Enabling Your App for CarPlay

Session 719

Albert Wan, CarPlay Engineering
Agenda

How apps run in CarPlay

CarPlay app integration
How Apps Run in CarPlay
Features Available to All Apps in CarPlay

Now Playing information and playback controls

Audio plays through car’s speakers

SiriKit (for appropriate intents)
Best Practices for All Apps

Don’t play audio automatically unless requested

Configure the audio session
Best Practices for All Apps

Don’t play audio automatically unless requested

Configure the audio session

Spoken audio apps

• AVAudioSessionModeSpokenAudio
Best Practices for All Apps

Don’t play audio automatically unless requested

Configure the audio session

Spoken audio apps
• AVAudioSessionModeSpokenAudio

Navigation apps
• AVAudioSessionModeSpokenAudio
• AVAudioSessionCategoryOptionInterruptSpokenAudioAndMixWithOthers
• Set mixable before making audio active
CarPlay Enabled Apps

Appear on the CarPlay home screen

Run in the foreground on both screens
CarPlay Enabled Apps

Supported app categories
• Audio apps
• Messaging and VoIP calling apps
• Automaker apps

Request CarPlay entitlement
http://developer.apple.com/carplay

Entitlement setup and provisioning
Designing for CarPlay

For icon guidance, see “App Icon” in “iOS Human Interface Guidelines”

For design guidelines, see “CarPlay Human Interface Guidelines”
Xcode and Simulator

Audio limitations (playback state)

Test on device and with an actual head unit

Wireless debugging in Xcode
Data Protection

Apps can run in CarPlay while the iPhone is passcode locked
Passcode protected data may be unavailable
Data Protection

Apps can run in CarPlay while the iPhone is passcode locked

Passcode protected data may be unavailable

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**Data Protection**

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CarPlay App Integration
CarPlay App Integration

Audio Apps

Messaging and VoIP Calling Apps

Automaker Apps
Audio Apps
Audio Apps

- Kevin Hart: Meet the... Oct 14, 2016 • 37 minutes
- Super Mario Run Dec 9, 2016 • 41 minutes
- Brand Yourself Like a Celebrity... March 27 • 31 minutes
- DSQUARED2: Fashion in C... Oct 26, 2015 • 45 minutes
- American Gods: Special Ev...
Audio Apps

Kevin Hart: Meet the Filmmaker
Kevin Hart: Meet th...er 14, 2016 at 05:00
Requirements for Audio Apps

Implement the `MPPlayableContent` API
- `MPPlayableContentDataSource`, `MPPlayableContentDelegate`

Respond to `MPRemoteCommandCenter` events

Update `MPNowPlayingInfoCenter`
Running
Afternoon Jams
The Chainsmokers
Macklemore
Taylor Swift
Little Voice
Eye of the Tiger
Shake It Off
Fifteen
Playlists
Afternoon Jams
The Chainsmokers
Artists
Macklemore
Taylor Swift
Albums
Little Voice

Running
Eye of the Tiger
(0, 0)

(0, 1)

(1, 0)

(1, 1)

(1, 2)

Fifteen
(2, 0)
(1, 2, 0)
(1, 2, 1)
contentItem at (0, 0)
numberOfChildItems at (1,2)

- Playlists
  - Running
    - Eye of the Tiger
  - Afternoon Jams
    - The Chainsmokers
      - Macklemore
        - Taylor Swift
          - Little Voice
  - Little Voice
numberOfChildItems at (1,2)

- Playlists
  - Afternoon Jams
  - The Chainsmokers
    - Running
    - Eye of the Tiger
- Artists
  - Macklemore
    - Taylor Swift
      - Shake It Off
      - Fifteen
  - Taylor Swift
    - Taylor Swift
    - Little Voice
      - 2 Children
Content Limits

Content limits may be enforced that can truncate the number of rows and container depth

Take changes into account with MPPlayableContentManager
extension YourAppContentManager : MPPlayableContentDelegate {
    // called whenever CarPlay state changes
    func playableContentManager(
        _ contentManager: MPPlayableContentManager,
        didUpdate context: MPPlayableManagerContext) {
        // check to see if content limits are enforced
        let contentLimitsEnforced = context.contentLimitsEnforced
        if contentLimitsEnforced {
            // the maximum number of items shown in a list when content limits are enforced
            let contentLimitItemCount = context.enforcedContentItemsCount
            // the maximum depth in the hierarchy when content limits are enforced
            let contentLimitTreeDepth = context.enforcedContentTreeDepth
        } else {
            ...
        }
    }
}
Tabs

Tabs—Add `UIBrowsableContentSupportsSectionedBrowsing` to `Info.plist`

Recommended to have at most 4 tabs for space constraints

Keep tab titles as short as possible for narrow screens and Now Playing button

Tab image assets will be rendered as template images
Now Playing Screen

Your Awesome Song
Your Artist — Your Album
// Set Metadata to be Displayed in Now Playing Info Center

let infoCenter = MPNowPlayingInfoCenter.default()
infoCenter.nowPlayingInfo = [
    MPMediaItemPropertyTitle: "Style",
    MPMediaItemPropertyArtist: "Taylor Swift",
    MPMediaItemPropertyAlbumTitle: "1989",
    MPMediaItemPropertyGenre: "Pop",
    MPMediaItemPropertyReleaseDate: "2014",
    MPMediaItemPropertyPlaybackDuration: 231,
    MPMediaItemPropertyArtwork: mediaItemArtwork,
    MPNowPlayingInfoPropertyElapsedPlayback: 53,
    MPNowPlayingInfoPropertyDefaultPlaybackRate: 1,
    MPNowPlayingInfoPropertyPlaybackRate: 1,
    MPNowPlayingInfoPropertyPlaybackQueueCount: 13,
    MPNowPlayingInfoPropertyPlaybackQueueIndex: 3,
    ... ]
Playback Controls

MPRemoteCommandCenter

• Play, pause, stop
• Previous track, next track
• Seek backward, seek forward
• Skip backward, skip forward
• Shuffle, repeat
• Like, dislike, bookmark
• Change playback rate
Changing Playback Rate

Add default playback rate to `MPNowPlayingInfoCenter`:

`MPNowPlayingInfoPropertyDefaultPlaybackRate`

Implement `changePlaybackRateCommand` with `supportedPlaybackRates` in `MPRemoteCommandCenter`
// Change Playback Rate

let infoCenter = MPNowPlayingInfoCenter.default()
infoCenter.nowPlayingInfo = [MPNowPlayingInfoPropertyDefaultPlaybackRate: 1.0,
    ... ]

let changePlaybackRateCommand = MPRemoteCommandCenter.shared().changePlaybackRateCommand
changePlaybackRateCommand.supportedPlaybackRates = [0.5, 1.0, 1.5, 2.0]
Playback Controls

If multiple commands are specified, CarPlay may combine them into a single button.
If multiple commands are specified, CarPlay may combine them into a single button.
Best Practices

Call the completion handler when content is ready to play or be displayed

Return at least one row in the root table view for non-tabbed apps

If your app has initial setup, populate the first row with an `MPContentItem` that is neither playable nor a container indicating the state of the app to the user
Messaging and VoIP Calling Apps

Chris Whitney, CarPlay Engineering
Messaging and VoIP Calling Apps
Requirements for Messaging and VoIP Calling Apps
Requirements for Messaging and VoIP Calling Apps

Messaging

• SiriKit Messaging Intents
• CarPlay Messaging Entitlement
Requirements for Messaging and VoIP Calling Apps

Messaging
• SiriKit Messaging Intents
• CarPlay Messaging Entitlement

VoIP Calling
• SiriKit Calling Intents
• CarPlay VoIP Calling Entitlement
• CallKit
Required SiriKit Intents for Messaging Apps
Required SiriKit Intents for Messaging Apps

Send a message

• INSendMessageIntent
Required SiriKit Intents for Messaging Apps

Send a message
• INSendMessageIntent

Search for messages
• INSearchForMessagesIntent
Required SiriKit Intents for Messaging Apps

Send a message
• INSendMessageIntent

Search for messages
• INSearchForMessagesIntent

Set attributes on a message
• INSetMessageAttributeIntent
Required SiriKit Intents for VoIP Calling Apps
Required SiriKit Intents for VoIP Calling Apps

Start an audio call

- INStartAudioCallIntent
Required SiriKit Intents for VoIP Calling Apps

Start an audio call
• INStartAudioCallIntent

Search call history
• INSearchCallHistoryIntent
Required SiriKit Intents for VoIP Calling Apps

Start an audio call

• INStartAudioCallIntent

Search call history

• INSearchCallHistoryIntent

What's New in SiriKit

Grand Ballroom B  Wednesday 1:50PM

Making Great SiriKit Experiences

Grand Ballroom A  Thursday 11:00AM
CallKit

Report incoming calls
Report incoming calls

Handle call actions
  • Start, answer, end
  • Mute, grouping, holding, keypad tones
CallKit

Report incoming calls

Handle call actions
- Start, answer, end
- Mute, grouping, holding, keypad tones
Notifications
Notifications

Request authorization for CarPlay
Notifications

Request authorization for CarPlay

Separate message notifications into an exclusive notification category
Notifications

Request authorization for CarPlay

Separate message notifications into an exclusive notification category

Add the CarPlay category option
Notifications

Request authorization for CarPlay

Separate message notifications into an exclusive notification category

Add the CarPlay category option

Set a SiriKit intent to handle notification selection
let authorizationOptions = [.badge, .sound, .alert, .carPlay]

let notificationCenter = UNUserNotificationCenter.current()
notificationCenter.requestAuthorization(options: authorizationOptions) { (granted, error) in
    // Enable or disable app features based on authorization
}

let messageCategory = UNNotificationCategory(
    identifier: "messages",
    actions: [...],
    intentIdentifiers: [INSearchForMessagesIntentIdentifier],
    options: .allowInCarPlay)

notificationCenter.setNotificationCategories([messageCategory])
Best Practices
Best Practices

Don’t show message contents in a notification’s title or subtitle
Best Practices

Don’t show message contents in a notification’s title or subtitle

Mark content as read in SiriKit
Best Practices

Don’t show message contents in a notification’s title or subtitle

Mark content as read in SiriKit

Show notifications for missed calls and message delivery failures
Automaker Apps
Automaker Apps

- Climate:
  - AUTO
  - +
  - -
  - OUTSIDE
  - 65°
  - 82°
  - 70°

- Radio:
  - DUAL

- Assistance:
  - -2
  - +
  - 1

Time:
- 9:41

LTE:
- LTE
Requirements for Automaker Apps
Requirements for Automaker Apps

Created by the car’s manufacturer to provide information and control features
Requirements for Automaker Apps

Created by the car’s manufacturer to provide information and control features

Automaker-specific entitlement
Requirements for Automaker Apps

Created by the car’s manufacturer to provide information and control features

Automaker-specific entitlement

Display a user interface in CarPlay
Requirements for Automaker Apps

Created by the car’s manufacturer to provide information and control features

Automaker-specific entitlement

Display a user interface in CarPlay

Only appear on supported vehicles from the automaker
Matching Automaker Apps to Vehicles
CarPlay Protocols Entitlement
Matching Automaker Apps to Vehicles

CarPlay Protocols Entitlement

com.sampleautos.performance
com.sampleautos.climate
Matching Automaker Apps to Vehicles
CarPlay Protocols Entitlement

com.sampleautos.performance
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Communicating with the Vehicle
Communicating with the Vehicle

Use External Accessory Framework
Communicating with the Vehicle

Use External Accessory Framework
• Define a custom protocol
Communicating with the Vehicle

Use External Accessory Framework

- Define a custom protocol
- Implement the protocol in the vehicle’s software
Communicating with the Vehicle

Use External Accessory Framework

• Define a custom protocol
• Implement the protocol in the vehicle’s software
• Observe accessory connection events
Communicating with the Vehicle

Use External Accessory Framework

• Define a custom protocol
• Implement the protocol in the vehicle’s software
• Observe accessory connection events
• Initialize an EASession for the protocol
Adding a CarPlay User Interface
Adding a CarPlay User Interface

Observe UIScreen connection events
Adding a CarPlay User Interface

Observe `UIScreen` connection events

Verify the screen’s traits contain `UIUserInterfaceIdiomCarPlay`
Adding a CarPlay User Interface

Observe `UIScreen` connection events

Verify the screen’s traits contain `UIUserInterfaceIdiomCarPlay`

Create a `UIWindow` with a root view controller
var carWindow: UIWindow?

func updateCarWindow() {
    guard let screen = UIScreen.screens.first(where:
        { $0.traitCollection.userInterfaceIdiom == .carPlay })
    else {
        // CarPlay is not connected
        self.carWindow = nil;
        return
    }

    // CarPlay is connected
    let carWindow = UIWindow(frame: screen.bounds)
    carWindow.screen = screen
    carWindow.makeKeyAndVisible()
    carWindow.rootViewController = CarViewController(nibName: nil, bundle: nil)
    self.carWindow = carWindow
}
updateCarWindow()

let notificationCenter = NotificationCenter.default
notificationCenter.addObserver(self,
    selector: #selector(screenDidUpdate(notification:)),
    name: .UIScreenDidConnect,
    object: nil)
notificationCenter.addObserver(self,
    selector: #selector(screenDidUpdate(notification:)),
    name: .UIScreenDidDisconnect,
    object: nil)

@objc func screenDidUpdate(notification: Notification) {
    updateCarWindow()
}
UIKit in CarPlay
UIKit in CarPlay

`UIButtonTypeSystem` displays with a CarPlay style
UIKit in CarPlay

UIButtonTypeSystem displays with a CarPlay style

UITableViewController may limit table length
UIKit in CarPlay

**UIButtonTypeSystem** displays with a CarPlay style

**UITableViewController** may limit table length

**UIFocusEnvironment** responds to input device events
UIKit in CarPlay

UIButtonTypeSystem displays with a CarPlay style

UITableViewController may limit table length

UIFocusEnvironment responds to input device events

Limited availability of system user interface elements
SiriKit for Automaker Apps
SiriKit for Automaker Apps

Car Commands Intents

• Lock and unlock
• Fuel or charge level
• Signal tone and lights
SiriKit for Automaker Apps

Car Commands Intents
• Lock and unlock
• Fuel or charge level
• Signal tone and lights

CarPlay Intents
• Climate, defroster, and seat heater settings
• Radio and audio source selection
Best Practices
Best Practices

Make your app useful even when outside of the car
Best Practices

Make your app useful even when outside of the car

Consider forwards and backwards compatibility
Best Practices

Make your app useful even when outside of the car

Consider forwards and backwards compatibility

Simplify the user interface – buttons, labels, tables, navigation, tabs
Best Practices

Make your app useful even when outside of the car

Consider forwards and backwards compatibility

Simplify the user interface – buttons, labels, tables, navigation, tabs

Determine how focus should move between UI elements
More Information

## Related Sessions

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<td>Grand Ballroom B</td>
<td>Wednesday 1:50PM</td>
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<td>Making Great SiriKit Experiences</td>
<td>Grand Ballroom A</td>
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