What’s New in Core Location

Simplify

Session 714

Adam Driscoll Apple
Core Location
Core Location

- Authorization
Core Location

• Authorization
• Location updates
Core Location

- Authorization
- Location updates
- Indoor updates
Core Location

• Authorization
• Location updates
• Indoor updates
• Region monitoring
Core Location

- Authorization
- Location updates
- Indoor updates
- Region monitoring
- Visit monitoring
Core Location

- Authorization
- Location updates
- Indoor updates
- Region monitoring
- Visit monitoring
- Significant location change monitoring/Geocoding/etc.
Core Location

- Authorization
- Location updates
  - Indoor updates
  - Region monitoring
- Visit monitoring
- Significant location change monitoring
Background location

Single location

Authorization

Apple Watch: Best practices
Background Location Updates

No background!
Background Location Updates

Recap

Background Modes
Background Location Updates

Recap

Background Modes

• Default: foreground only
Background Location Updates

Recap

Background Modes

• Default: foreground only
Background Location Updates

Recap

Background Modes

• Default: foreground only
• Info.plist
  - UIBackgroundModes

![Background Modes settings](image)
Background Location Updates

How it works:
Background Location Updates

How it works:

• Start
Background Location Updates

How it works:

• Start
• Continue
Background Location Updates

How it works:

• Start
• Continue
• Stop
Background Location Updates

How it works:

• Start
• Continue
• Stop
Room for Improvement?

Simplify
Room for Improvement?

Simplify

• Lower stakes
Room for Improvement?

Simplify

• Lower stakes
• Looser coupling
Room for Improvement?

Simplify

• Lower stakes
• Looser coupling
Background: When You Want It
Background: When You Want It

allowsBackgroundLocationUpdates
allowsBackgroundLocationUpdates

• Per CLLocationManager
Background: When You Want It

allowsBackgroundLocationUpdates

- Per CLLocationManager
- Activates Info.plist election
Background: When You Want It

allowsBackgroundLocationUpdates
- Per CLLocationManager
- Activates Info.plist election
- Default value:
allowsBackgroundLocationUpdates

- Per CLLocationManager
- Activates Info.plist election
- Default value:
  
  NO
Background: When You Want It
Compatibility
allowsBackgroundLocationUpdates
Background: When You Want It

Compatibility

allowsBackgroundLocationUpdates

• Grandfathered
Background: When You Want It

Compatibility

allowsBackgroundLocationUpdates

• Grandfathered

• Deploy with -respondsToSelector:
Background: When You Want It

Compatibility

allowsBackgroundLocationUpdates

- Grandfathered
- Deploy with -respondsToSelector:

```swift
let locationManager = CLLocationManager()
if #available(iOS 9.0, *) {
    locationManager.allowsBackgroundLocationUpdates = true
}
```
Audible Cues?

What’s New in Core Audio

Nob Hill

Wednesday 4:30PM
Audible Cues?

AVAudioSessionCategoryOptionInterruptSpokenAudioAndMixWithOthers
Single Location

-requestLocation
Single Location

-requestLocation

Automatically
Single Location

-requestLocation

Automatically

• Starts
Single Location

- `requestLocation`

  Automatically
  
  • Starts
  • Thresholds
Single Location

- `requestLocation`

Automatically
- Starts
- Thresholds
- Calls delegate once
Single Location

- `requestLocation`

Automatically

- Starts
- Thresholds
- Calls delegate once
- Stops
Single Location

- `requestLocation`

Automatically
- Starts
- Thresholds
- Calls delegate once
- Stops
Single Location

- requestLocation

Automatically
- Starts
- Thresholds
- Calls delegate once
- Stops
Single Location

requestLocation

Automatically

• Starts
• Thresholds
• Calls delegate once
• Stops
Single Location

-requestLocation
Single Location

- requestLocation
  - desiredAccuracy
Single Location

- requestLocation
  - desiredAccuracy
Single Location

- requestLocation
  - desiredAccuracy
Single Location

- requestLocation
  - desiredAccuracy
  - locationManager:didUpdateLocations:
Single Location

- requestLocation
  - desiredAccuracy
- locationManager:didUpdateLocations:
- locationManager:didFailWithError:
Single Location

- requestLocation
  - desiredAccuracy
- locationManager:didUpdateLocations:
- locationManager:didFailWithError:
  - kCLErrorLocationUnknown
Single Location

- `requestLocation`
  - `desiredAccuracy`
  - `locationManager:didUpdateLocations:`
  - `locationManager:didFailWithError:`
    - `kCLErrorLocationUnknown`

  - Exclusive of `-startUpdatingLocation`
  - Cancel with `-stopUpdatingLocation`
Apple Watch
Apple Watch
Apple Watch and iPhone
Apple Watch and iPhone

Devices: pair
Apple Watch and iPhone

Devices: pair
Apps: extension
Apple Watch and iPhone

Devices: pair
Apps: extension
Apple Watch and iPhone

Devices: pair
Apps: extension
Apple Watch and iPhone

Devices: pair
Apps: extension

Sub Topics:
Apple Watch and iPhone

Devices: pair
Apps: extension

Sub Topics:
• Authorization
Apple Watch and iPhone

Devices: pair
Apps: extension

Sub Topics:
• Authorization
• Cooperation
Authorization

Recap
Authorization

Recap

User granted
Authorization

Recap

User granted

requestWhenInUseAuthorization
Authorization

Recap

User granted

- requestWhenInUseAuthorization
- requestAlwaysAuthorization
## Authorization

### Recap

- User granted
  - `-requestWhenInUseAuthorization`
  - `-requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
</table>
Authorization

Recap

<table>
<thead>
<tr>
<th>User granted</th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>-requestWhenInUseAuthorization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-requestAlwaysAuthorization</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Location

<table>
<thead>
<tr>
<th>Location</th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Authorization

Recap

<table>
<thead>
<tr>
<th>User granted</th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>-requestWhenInUseAuthorization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-requestAlwaysAuthorization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>


Authorization

Recap

User granted

- requestWhenInUseAuthorization
- requestAlwaysAuthorization

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Background (continuous)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Authorization

Recap

User granted
- `requestWhenInUseAuthorization`
- `requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Background (continuous)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
## Authorization

### Recap

User granted

- requestWhenInUseAuthorization
- requestAlwaysAuthorization

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(continuous)</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(intermittent)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Authorization

### Recap

- User granted
  - requestWhenInUseAuthorization
  - requestAlwaysAuthorization

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background (continuous)</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## Authorization

### Recap

User granted
- `requestWhenInUseAuthorization`
- `request ALWAYS Authorization`

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background (continuous)</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Authorization

### Recap

User granted

- `requestWhenInUseAuthorization`
- `requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th></th>
<th>iOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(continuous)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>(intermittent)</td>
<td>No</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Monitor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Local Notification</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Authorization

User granted

- requestWhenInUseAuthorization
- requestAlwaysAuthorization

<table>
<thead>
<tr>
<th>watchOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background (continuous)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Authorization

User granted
- `requestWhenInUseAuthorization`
- `requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th></th>
<th>watchOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td>Single</td>
<td>Single</td>
</tr>
<tr>
<td>Background (continuous)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Authorization

<table>
<thead>
<tr>
<th></th>
<th>watchOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td><strong>Background (continuous)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>Background (intermittent)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Authorization

User granted

- `-requestWhenInUseAuthorization`
- `-requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th></th>
<th>watchOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Single</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Background (continuous)</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td>No</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Authorization

### User granted
- `-requestWhenInUseAuthorization`
- `-requestAlwaysAuthorization`

<table>
<thead>
<tr>
<th>Authorization</th>
<th>watchOS</th>
<th>WhenInUse</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Single</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Background (continuous)</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Background (intermittent)</td>
<td>No</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Authorization

In Use status
Authorization

In Use status

In Use if:
Authorization

In Use status

In Use if:

• Foreground
Authorization

In Use status

In Use if:

• Foreground
• Blue Bar
Authorization

In Use status

In Use if:

- Foreground
- Blue Bar
- Handling message from Apple Watch
Authorization

Prompting

Initiate on iPhone
Location manager not updating locations
Location batch size: 0
Total locations received: 0

Start updating location
Location manager not updating locations
Location batch size: 0
Total locations received: 0

Start updating location
Location manager updating location
Location batch size: 0
Total locations received: 0

Allow “Potloc” to access your location while you use the app?
Your location will be used for demonstration purposes.

Don’t Allow  Allow
Location manager updating location
Location batch size: 0
Total locations received: 0

Allow “Potloc” to access your location while you use the app?

Your location will be used for demonstration purposes.

Don’t Allow  Allow
Location manager not updating location

Location batch size: 4
Total locations received: 7

Start updating location
Authorization
Prompting

Initiate on iPhone
Authorization

Prompting

Initiate on iPhone

• iPhone shows prompt
Authorization

Prompting

Initiate on iPhone
- iPhone shows prompt
- Apple Watch shows nothing
Authorization
Prompting
Authorization

Prompting

Initiate on Apple Watch
Allow “Potloc” to access your location while you use the app?
Your location will be used for demonstration purposes.

Don’t Allow  Allow

Potloc would like to access your location. You can confirm or deny this on your iPhone.
Allow “Potloc” to access your location while you use the app?
Your location will be used for demonstration purposes.

Don’t Allow  Allow

Potloc would like to access your location. You can confirm or deny this on your iPhone.
Allow “Potloc” to access your location while you use the app?
Your location will be used for demonstration purposes.

Don’t Allow  Allow
Authorization

Prompting

Initiate on Apple Watch
Authorization

Prompting

Initiate on Apple Watch

• Apple Watch shows alert
Authorization
Prompting

Initiate on Apple Watch
• Apple Watch shows alert
• iPhone shows prompt
Authorization

Prompting

Initiate on Apple Watch
• Apple Watch shows alert
• iPhone shows prompt
• Answer on iPhone
Available on watchOS

- `requestLocation`
Available on watchOS

- requestLocation

Accuracy with iPhone
Available on watchOS

- `requestLocation`

Accuracy with iPhone

- Even indoor
Available on watchOS

- `requestLocation`

Accuracy with iPhone
- Even indoor

Accuracy standalone
Available on watchOS

- requestLocation

Accuracy with iPhone
- Even indoor

Accuracy standalone
- kCLLocationAccuracyHundredMeters
Available on watchOS

- requestLocation

Accuracy with iPhone
- Even indoor

Accuracy standalone
- kCLLocationAccuracyHundredMeters
- Best effort
Cooperation

If you need:
Cooperation

If you need:

• Continuous background location
Cooperation

If you need:

• Continuous background location

• Region monitoring
Cooperation

If you need:

- Continuous background location
- Region monitoring
- Anything *available* on iOS, but *prohibited* on watchOS
Cooperation

WCSession

Introducing Watch Connectivity

Pacific Heights
Thursday 11:00AM
Cooperation

WCSession

- `sendMessage:replyHandler:errorHandler:`
Cooperation

WCSession

- sendMessage:replyHandler:errorHandler:
- updateApplicationContext:
Sending Messages
Apple Watch –> iPhone

-sendMessage:replyHandler:errorHandler:
Sending Messages
Apple Watch -> iPhone

sendMessage:replyHandler:errorMessage:
Sending Messages
Apple Watch –> iPhone

sendMessage:replyHandler:errorMessage:
Sending Messages

Apple Watch → iPhone

sendMessage:replyHandler:errorHandler:
Sending Messages
Apple Watch → iPhone

sendMessage:replyHandler:errorHandler:
Sending Messages

Apple Watch -> iPhone

sendMessage:replyHandler:ErrorHandler:
Sending Messages
Apple Watch -> iPhone

sendMessage:replyHandler:errorMessage:
Sending Messages
Apple Watch → iPhone

sendMessage:replyHandler:errorHandler:
Sending Messages
Apple Watch –> iPhone

-sendMessage:replyHandler:errorHandler:
Sending Messages
Apple Watch -> iPhone

sendMessage:replyHandler:errorMessage:
Sending Messages
Apple Watch -> iPhone

-sendMessage:replyHandler:errorHandler:
  - Launch if necessary
Sending Messages
Apple Watch –> iPhone

- `sendMessage:replyHandler:errorMessage:`
  - Launch if necessary
  - In Use status transfers
Sending Messages
Apple Watch -> iPhone

-sendMessage:replyHandler:errorCode:
  • Launch if necessary
  • In Use status transfers
  • Remember allowsBackgroundLocationUpdates
Sending Messages

iPhone -> Apple Watch

sendMessage:replyHandler:errorHandler:
Sending Messages
iPhone -> Apple Watch

sendMessage:replyHandler:errorHandler:
Sending Messages

iPhone -> Apple Watch

sendMessage:replyHandler:ErrorHandler:
Sending Messages
iPhone -> Apple Watch

sendMessage:replyHandler:errorHandler:
Sending Messages

iPhone -> Apple Watch

sendMessage:replyHandler:errorHandler:

• Must be running
Sending Messages
iPhone -> Apple Watch

@updateApplicationContext:
Sending Messages
iPhone -> Apple Watch

@updateApplicationContext:
• Last one kept
Sending Messages
iPhone -> Apple Watch

@updateApplicationContext:
• Last one kept
Sending Messages

iPhone -> Apple Watch

- `updateApplicationContext`:
  - Last one kept
Sending Messages

iPhone -> Apple Watch

- `updateApplicationContext`:
  - Last one kept
  - `allowDeferredLocationUpdatesUntilTraveled:timeout:`
allowsBackgroundLocationUpdates
allowsBackgroundLocationUpdates

- requestLocation
allowsBackgroundLocationUpdates

-requestLocation

Cooperation: PotLoc
allowsBackgroundLocationUpdates

-requestLocation

Cooperation: PotLoc

Frameworks Lab @ 2:30-4:10PM
More Information

Sample Code
PotLoc Sample Code

Technical Support
Apple Developer Forums
http://developer.apple.com/forums

General Inquiries
Craig Keithley Technology Evangelist
keithley@apple.com

Jake Behrens App Frameworks Evangelist
behrens@apple.com
# Related Sessions

<table>
<thead>
<tr>
<th>Session</th>
<th>Location</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introducing WatchKit for watchOS 2</td>
<td>Presidio</td>
<td>Tuesday 10:00AM</td>
</tr>
<tr>
<td>What's New in Core Motion</td>
<td>Nob Hill</td>
<td>Tuesday 3:30PM</td>
</tr>
<tr>
<td>What's New in MapKit</td>
<td>Nob Hill</td>
<td>Tuesday 4:30PM</td>
</tr>
<tr>
<td>Achieving All-Day Battery Life</td>
<td>Nob Hill</td>
<td>Wednesday 9:00AM</td>
</tr>
<tr>
<td>Debugging Energy Issues</td>
<td>Nob Hill</td>
<td>Wednesday 10:00AM</td>
</tr>
<tr>
<td>What's New in Core Audio</td>
<td>Nob Hill</td>
<td>Wednesday 4:30PM</td>
</tr>
<tr>
<td>Introducing Watch Connectivity</td>
<td>Pacific Heights</td>
<td>Thursday 11:00AM</td>
</tr>
</tbody>
</table>
Related Lab

Core Location Lab

Frameworks Lab A
Thursday 2:30PM
Apple WWDC15