Connecting CareKit to the Cloud

Session 239

Kelsey Dedoshka, Software Engineer
Agenda

CareKit overview

Bridge API

Demo
CareKit Overview
June 9, 2017
Your care overview is 67% complete

PHYSICAL ACTIVITY

Hamstring Stretch 5 mins

OTHER

Pain
Lower Back

of 10

OPTIONAL

Blood Glucose
After dinner
Hamstring Stretch 5 mins

Your care overview is 67% complete

To-Do Intervention Activity
June 9, 2017
Your care overview is 67% complete

PHYSICAL ACTIVITY

Hamstring Stretch 5 mins

OTHER

Pain
Lower Back 9/10

OPTIONAL

Blood Glucose
After dinner
To-Do

Intervention Activity

Hamstring Stretch 5 mins

To-Do

Assessment Activity

Pain
Lower Back

Blood Glucose
After dinner
Insights

<table>
<thead>
<tr>
<th>Pain</th>
<th>Weight</th>
<th>Blood Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 of 10</td>
<td>120 lb</td>
<td>125 mg/dL</td>
</tr>
</tbody>
</table>

THRESHOLD ALERTS

Pain
High pain level. Consider taking medication.

INSIGHTS

Medication Adherence
Your medication adherence was 14% last week.

Pain vs Medication

<table>
<thead>
<tr>
<th>Day</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fri</td>
<td>5</td>
</tr>
<tr>
<td>Sat</td>
<td>8</td>
</tr>
<tr>
<td>Sun</td>
<td>8</td>
</tr>
<tr>
<td>Mon</td>
<td>3</td>
</tr>
<tr>
<td>Tue</td>
<td>2</td>
</tr>
<tr>
<td>Wed</td>
<td>3</td>
</tr>
</tbody>
</table>
**Widgets** Threshold Alert

- Pain: 9 of 10
- Weight: 120 lb
- Blood Glucose: 125 mg/dL

**Threshold Alerts**

**Pain**
High pain level. Consider taking medication.

**Insights**

**Medication Adherence**
Your medication adherence was 14% last week.

**Pain vs Medication**
- Fri 6/2: 5 (50%)
- Sat 6/3: 8 (100%)
- Sun 6/4: 8 (100%)
- Mon 6/5: 3 (100%)
- Tue 6/6: 2 (50%)
- Wed:**/2: 3 (50%)

**Care Contents**

**Connect**
Threshold Alert

Widgets Threshold Alert

Text Threshold Alert

Insights

- Pain: 9 of 10
- Weight: 120 lb
- Blood Glucose: 125 mg/dL

Threshold Alerts

Pain
High pain level. Consider taking medication.

Insights

Medication Adherence
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Pain vs Medication

- Fri 6/2: 5
- Sat 6/3: 8
- Sun 6/4: 8
- Mon 6/5: 3
- Tue 6/6: 2
- Wed: 3
Widgets Threshold Alert

Text Threshold Alert
CareKit Patient Apps

CareKit Care Team Apps
CareKit
Patient Apps

CareKit
Care Team Apps
CareKit
Patient Apps

CareKit
Care Team Apps
Framework Additions
Framework Additions

Hooks directly in the framework
Framework Additions

Hooks directly in the framework

Improve the data pipeline
Framework Additions

Hooks directly in the framework
Improves the data pipeline
Allows for data sharing
Use Case
Eye surgery
Use Case
Eye surgery

Antibiotic eye drops
Use Case
Eye surgery

Antibiotic eye drops
Check eye-drop compliance
Use Case
Eye surgery
Use Case
Eye surgery

Eye-drop adherence
### Use Case

**Eye surgery**

**Eye-drop adherence**

Care team monitors results

#### Pain

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Pain</td>
<td>9 of 10</td>
<td></td>
</tr>
<tr>
<td>Morning Drops</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Evening Drops</td>
<td>100%</td>
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</table>

#### Pain vs Medication

<table>
<thead>
<tr>
<th>Day</th>
<th>Pain</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fri</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>Sat</td>
<td>7</td>
<td>50%</td>
</tr>
<tr>
<td>Sun</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Mon</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Wed</td>
<td>5</td>
<td></td>
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</tbody>
</table>

**Medication Adherence**

Your medication adherence was 75% last week.
Use Case
Eye surgery

Eye-drop adherence
Care team monitors results
Showcases data syncing
Bridge API

Kelsey Dedoshka, Software Engineer
Bridge API

- iOS SDK
- CareKit Framework
- CareKit Bridge API
- 3rd-Party Cloud API
- iOS SDK
Bridge API

Abstract cloud API

- 3rd-Party Cloud API
- CareKit Bridge API
- CareKit Framework
- iOS SDK
Bridge API

Abstract cloud API

Seamless integration

- 3rd-Party Cloud API
- CareKit Bridge API
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- iOS SDK
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Abstract cloud API
Seamless integration
Based upon CareKit schema

- 3rd-Party Cloud API
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- iOS SDK
Bridge API

Abstract cloud API
Seamless integration
Based upon CareKit schema
Provides necessary hooks

- 3rd-Party Cloud API
- CareKit Bridge API
- CareKit Framework
- iOS SDK
Bridge API

Abstract cloud API
Seamless integration
Based upon CareKit schema
Provides necessary hooks
Delegate functions

3rd-Party Cloud API
CareKit Bridge API
CareKit Framework
iOS SDK
Abstract cloud API
Seamless integration
Based upon CareKit schema
Provides necessary hooks
Delegate functions
UI Modules

3rd-Party Cloud API
CareKit Bridge API
CareKit Framework
iOS SDK
How It Works

Activity Type

- Assessment
- Intervention
- Custom
How It Works

Activity Type

Assessment
Intervention
Custom

Care Plan Store
How It Works

Activity Type

Assessment
Intervention
Custom

Care Plan Store

Bridge API
How It Works

Activity Type

Assessment
Intervention
Custom

Care Plan Store

Bridge API

Cloud
// Bridge API handling Activity updates
_cloudBridgeDelegate?.carePlanStoreActivityListDidChange?(self)

// Bridge API handling Event updates
_cloudBridgeDelegate?.carePlanStore?(self, didReceiveUpdateOf: copiedEvent)
// Bridge API handling Activity updates
_cloudBridgeDelegate?.carePlanStoreActivityListDidChange?(self)

// Bridge API handling Event updates
_cloudBridgeDelegate?.carePlanStore?(self, didReceiveUpdateOf: copiedEvent)
// Bridge API handling Activity updates
_cloudBridgeDelegate?.carePlanStoreActivityListDidChange?(self)

// Bridge API handling Event updates
_cloudBridgeDelegate?.carePlanStore?(self, didReceiveUpdateOf: copiedEvent)
Cloud Solutions
Cloud Solutions

Custom
Cloud Solutions

Custom

Medable
Cloud Solutions

Custom

Medable

CloudMine
Example
Medable
// Start the Cloud Service and Establish Login Connection
Medable.start()

MDCKCloudBridge.login(withEmail: wwdcEmail, password: wwdcPassword, verificationToken: nil)
{
    bridge, fault in
    if fault {
        // Handle Fault
        ...
    } else {
        // Access bridge for logged in user
        ...
    }
}
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    if fault {
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        ...
    } else {
        // Access bridge for logged in user
        ...
    }
}
// Retrieve User Connections
MDCKCloudBridge.listStoreConnections {(connections, hasMore, fault) in
    if fault {
        // Handle Fault
        ...
    } else {
        connections.forEach { connection in
            switch connection.state {
                // Handle connections
                ...
            }
        }
    }
}
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            switch connection.state {
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        }
    }
}
Dr. Maria Ruiz  6/9/17, 9:10 AM
Saw that you completed all of your eye drops for the day, nice job!

Kelsey Dedoshka  6/9/17, 9:21 AM
Thanks, I am starting to feel a lot better.

Dr. Maria Ruiz  6/9/7, 9:41 AM
Keep up the good work.

I will, thank you!
// return the number of messages for the selected contact
func connectViewControllerNumberOfConnectMessageItems(viewController: OCKConnectViewController, careTeamContact: OCKContact) -> Int {
    ...
}

// return the message item for the selected inbox
func connectViewController(_ viewController: OCKConnectViewController, connectMessageItemAt index: Int, careTeamContact contact: OCKContact) -> OCKConnectMessageItem {
    ...
}

// utilize the bridge API and cloud solution to send a secure message
func connectViewController(_ viewController: OCKConnectViewController, didSendConnectMessage message: String, careTeamContact: OCKContact) {
    ...
}
// return the number of messages for the selected contact
func connectViewControllerNumber(ofConnectMessageItems viewController: OCKConnectViewController, careTeamContact: OCKContact) -> Int {
  ...
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func connectViewController(_ viewController: OCKConnectViewController, connectMessageItemAt index: Int, careTeamContact contact: OCKContact) -> OCKConnectMessageItem {
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    ...
}

// utilize the bridge API and cloud solution to send a secure message
func connectViewController(_ viewController: OCKConnectViewController, didSelectConnectMessage message: String, careTeamContactContact: OCKContact) {
    ...
}
// return the number of messages for the selected contact
func connectViewControllerNumber(ofConnectMessageItems viewController:
    OCKConnectViewController, careTeamContact: OCKContact) -> Int {
    ...
}

// return the message item for the selected inbox
func connectViewController(_ viewController: OCKConnectViewController, connectMessageItemAt
    index: Int, careTeamContact contact: OCKContact) -> OCKConnectMessageItem {
    ...
}

// utilize the bridge API and cloud solution to send a secure message
func connectViewController(_ viewController: OCKConnectViewController, didSendConnectMessage
    message: String, careTeamContact: OCKContact) {
    ...
}
// conversation created – perform any necessary updates
mdBridge.createConversation(withMessage: message, targets: [carePlan.targetId]) { id, fault in
    if fault == nil {
        ...
    }
}

// send new message – perform any necessary updates
mdBridge.sendMessage(message, withConversationId: convoId, callback: { message, fault in
    if fault == nil {
        ...
    }
})
// conversation created - perform any necessary updates
mdBridge.createConversation(withMessage: message, targets: [carePlan.targetId]) { id, fault in
    if fault == nil {
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})
Demo

Utilizing the bridge API in code

Akshay Yadav, Software Engineer
Utilizing the API
Utilizing the API

Use third-party solutions
Utilizing the API

Use third-party solutions

Build your own
Utilizing the API

Use third-party solutions

Build your own

Develop care team apps
CareKit is an open source software framework for creating apps that help people better understand and manage their health.

<table>
<thead>
<tr>
<th>Date</th>
<th>Commit Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 years ago</td>
<td>Initial commit</td>
</tr>
<tr>
<td>8 months ago</td>
<td>Merge pull request #220 from mappynoperson/removed-radar-bug</td>
</tr>
<tr>
<td>11 months ago</td>
<td>Added updated find_headers.rb from ResearchKit git</td>
</tr>
<tr>
<td>9 months ago</td>
<td>Fixing mercury symbol in naming unit</td>
</tr>
<tr>
<td>9 months ago</td>
<td>Add CONTRIBUTIONS.md</td>
</tr>
<tr>
<td>9 months ago</td>
<td>Fix counting in specs</td>
</tr>
<tr>
<td>9 months ago</td>
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**CareKit Framework**

CareKit™ is an open source software framework for creating apps that help people better understand and manage their health.
More Information

<table>
<thead>
<tr>
<th>Related Sessions</th>
<th>WWDC 2017</th>
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<tbody>
<tr>
<td>What’s New in Health</td>
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<tr>
<td>What’s New in CareKit and ResearchKit</td>
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<td>ResearchKit and CareKit Lab</td>
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