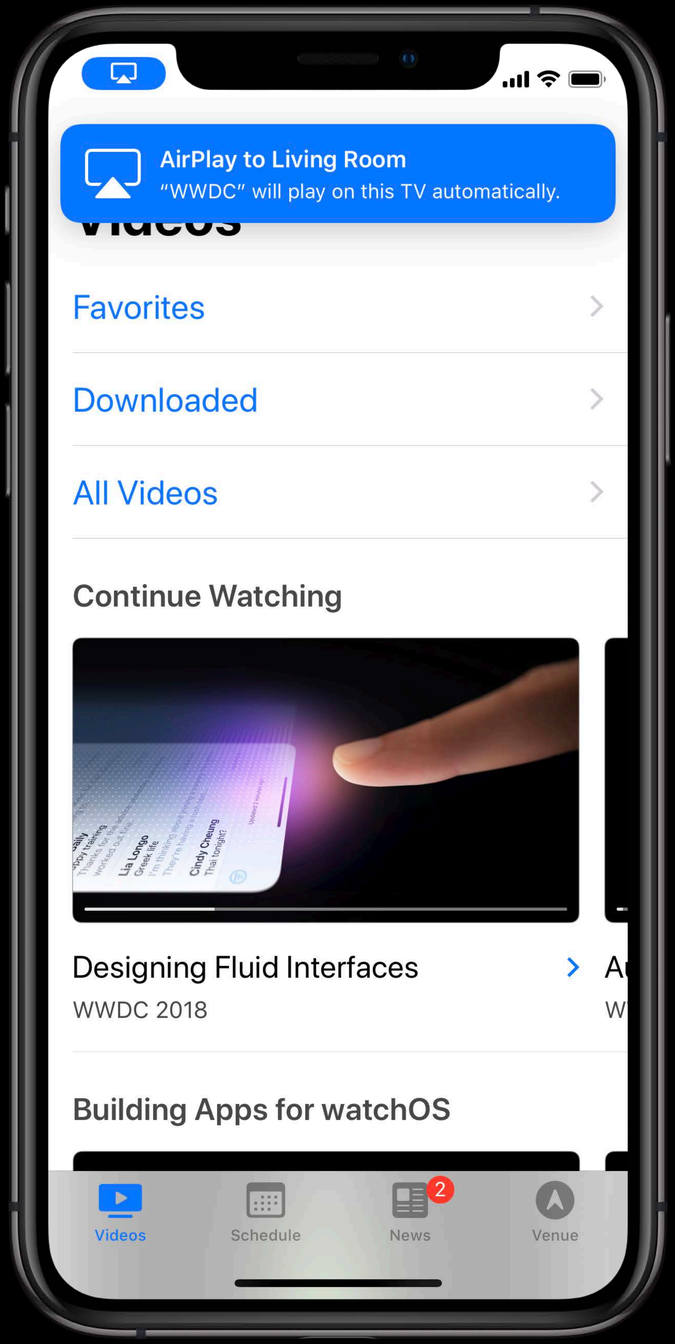
Do Not Accidentally Interrupt Others

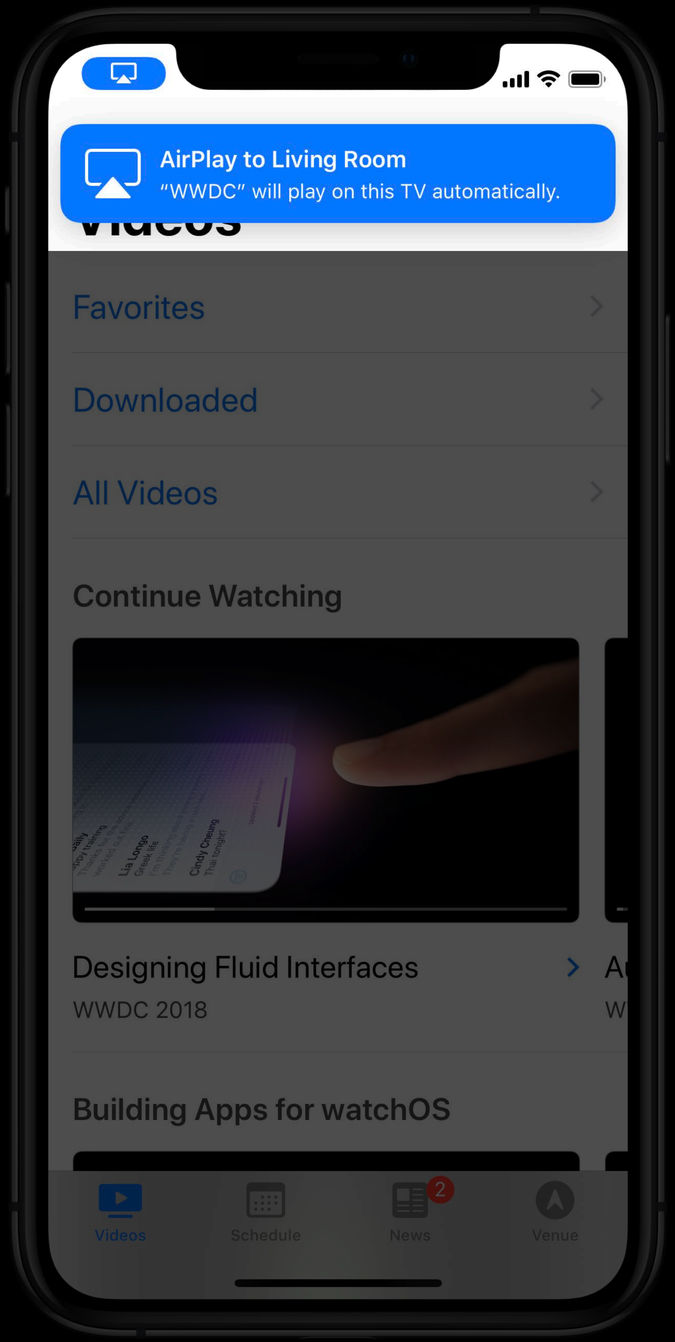
Do not auto-play primary content

- User should always be in control of when media starts


9:41
FaceTime
Tuesday
4
Calendar
Photos
Camera
Mail
Clock
Maps
280
Weather
Reminders
Notes
Stocks
News
Books
App Store
Podcasts
tv
TV
Health
Home
Wallet
Settings
App
MyApp


9:41
0:14:17
-0:50:24


AirPlay to Living Room
“WWDC” will play on this TV automatically.
Videos
Favorites
Downloaded
All Videos
Continue Watching
Designing Fluid Interfaces
WWDC 2018
Building Apps for watchOS
Videos
Schedule
News
2
Venue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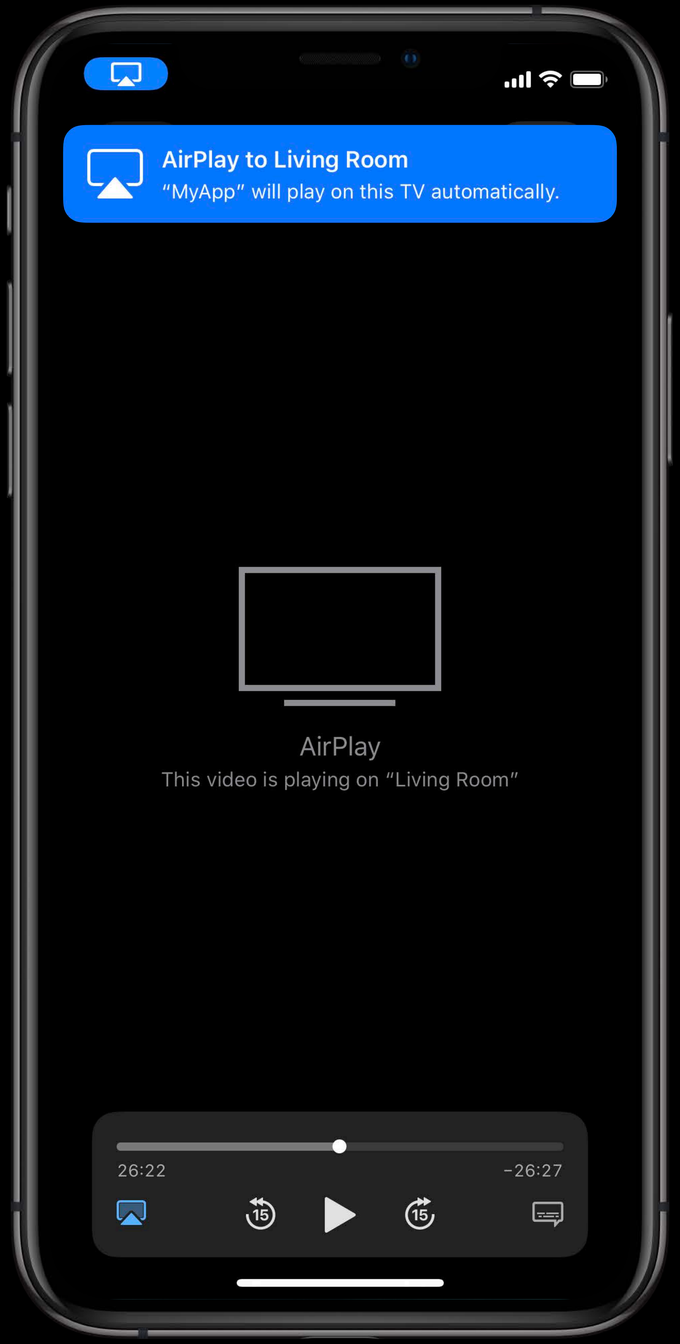
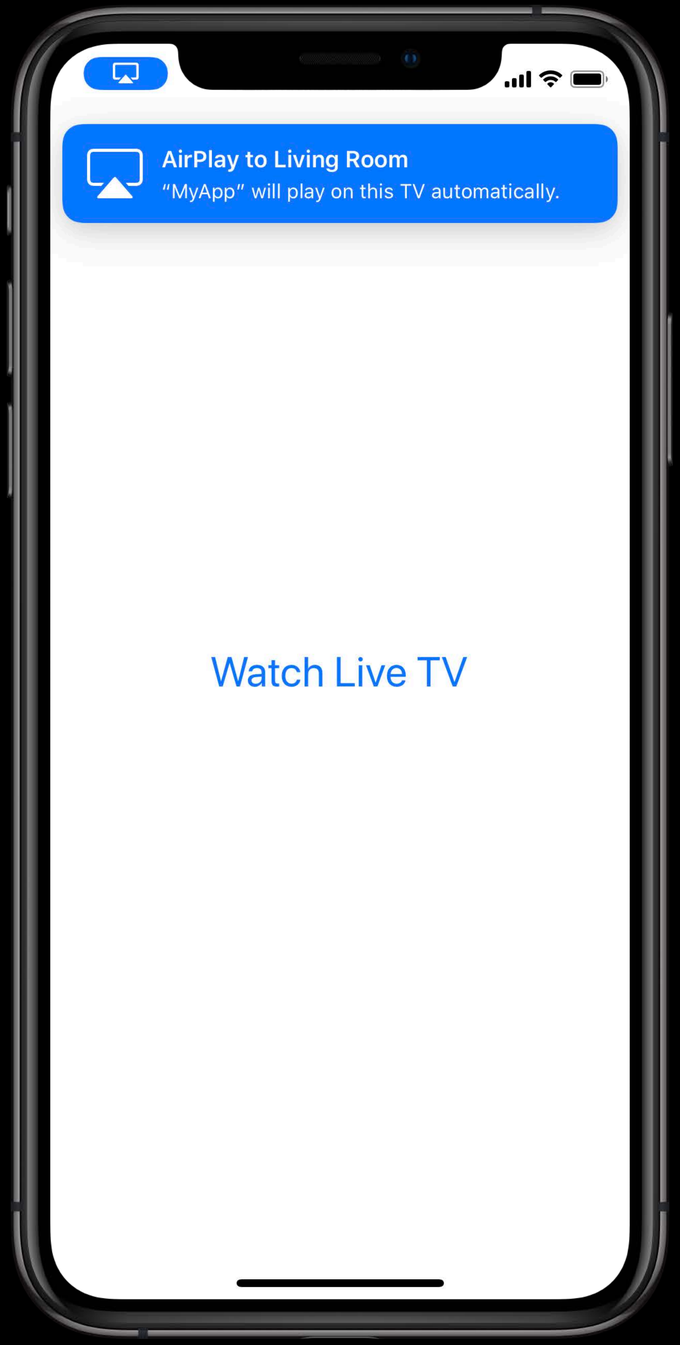
Schedule
News
2
Venue


9:41
FaceTime
Tuesday
4
Calendar
Photos
Camera
Mail
Clock
Maps
280
Weather
Reminders
Notes
Stocks
News
Books
App Store
Podcasts
tv
TV
Health
Home
Wallet
Settings
App
MyApp


AirPlay to Living Room
“MyApp” will play on this TV automatically.
AirPlay
This video is playing on “Living Room”
26:22
-26:27
15
15


AirPlay to Living Room
“MyApp” will play on this TV automatically.
Watch Live TV

Best quality video

AirPlay picker

Remote controls

AirPlay multitasking

Long-form video apps

Long-Form Video Apps

Marty Pye, AVKit

What is a Long-Form Video App?

Movies

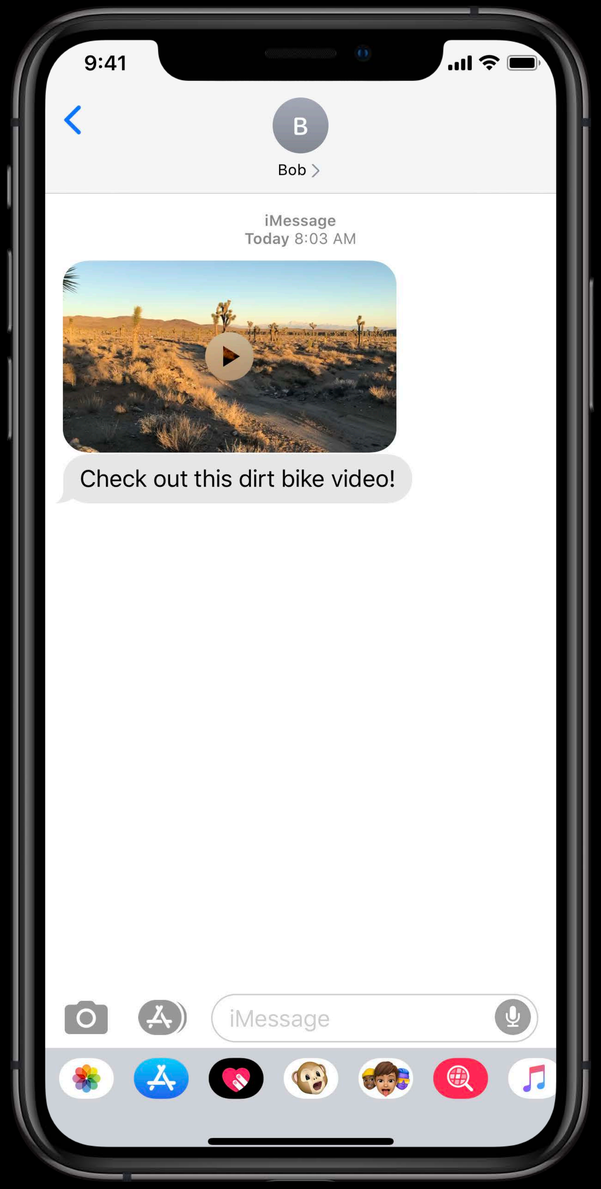
TV

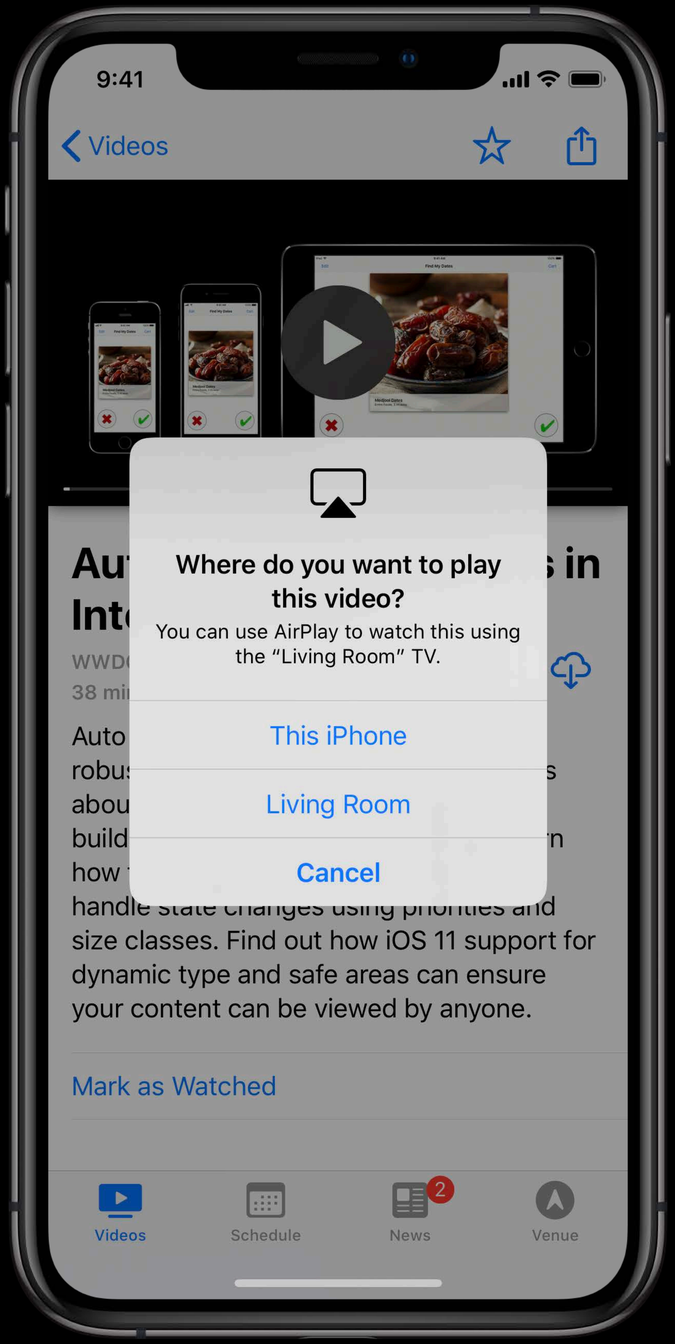
Social Media

News Clips

How is AirPlay Routing different for long-form video apps?


AirPlay
This video is playing on “Living Room”
26:22
-26:27


9:41
B
Bob
iMessage
Today 8:03 AM
Check out this dirt bike video!
iMessage


9:41
Videos
Where do you want to play this video?
You can use AirPlay to watch this using the “Living Room” TV.
This iPhone
Living Room
Cancel
Mark as Watched
Videos
Schedule
News
2
Venue

How to Take Advantage of These New Features?

How to Take Advantage of These New Features?

Register your app as a long-form video app

Registering as a Long-Form Video App

NEW

Add this key to your app’s Info.plist:

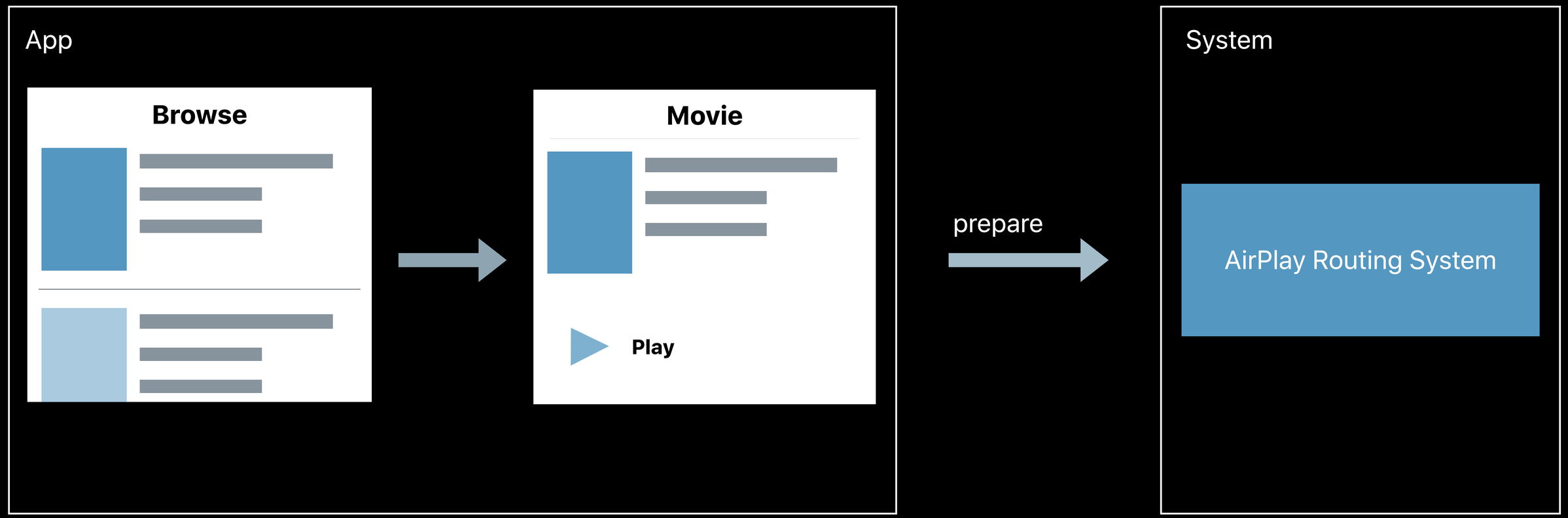
```
<key>AVInitialRouteSharingPolicy</key>
<string>LongFormVideo</string>
```

How to Take Advantage of These New Features?

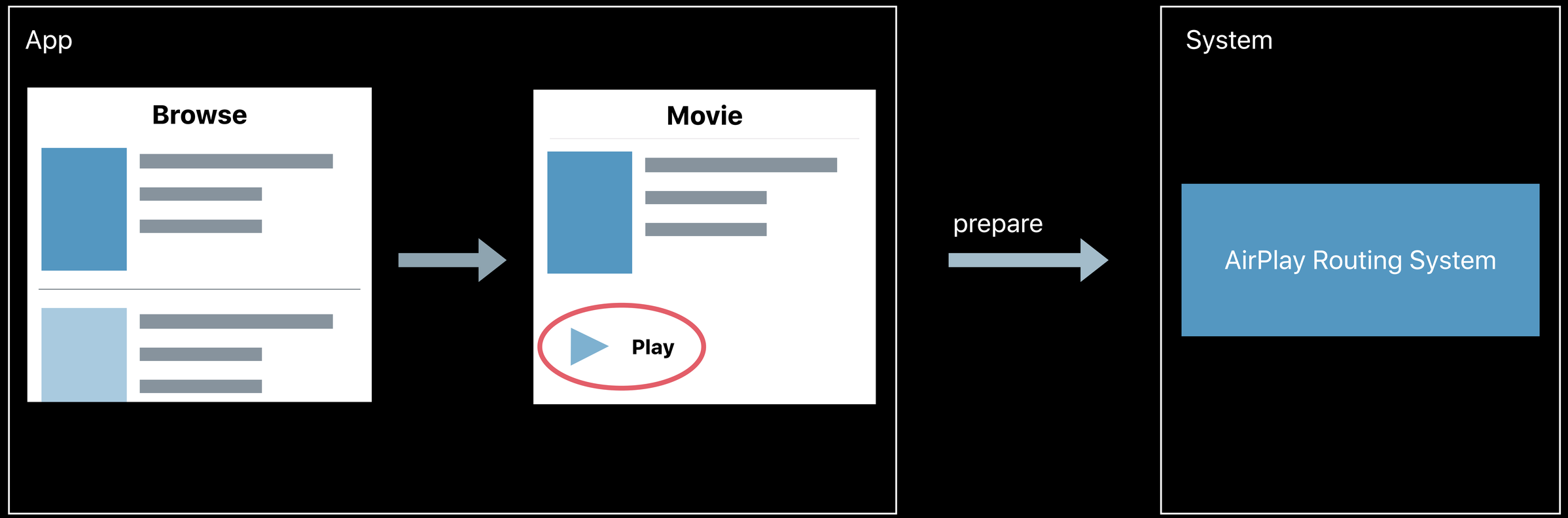
Register your app as a long-form video app

Prepare the routing system prior to playback

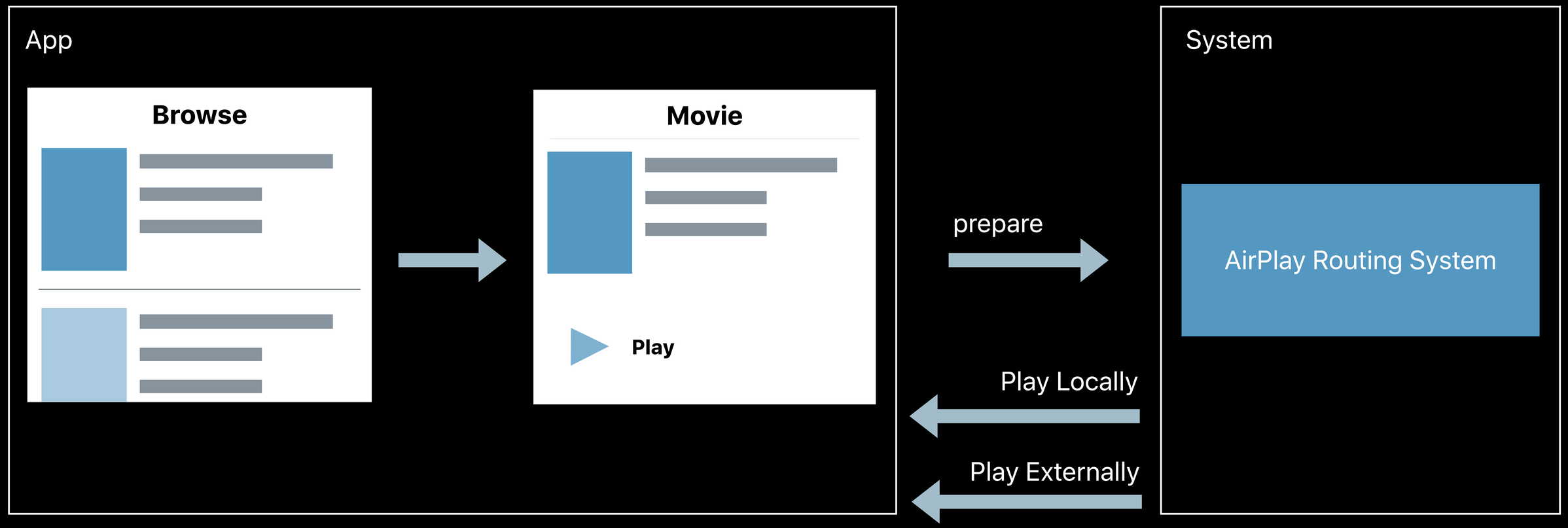
Prepare Routing System Prior to Playback



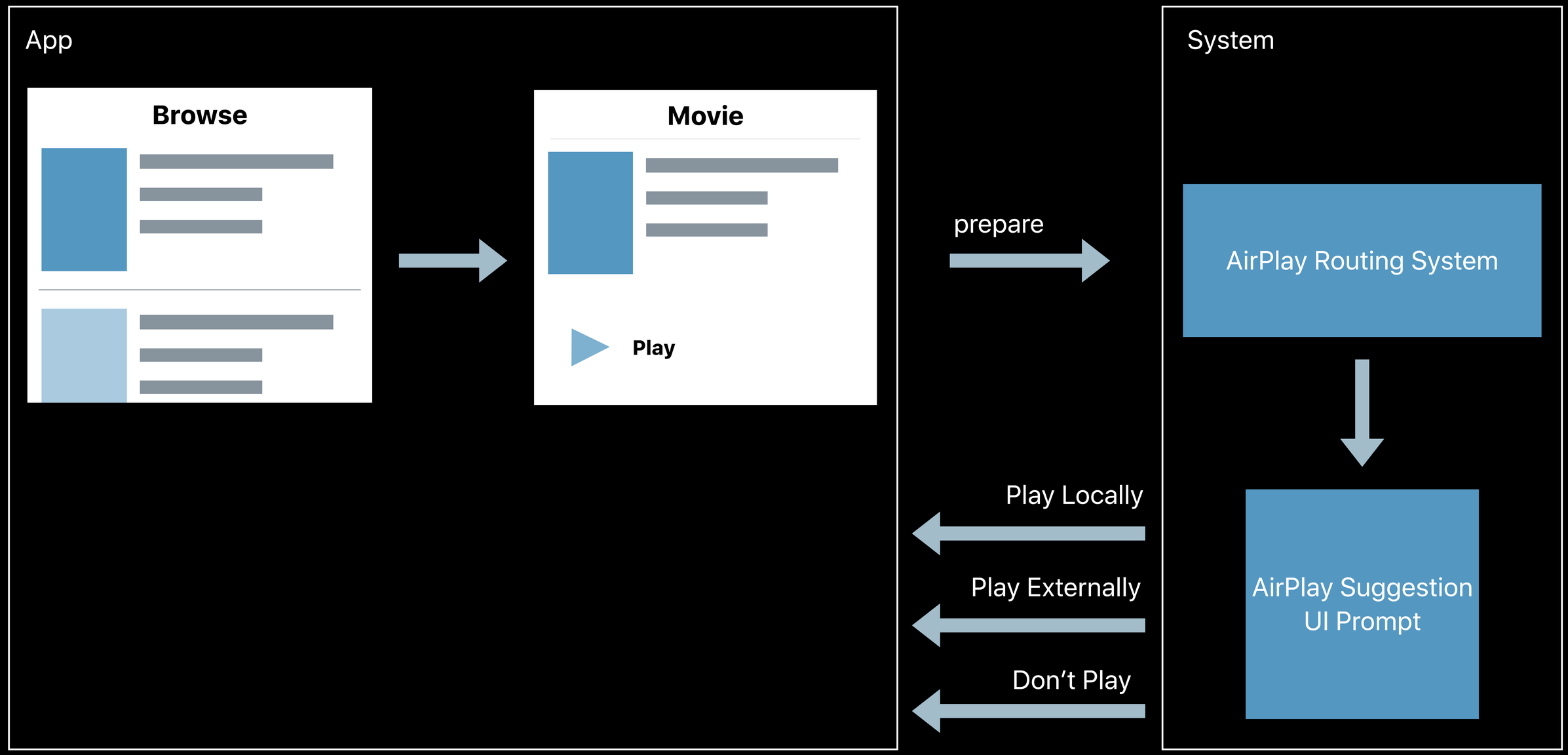
Prepare Routing System Prior to Playback



Prepare Routing System Prior to Playback



Prepare Routing System Prior to Playback



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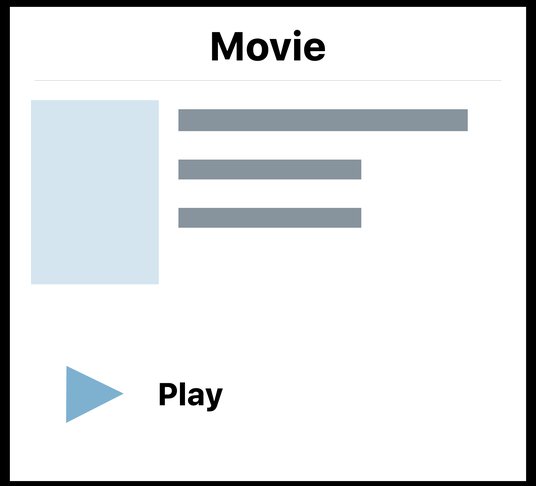
NEW

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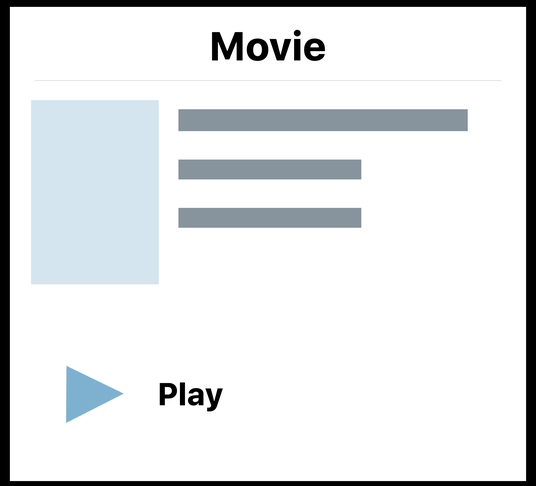


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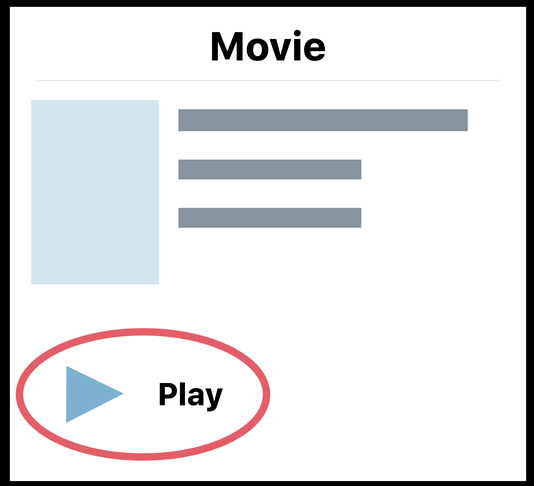


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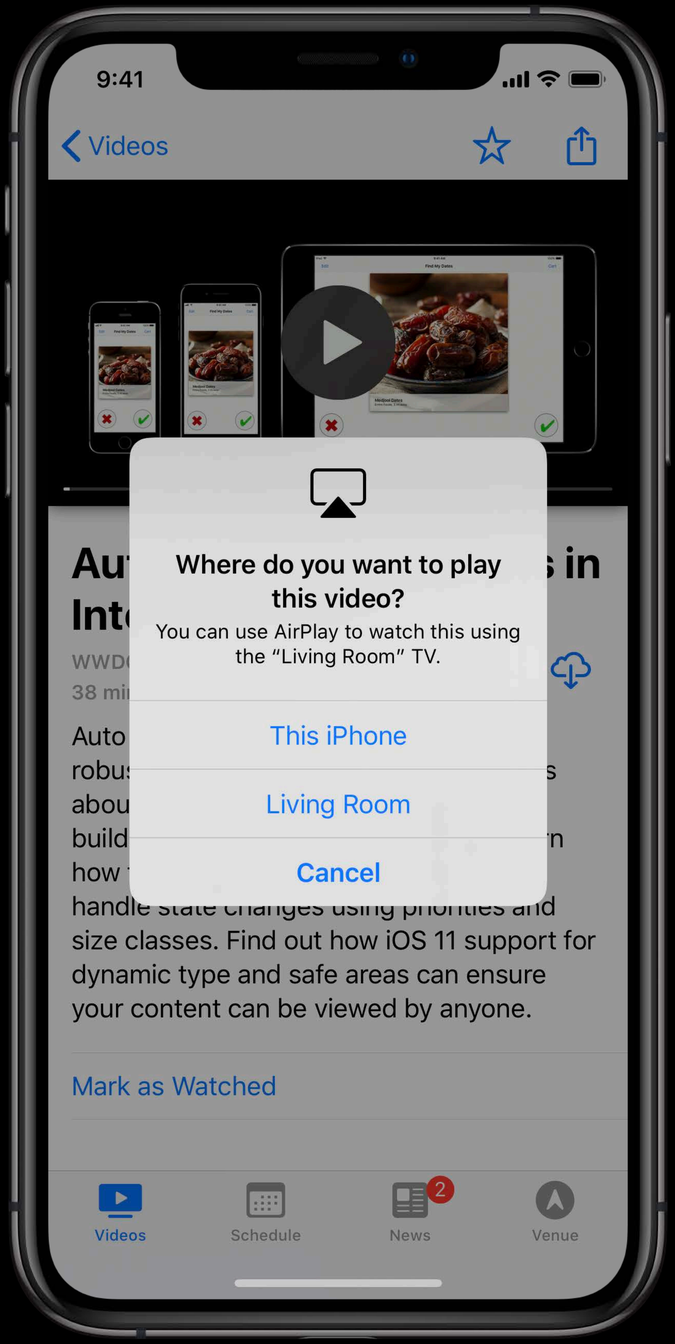
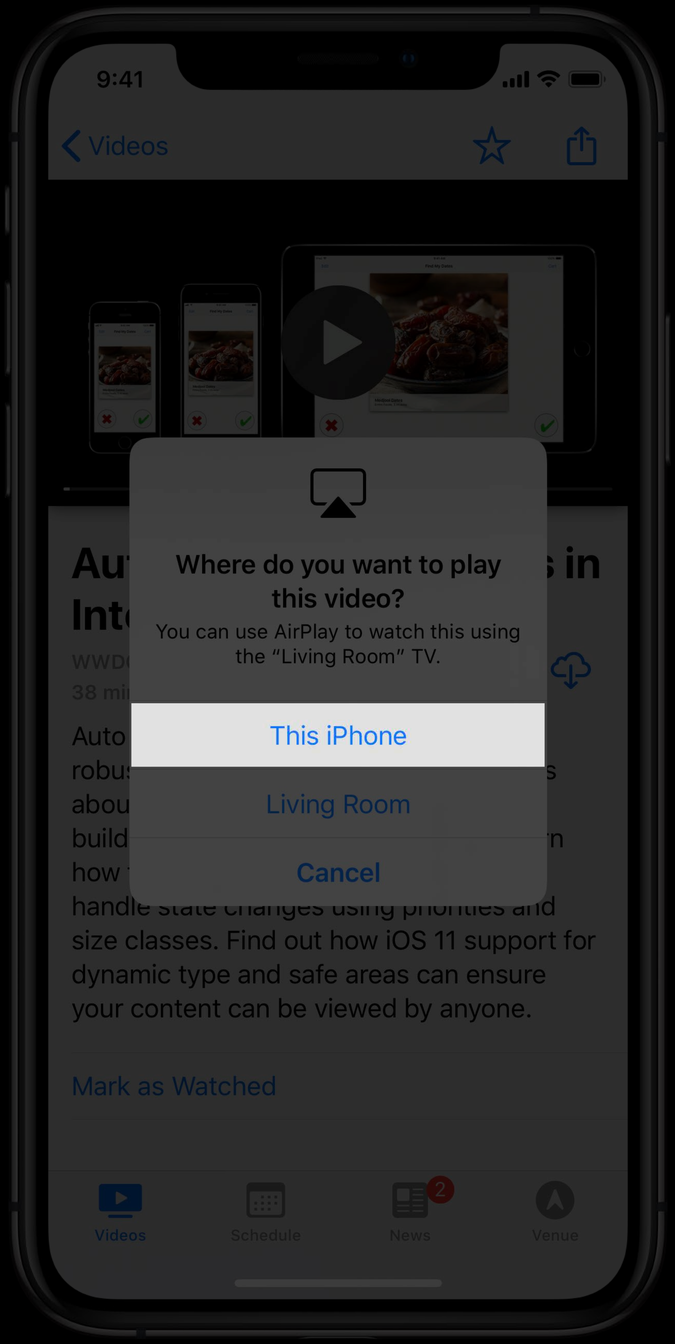

9:41
Videos
Where do you want to play this video?
You can use AirPlay to watch this using the “Living Room” TV.
This iPhone
Living Room
Cancel
Mark as Watched
Videos
Schedule
News
2
Venue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            case .local:
                // Present UI streamlined for local playback.
            case .external:
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            case .none:
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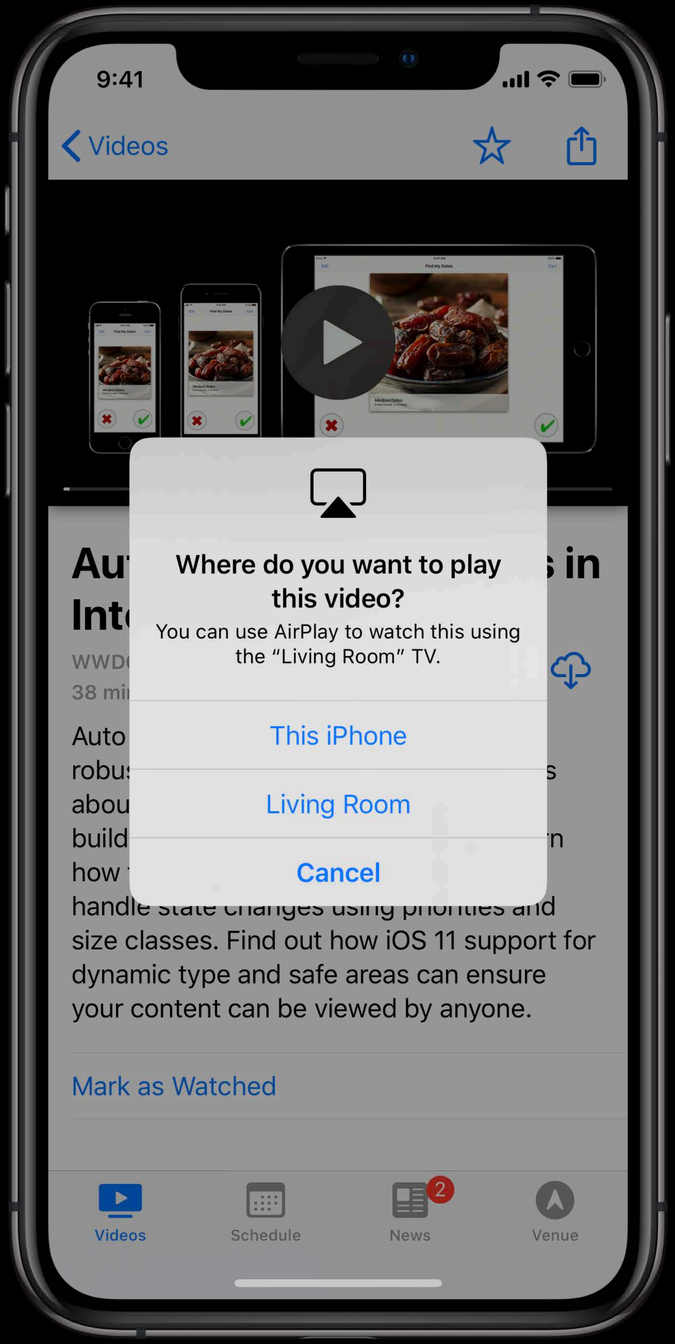
9:41
Surface
Bongo
0:14:17
-0:50:24
15
15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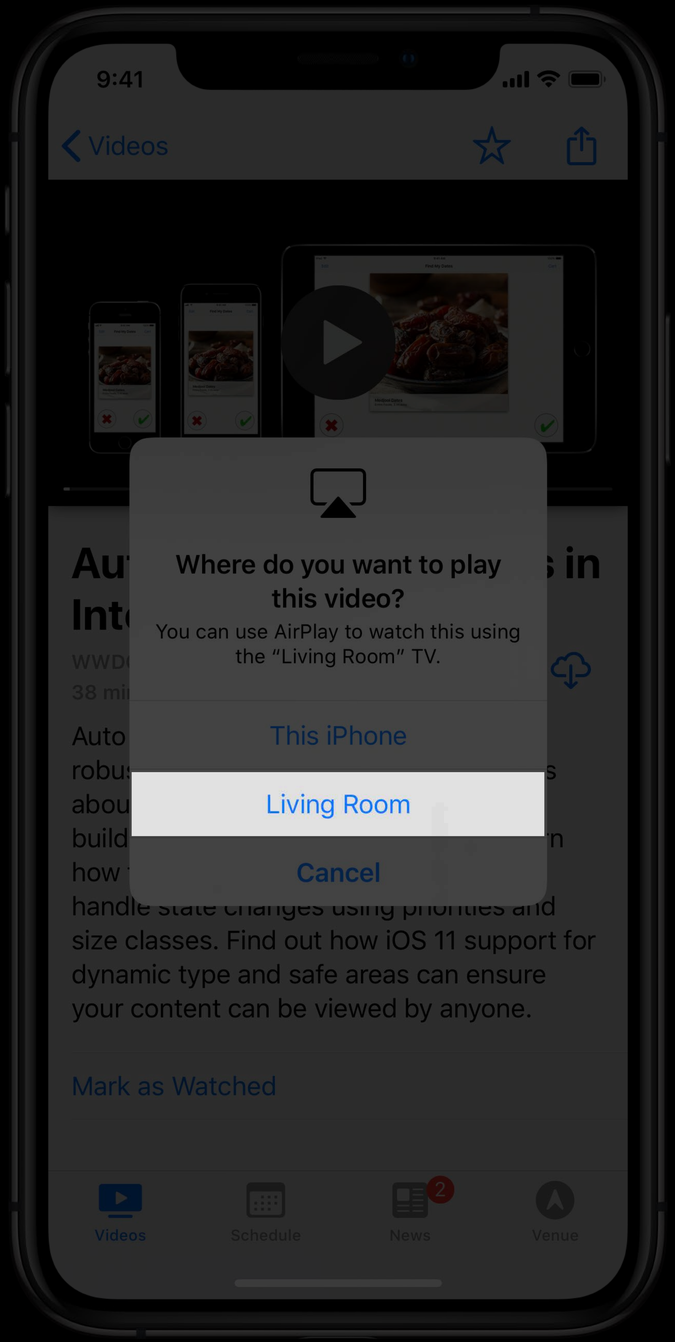
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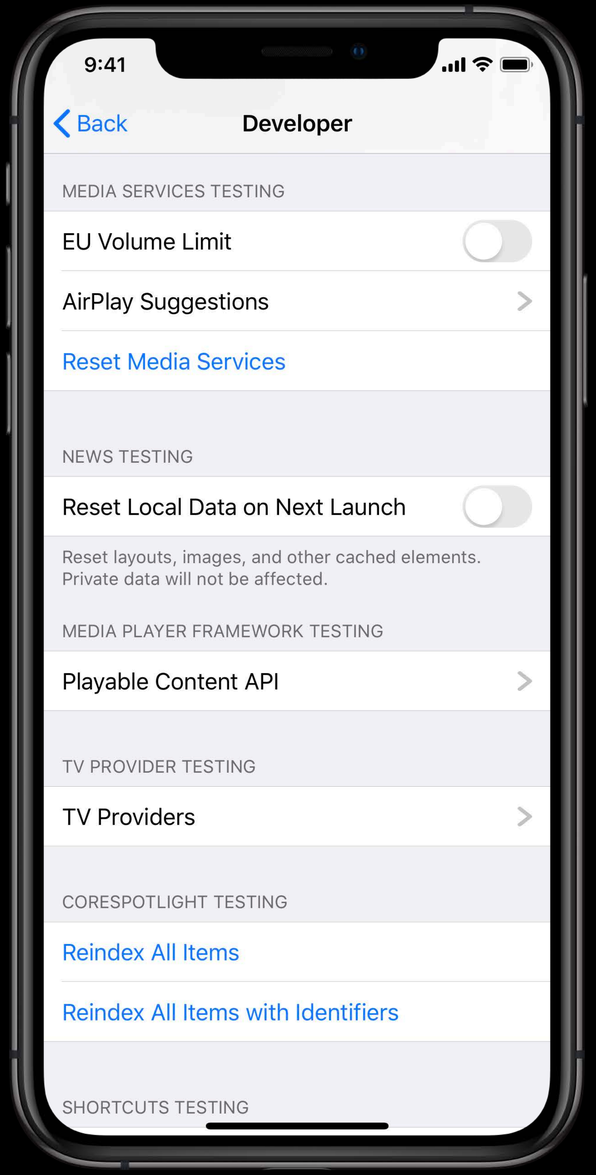
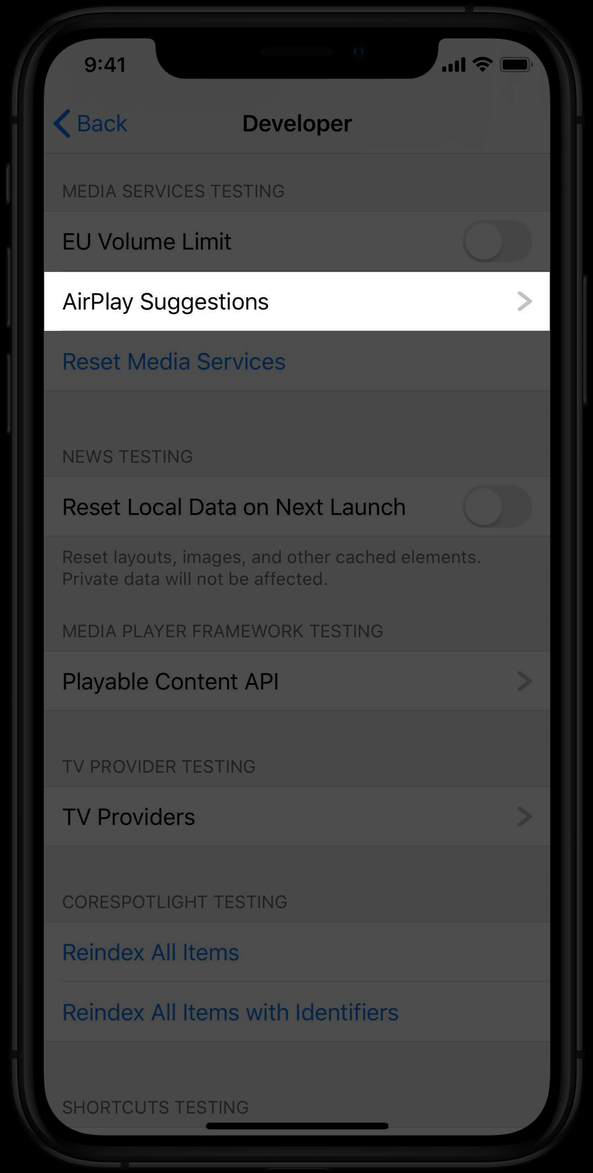
Testing AirPlay Suggestions



Testing AirPlay Suggestions



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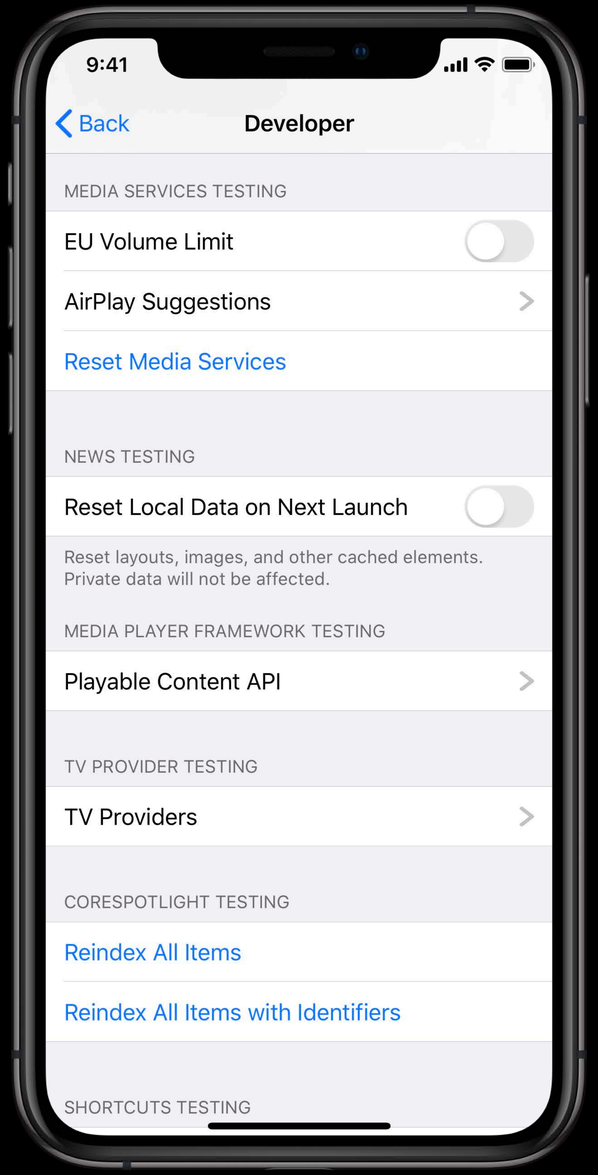

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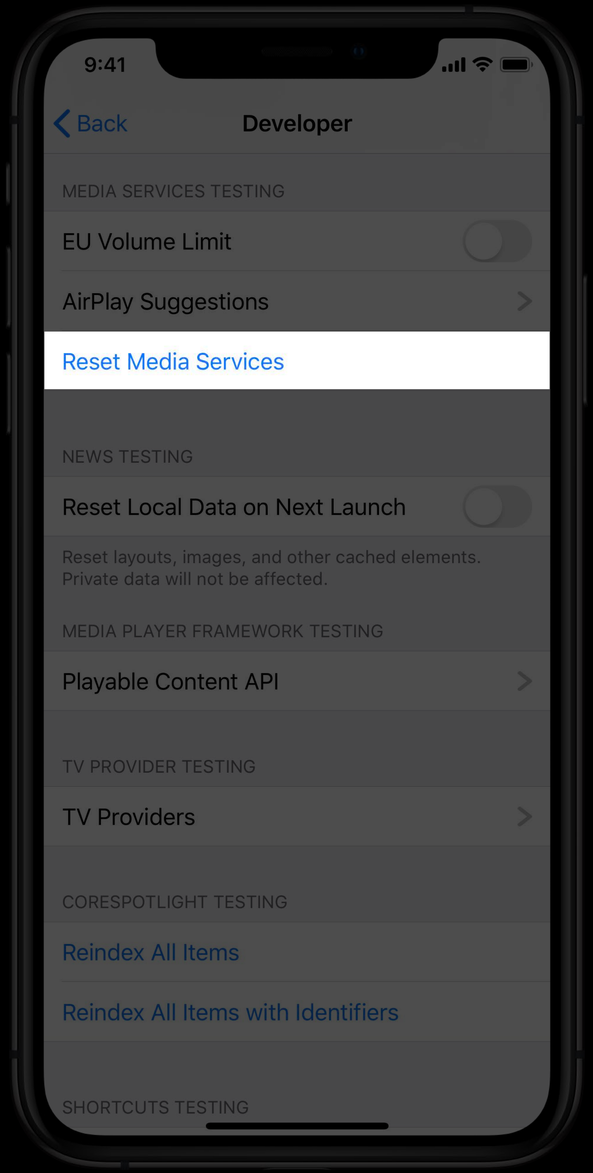

You can still manually AirPlay!

Sample Code

LongFormVideoApp

Summary

AirPlay Picker

Remote Controls

AirPlay Multitasking

Long-Form Video Apps

Routing System

More Information

developer.apple.com/wwdc19/501

AirPlay Lab	Tuesday, 12:00
Delivering Intuitive Media Playback with AVKit	Thursday, 10:00


WWDC19