

Creating Extensions for iOS and OS X, Part 1

Extending Apps

Session 205

Ian Baird

iOS Frameworks Engineer

Matt Gamble

iOS Notifications Engineer

Guy Fullerton

iOS Social & Accounts Engineer

Agenda

Extensions and Extension Points

Agenda

Extensions and Extension Points

Today Extensions

Agenda

Extensions and Extension Points

Today Extensions

Share Extensions

What are Extensions?

iPad 9:41 AM apple.com

Store Mac iPod

What will you do with your iPad?

Everyone has something to share. Share your iPad in their unique way.

Explore the possibilities.

AirDrop

Share instantly with people nearby. If they do not appear automatically, ask them to open Control Center and turn on AirDrop.

- Message
- Mail
- Butterfly
- Photos
- Add Bookmark
- Add to Reading List
- Add to Home Screen
- Subscribe in Shared Links

Apple and the Environment
See how we're trying to do better for the planet.

You're more powerful than you think.
iPhone 5

MacBook Air
All the power you want. All day long.

WWDC 14



iPad 9:41 AM apple.com

Store Mac iPod






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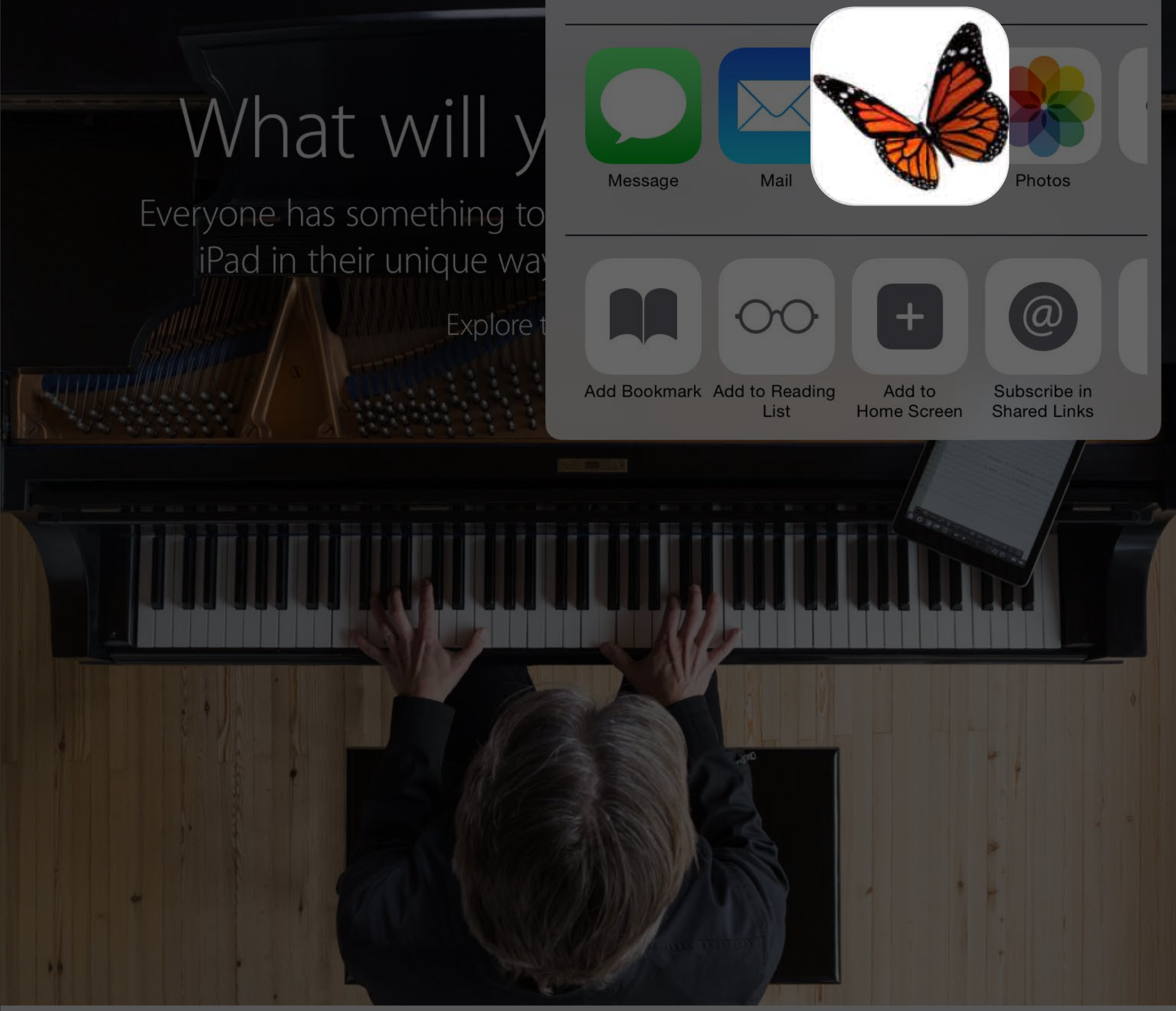
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Add Bookmark Add to Reading List Add to Home Screen Subscribe in Shared Links



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iPhone 5 (S)

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What... be?

Everyone has some... people are using iPad in their... world's story.

**Butterfly**

Enter your message here...

Cancel Send



WWDC 14

Watch the keynote live.
Starting today at 10am PDT.

You're more powerful than you think.
iPhone 5 [S]



MacBook Air

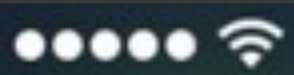
All the power you want. All day long.



Apple and the Environment

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9:41 AM

100%

Today

Notifications

Monday, June 2nd



Mostly sunny currently. The high will be 81°. Partly cloudy tonight with a low of 55°.



SportsCenter



Athletics

30-17

5/23



Blue Jays

26-22

4:07 PM
OAK -124



Twins

23-21

5/23



Giants

29-18

7:15 PM
SF -154



Today Notifications

Tuesday, May 27th

Today is Christine Ryan's birthday.

Calendar

No Events

Weather

4:23 PM Windham 54°

4:23 PM Boston 55°

4:23 PM Boston Heights 77°

9:23 PM Boston 52°

Calculator

0

C	±	%	÷
7	8	9	×
4	5	6	-
1	2	3	+
0	.		=

Stocks

DOW J	16,675.50	+0.42%
GOOG	565.95	+2.40%
T	35.21	-0.31%
AAPL	625.63	+1.87%
AMZN	310.82	-0.45%

Show More...

Edit





9:41 AM

100%

apple.com



Store Mac iPod iPhone iPad iTunes Support

What will your verse be?

Everyone has something to share.



AirDrop

Share instantly with people nearby. If they do not appear automatically, ask them to open Control Center and turn on AirDrop.



Message



Mail



Twitter



Facebook



Add
Bookmark



Add to
Reading List



Add to
Home Screen



Annotate
Image

Cancel

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9:41 AM

100%

apple.com



Store Mac iPod iPhone iPad iTunes Support

What will your verse be?

Everyone has something to share.

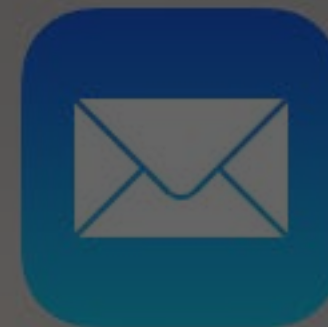


AirDrop

Share instantly with people nearby. If they do not appear automatically, ask them to open Control Center and turn on AirDrop.



Message



Mail



Twitter



Facebook



Add
Bookmark



Add to
Reading List



Add to
Home Screen



Image

Cancel

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To:

Cc:

Bcc:

Subject: Weekend at the lake

From: Johnny Appleseed <johnnyappleseed@apple.com>

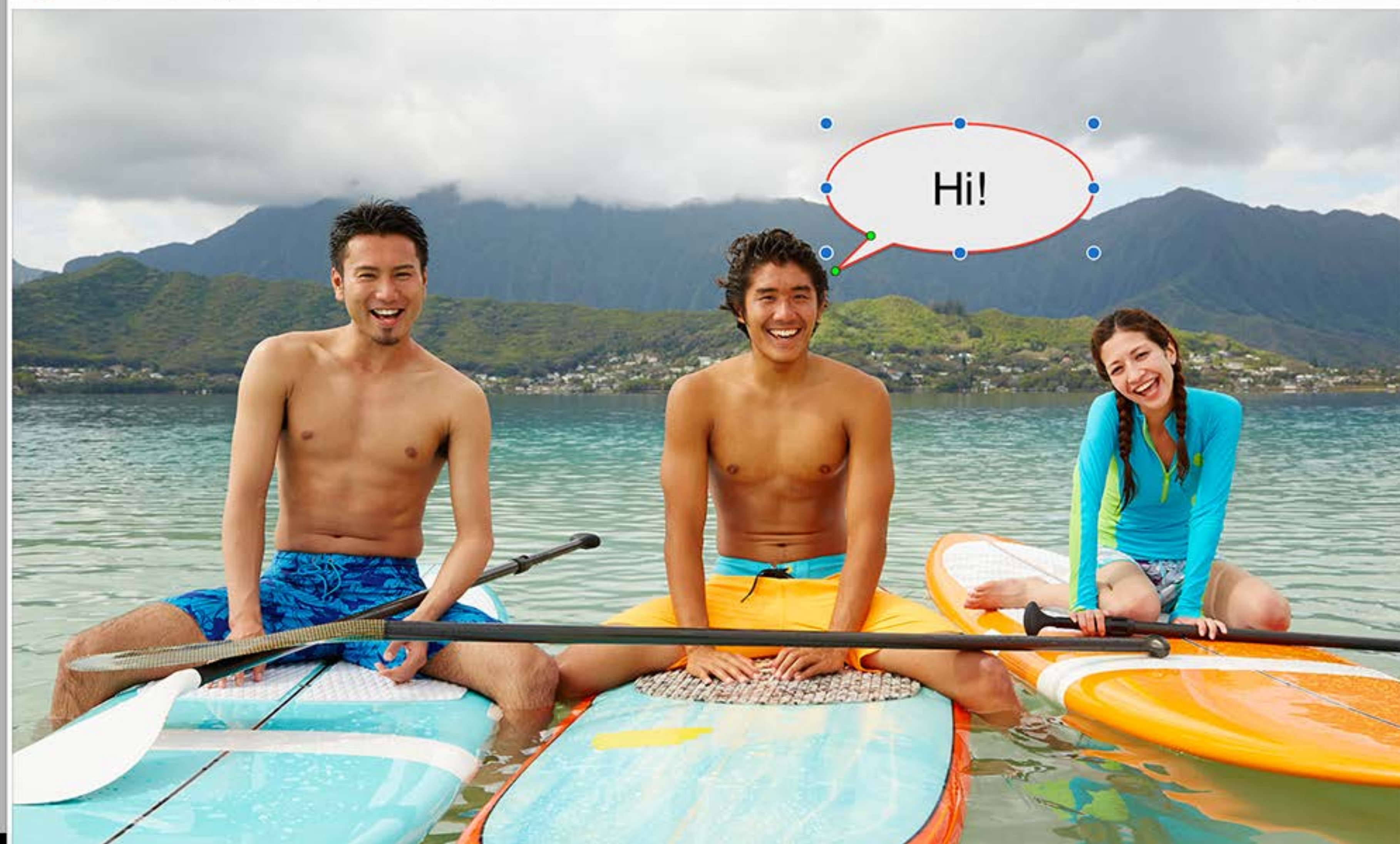
Signature: None

Message Size: 6 MB

Image Size: Actual Size



Cancel Done



Cancel

Filter Funhouse

Done



Sepia



Chrome



Fade





Open From...

iPad

+ Add a Place

Locations iCloud Done

Search

- iCloud 
- OneDrive 
- Box 
- More... 

Resume Business Letter IMA Report

Purchase Invoice Report Proposal

NEWSLETTER

Sync Extension Documents

Search

Favorites

- All My Files
- AirDrop
- Applications
- Desktop
- Documents
- Downloads

Devices

- Remote...

Shared

- de-home
- All...

Tags

- Red
- Orange

Hydra

Iguana

London

Milos

Prow

Santorini

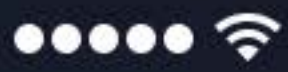
Sunrise

Turkey

FS Add 2 Selected Items to Group 1

FS Add 2 Selected Items to Group 2

[View on FinderSync Demo Web Site](#)



9:41 AM

100%

Cancel

Miss you already

Send

To: [Stefan Schuch](#)

Cc/Bcc:

Subject: Miss you already

Paul and I can't believe the week
went by so quickly

apply

quilt

woolly

Q W E R T Y U I O P

A S D F G H J K L

⏪ Z X C V B N M ⏩

?123 , . ⏪

Delivering Extensions

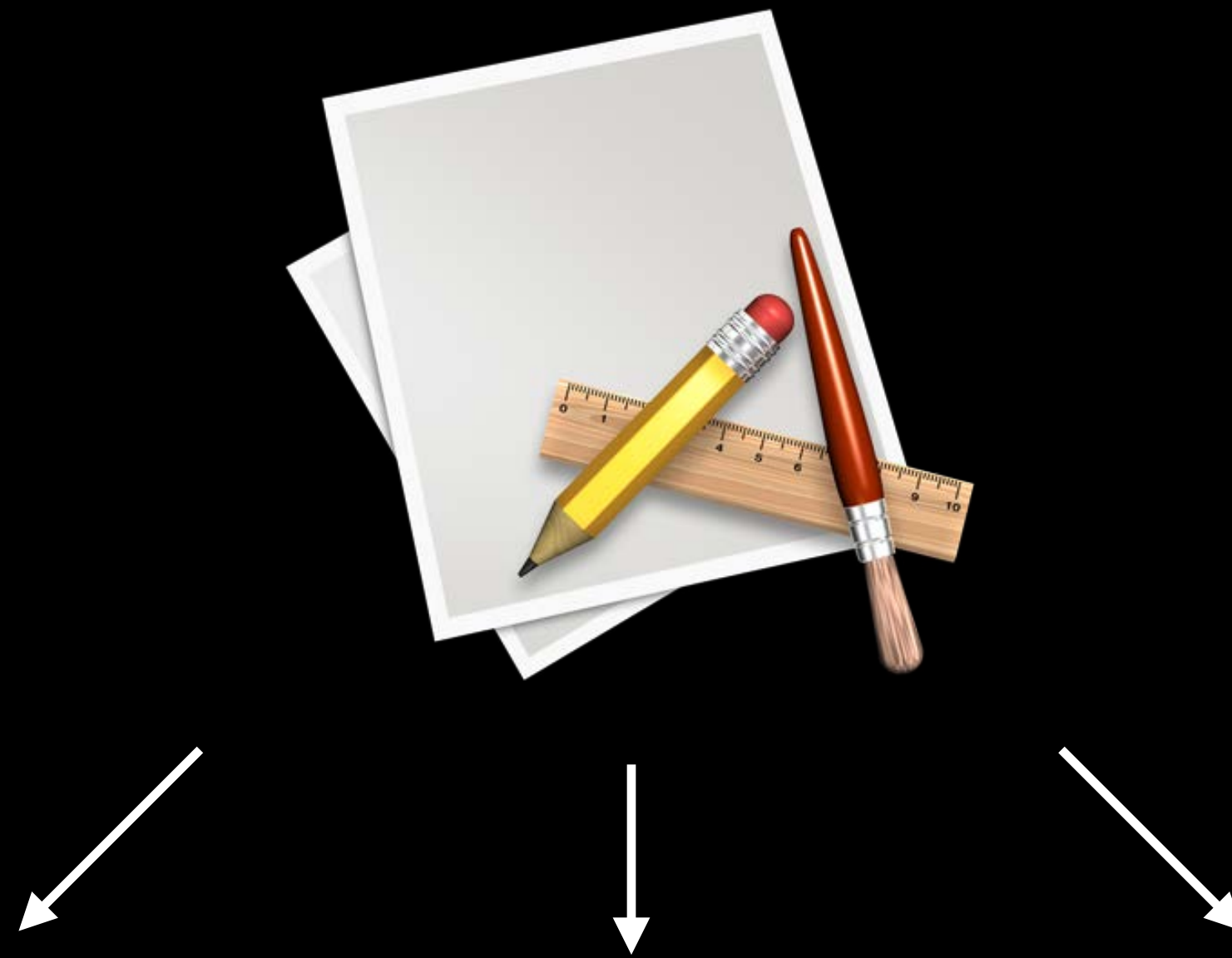
Delivering Extensions

Extension Container



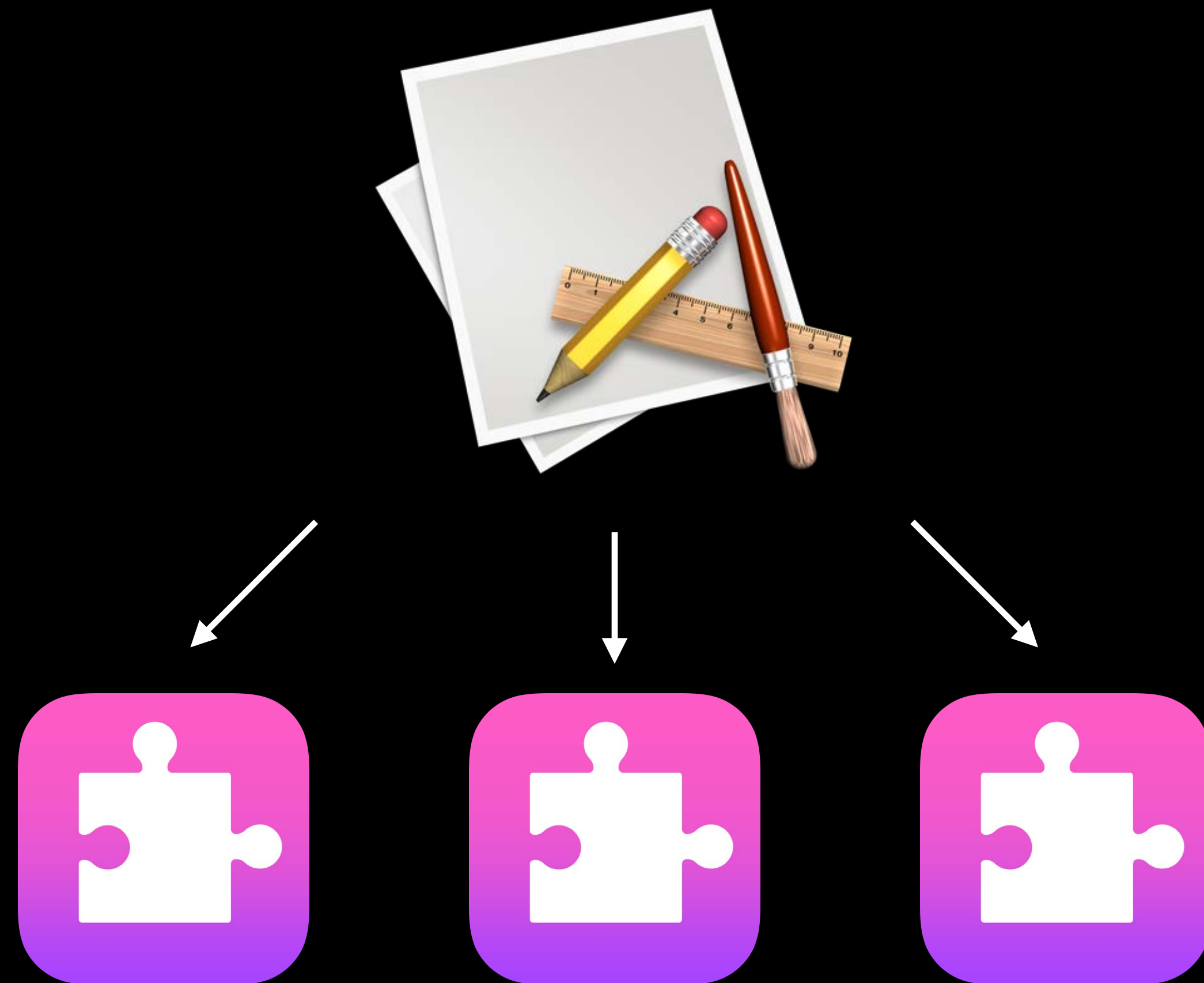
Delivering Extensions

Extension Container



Delivering Extensions

Extension Container



What are Extension Points?

Binding

What are Extension Points?

Binding



NotificationCenter.framework

Today Widget

What are Extensions?

Purpose built binaries

What are Extensions?

Purpose built binaries

Not apps

What are Extensions?

Purpose built binaries

Not apps

Accessed via Apple frameworks code

What are Extensions?

Purpose built binaries

Not apps

Accessed via Apple frameworks code

Not app to app IPC

What are Extensions?

Purpose built binaries

Not apps

Accessed via Apple frameworks code

Not app to app IPC

- Still use `-[UIApplication openURL:]`

What are Extension Points?

Overview

Mark extensible parts of the system

What are Extension Points?

Overview

Mark extensible parts of the system

Packaged in System Frameworks

What are Extension Points?

Overview

Mark extensible parts of the system

Packaged in System Frameworks

Combine API and Policy

What are Extension Points?

Policy

Launch characteristics

What are Extension Points?

Policy

Launch characteristics

Presentation

What are Extension Points?

Policy

Launch characteristics

Presentation

View controller and non view

iPad 9:41 AM apple.com

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Activating Extensions



Extension Host



Extension

Activating Extensions



Extension Host



Extension



Extension Host



Extension



Extension Host



Directly Launch



Extension

Summary

Small pieces of functionality

Summary

Small pieces of functionality

Extend the system in new and interesting ways

Summary

Small pieces of functionality

Extend the system in new and interesting ways

Extension Points mark extendable parts of the system

Notification Center Extensions

The widgets you need and deserve

Matt Gamble

iOS Notifications Engineer





Notification Center Widgets

Widgets are view controllers

Notification Center Widgets

Widgets are view controllers

Lifecycle, containment, etc.

Notification Center Widgets

Widgets are view controllers

Lifecycle, containment, etc.

Appearance calls:

- `(void)viewWillAppear:(BOOL)animated;`
- `(void)viewDidAppear:(BOOL)animated;`
- `(void)viewWillDisappear:(BOOL)animated;`
- `(void)viewDidDisappear:(BOOL)animated;`

Notification Center Widgets

Widgets are view controllers

Lifecycle, containment, etc.

Appearance calls:

- `(void)viewWillAppear:(BOOL)animated;`
- `(void)viewDidAppear:(BOOL)animated;`
- `(void)viewWillDisappear:(BOOL)animated;`
- `(void)viewDidDisappear:(BOOL)animated;`

Notification Center Widgets

Performance

Notification Center Widgets

Performance

Load cached data for seamless transitions

Notification Center Widgets

Performance

Load cached data for seamless transitions

Kick off expensive operations early and in the background

Notification Center Widgets

Performance

Load cached data for seamless transitions

Kick off expensive operations early and in the background

Cache fetched data (see “Load cached data for seamless transitions”)

Notification Center Widgets

Handling layout

Notification Center Widgets

Handling layout

The Notification Center sets the frames

Notification Center Widgets

Handling layout

The Notification Center sets the frames

Adjusting Height

Notification Center Widgets

Handling layout

The Notification Center sets the frames

Adjusting Height

1. Auto layout

Notification Center Widgets

Handling layout

The Notification Center sets the frames

Adjusting Height

1. Auto layout
2. `setPreferredSize:`

Notification Center Widgets

Handling layout



The Notification Center sets the frames

Adjusting Height

1. Auto layout
2. `setPreferredSize:`

Same across iOS and OS X

Notification Center Widgets

Handling layout



Notification Center Widgets

Handling layout



```
- (IBAction)action:(id)sender {  
  
    CGSize updatedSize = [self preferredContentSize];  
    updatedSize.height = 100.0;  
  
    [self setPreferredSize:updatedSize];  
  
}
```

Notification Center Widgets

Handling layout



```
- (IBAction)action:(id)sender {  
  
    CGSize updatedSize = [self preferredContentSize];  
    updatedSize.height = 100.0;  
  
    [self setPreferredSize:updatedSize];  
  
}
```


Notification Center Widgets

Animating along with height changes



Notification Center Widgets

Animating along with height changes



```
- (void)viewWillTransitionToSize:(CGSize)size
    withTransitionCoordinator:(id <UIViewControllerTransitionCoordinator>)coordinator {

    [coordinator animateAlongsideTransition:

        ^(id<UIViewControllerTransitionCoordinatorContext> context) {
            [view setAlpha:0.0];
        }

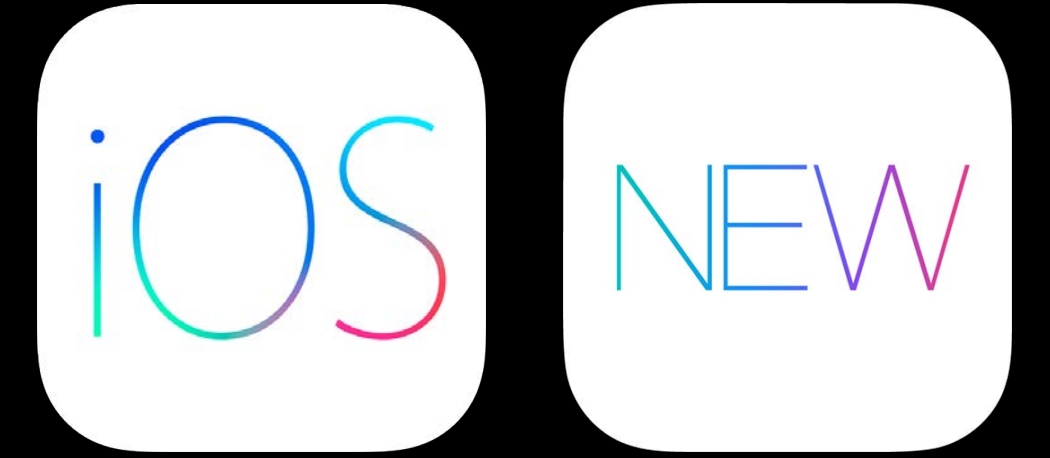
        completion:

        ^(id<UIViewControllerTransitionCoordinatorContext> context) {
            [view removeFromSuperview];
        }

    ];
}
```

Notification Center Widgets

Animating along with height changes



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- (void)viewWillTransitionToSize:(CGSize)size
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        }

    ];
}
```


Notification Center Widgets

Animating along with height changes



```
- (void)viewWillTransitionToSize:(NSSize)newSize {  
    [NSAnimationContext runAnimationGroup:^(NSAnimationContext *context) {  
        [view setAlpha:0.0];  
    } completionHandler:^(  
        [view removeFromSuperview];  
    )];  
}
```

Notification Center Widgets

Animating along with height changes



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- (void)viewWillTransitionToSize:(NSSize)newSize {  
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    )];  
}
```

Notification Center Widgets

NCWidgetProviding



Notification Center Widgets

NCWidgetProviding



```
- (void)widgetPerformUpdateWithCompletionHandler:(void (^)(NCUpdateResult result))completionHandler {
```

```
    [self performUpdate];
```

```
    NCUpdateResult updateResult;
```

```
    if (/* Hey look, I have new content! */) {
        updateResult = NCUpdateResultNewData;
    } else if ( /* Hm, nothing new here. */) {
        updateResult = NCUpdateResultNoData;
    } else if ( /* Uh-oh... */) {
        updateResult = NCUpdateResultFailed;
    }
}
```

```
    completionHandler(updateResult);
```

```
}
```

Notification Center Widgets

NCWidgetProviding



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NCWidgetProviding



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Notification Center Widgets

NCWidgetProviding



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Notification Center Widgets

NCWidgetProviding



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Notification Center Widgets

NCWidgetProviding



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        updateResult = NCUpdateResultFailed;
    }
}
```

```
    completionHandler(updateResult);
```

```
}
```

Demo

Clowning around

Notification Center Widgets

Summary

Notification Center Widgets

Summary

Widgets are view controllers

Notification Center Widgets

Summary

Widgets are view controllers

Widgets should resume immediately

Notification Center Widgets

Summary

Widgets are view controllers

Widgets should resume immediately

Notification Center handles layout

- Express preferred height with constraints or preferredContentSize

Notification Center Widgets

Summary

Widgets are view controllers

Widgets should resume immediately

Notification Center handles layout

- Express preferred height with constraints or preferredContentSize

Animate content along with resize animation

Notification Center Widgets

Summary

Widgets are view controllers

Widgets should resume immediately

Notification Center handles layout

- Express preferred height with constraints or preferredContentSize

Animate content along with resize animation

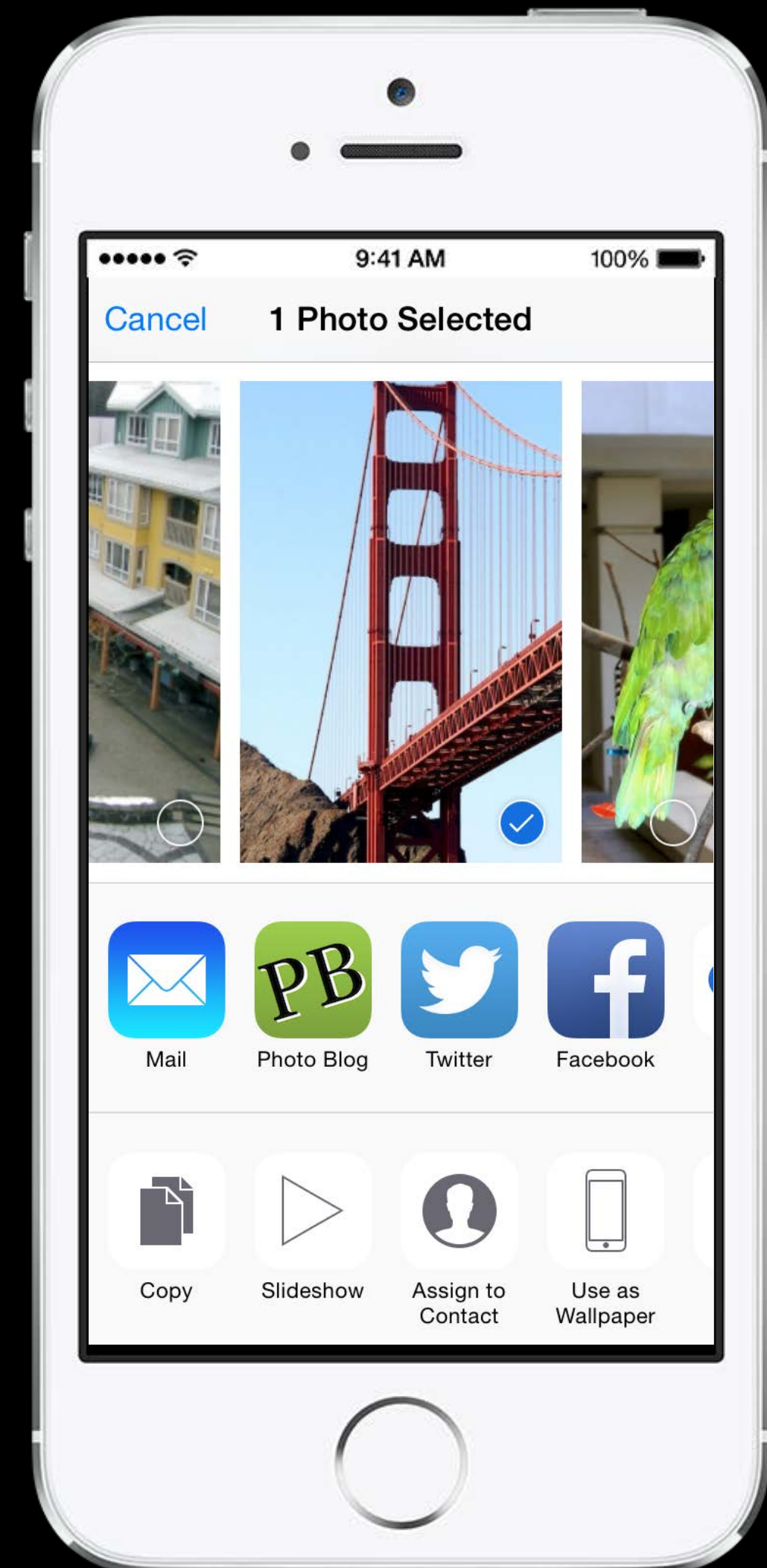
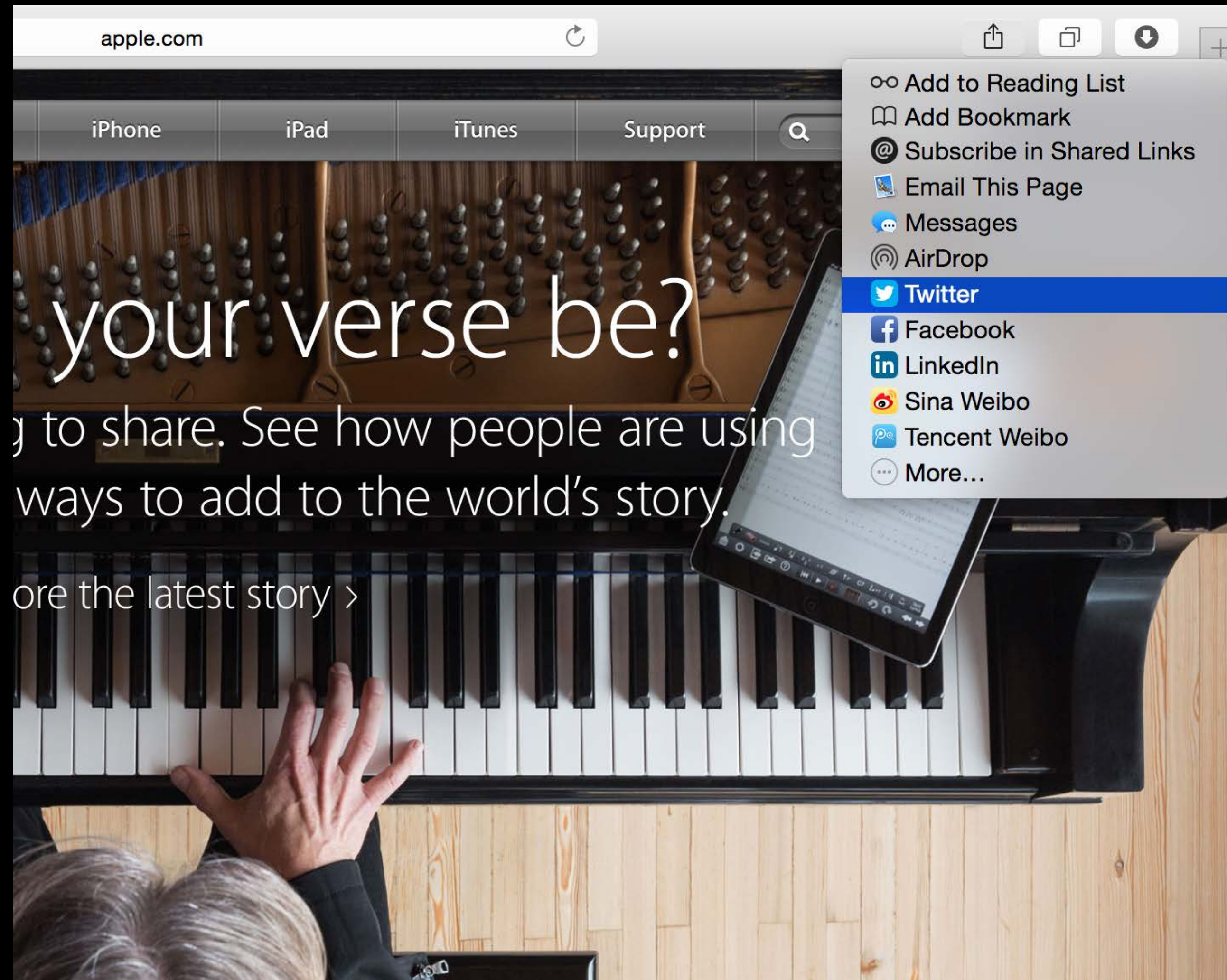
Handle update requests

Share Extensions

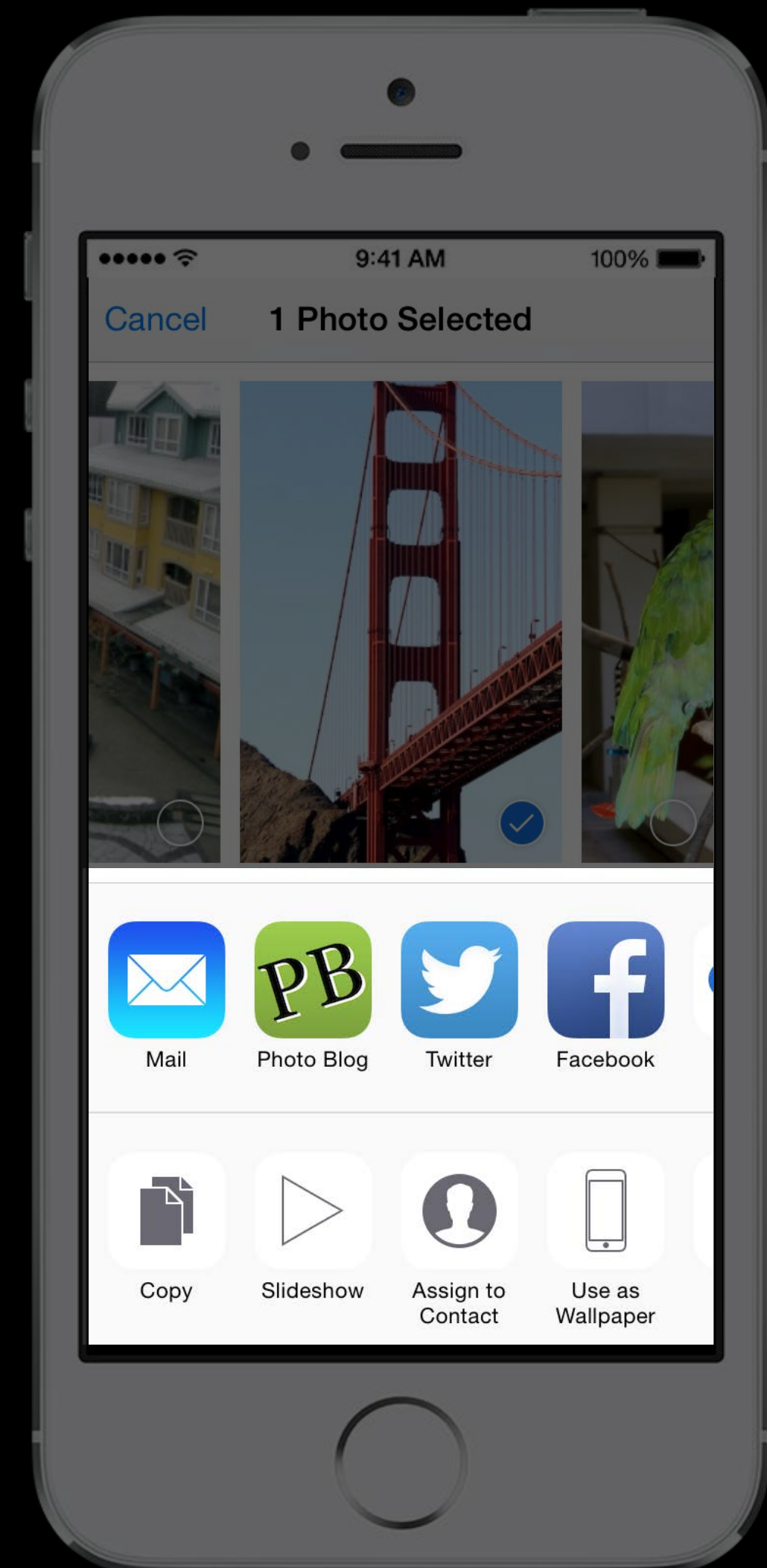
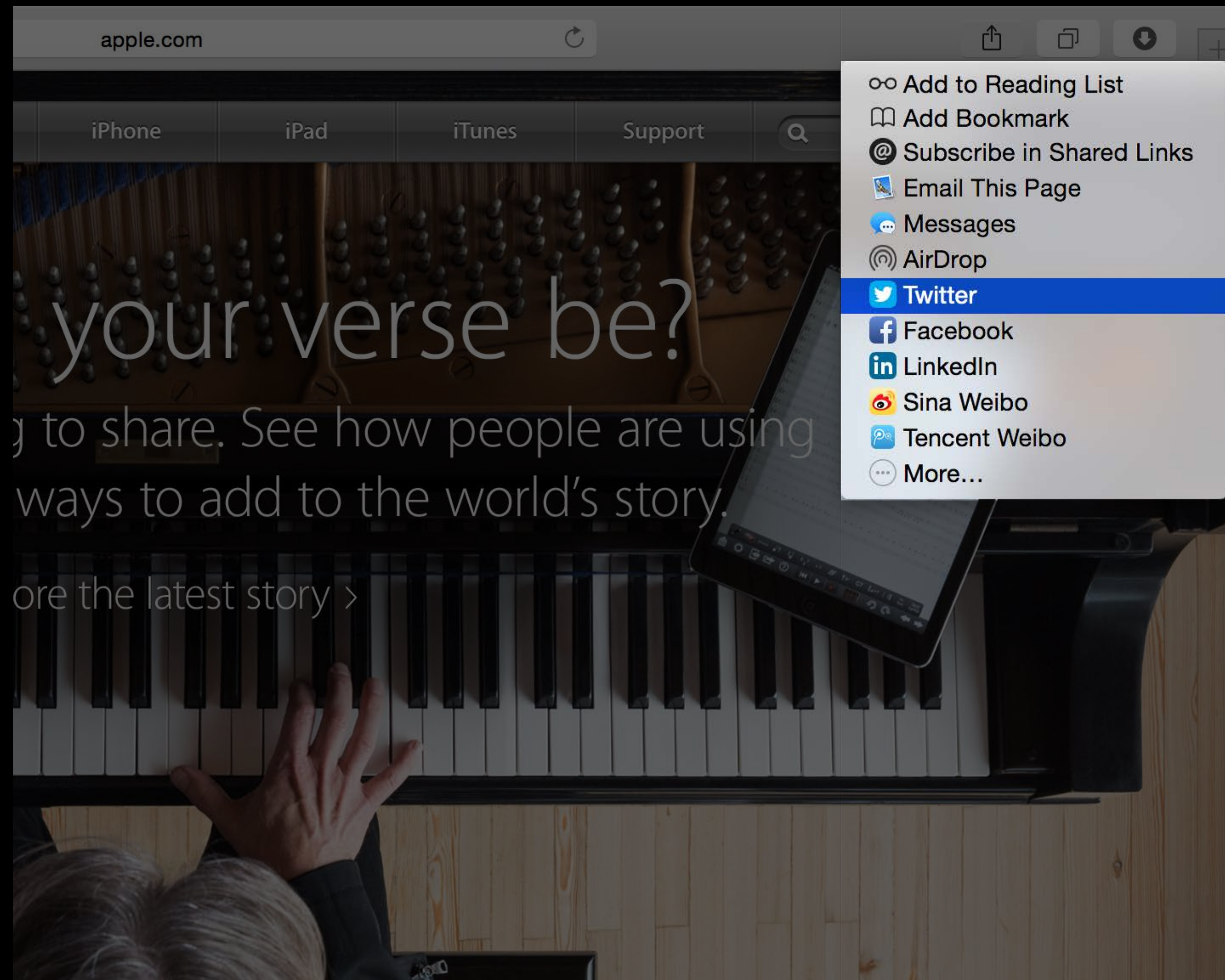
Guy Fullerton

iOS Social & Accounts Engineer

Share Extensions



Share Extensions





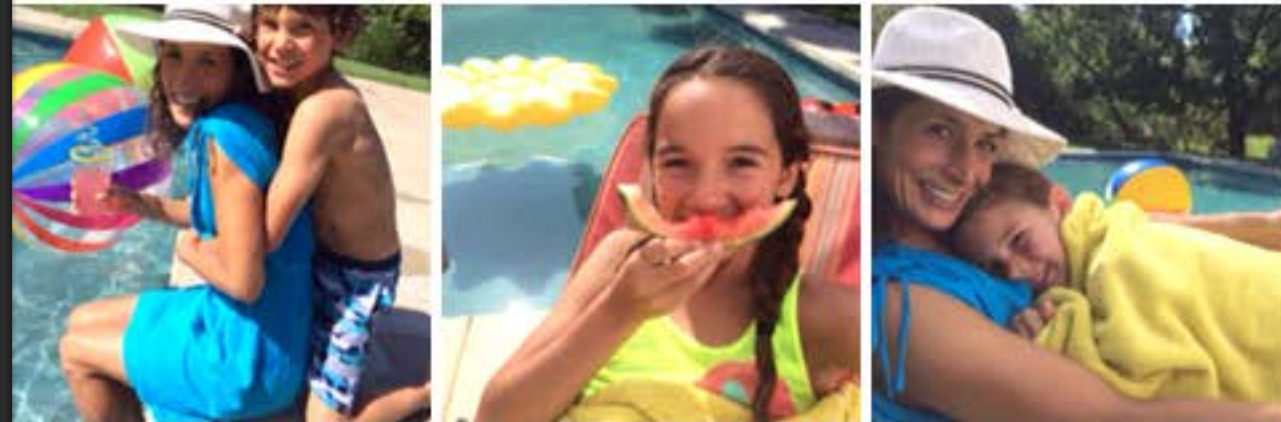
9:41 AM

100%

[← Collections](#) Moments [🔍](#) [Select](#)

April 16

[Share](#)



April 17

[Share](#)



Photos



Shared



Albums



9:41 AM

100%



April 17
10:52 AM

Edit





9:41 AM

100%

Cancel

1 Photo Selected



AirDrop

Share instantly with people nearby. If they do not appear automatically, ask them to open Control Center and turn on AirDrop.



Message



Mail



Photo Blog



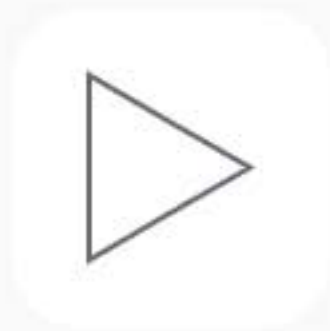
Twitter



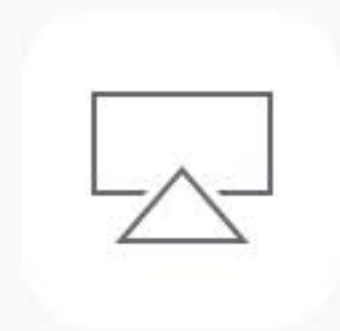
F



Copy



Slideshow



AirPlay



Assign to Contact



V



9:41 AM

100%

Cancel

1 Photo Selected

Cancel

Photo Blog

Post

Great day for kites!



80

Audience

Public >

1 2 3 4 5 6 7 8 9 0

- / : ; () \$ & @ ”

#+= . , ? ! ’ < ×

ABC 😊 🎤 space return

Share Extensions

Display name

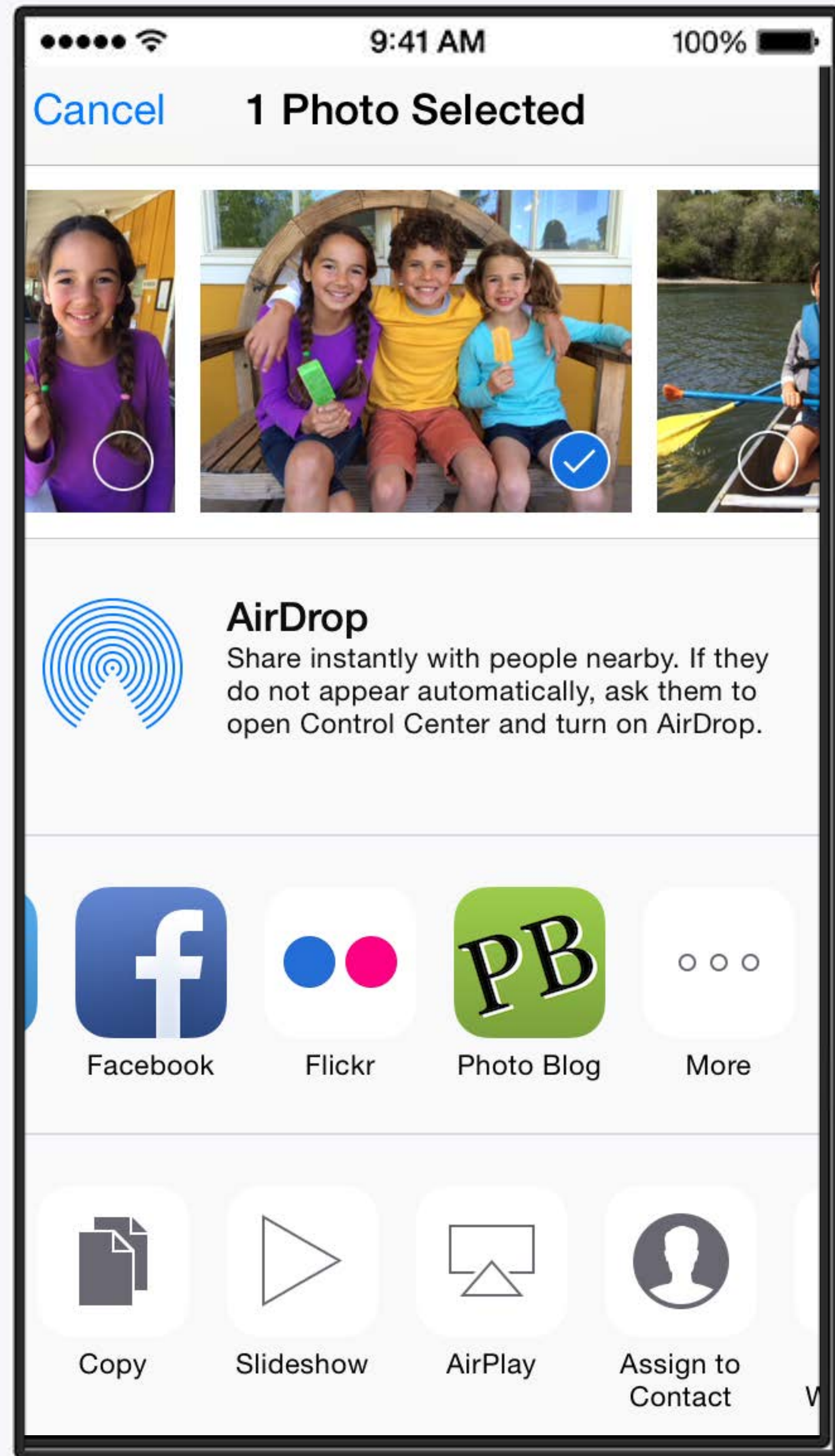
Activation rules

Implement a `ViewController`

Upload the content

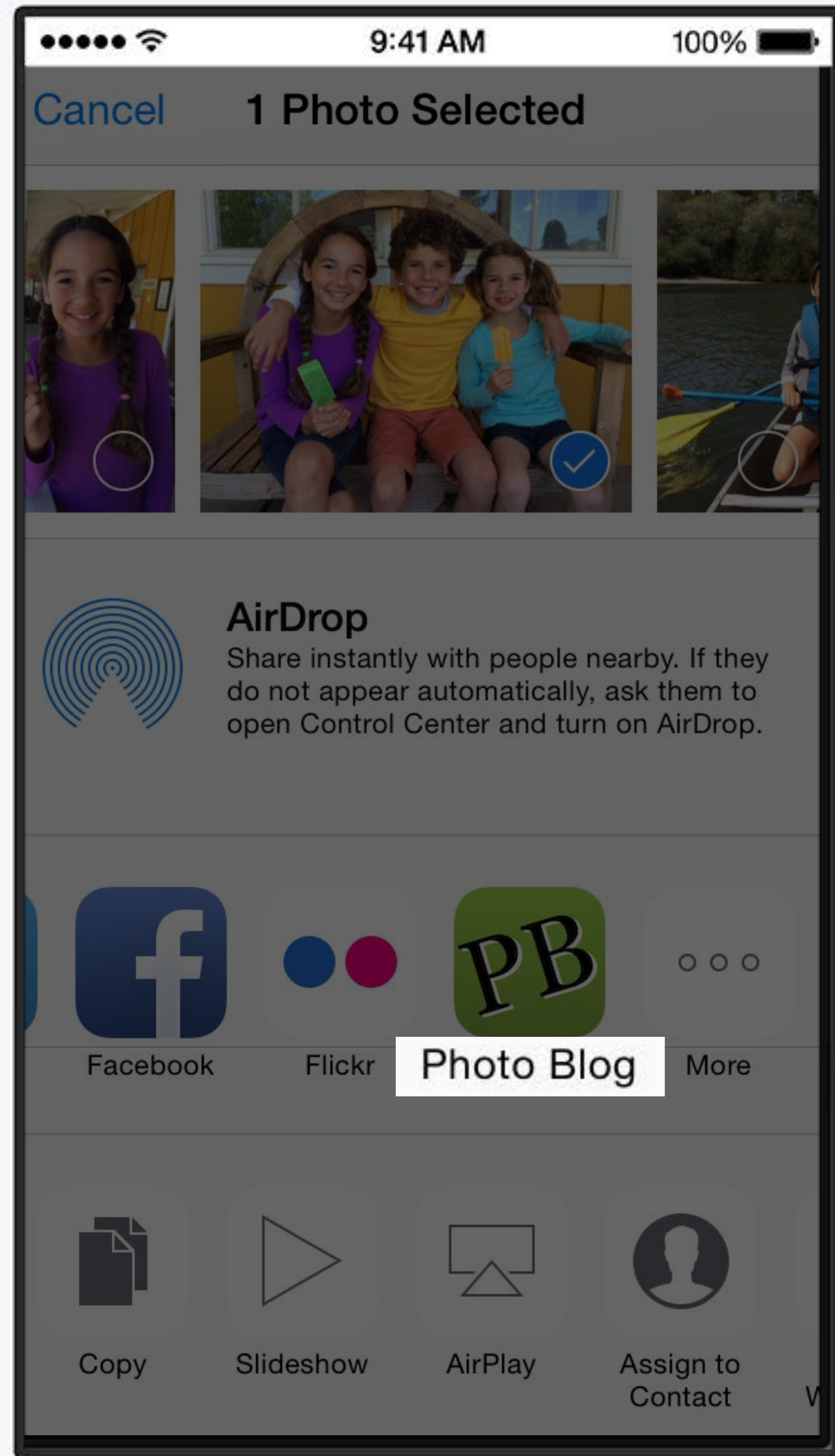
Signal completion/cancellation

Display Name

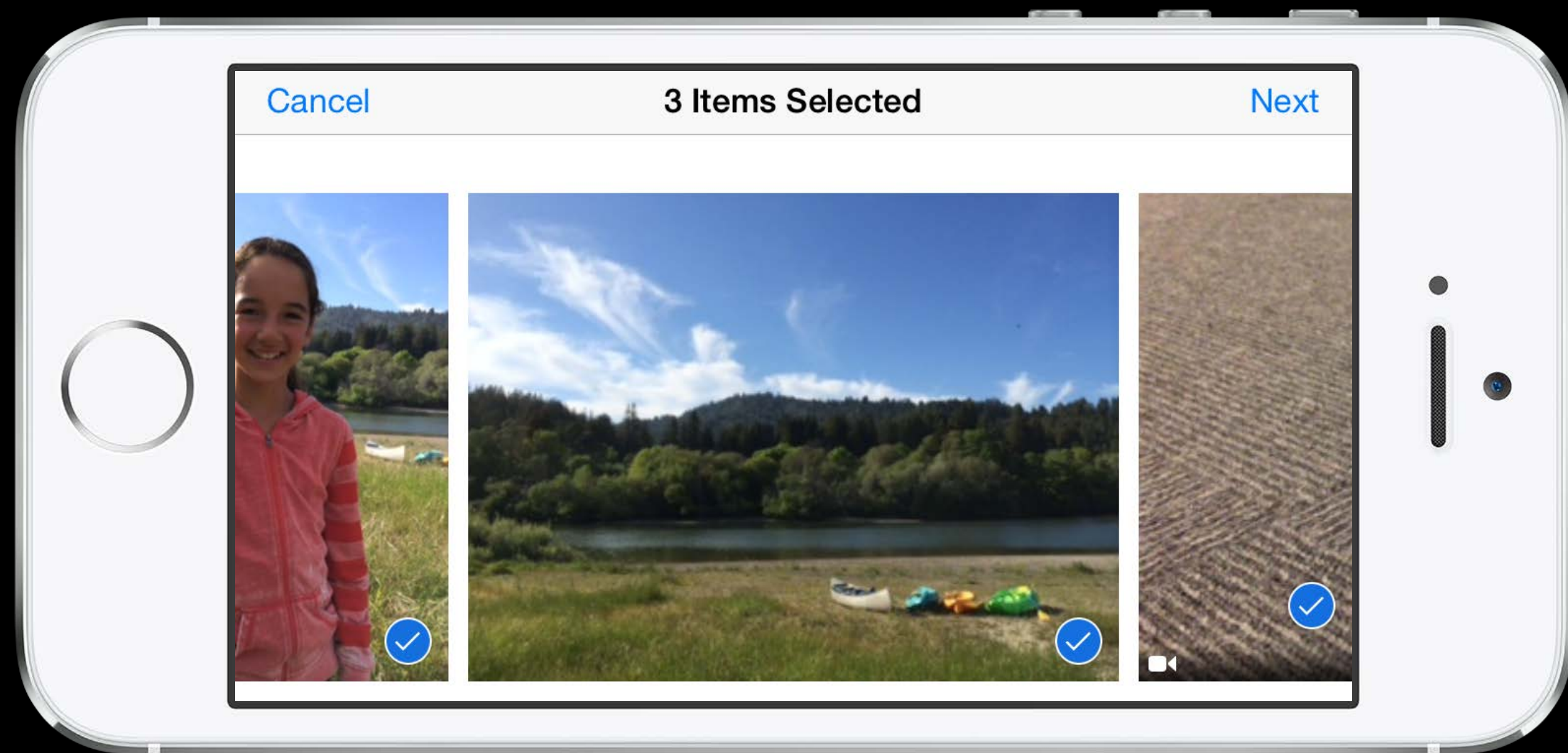


Display Name

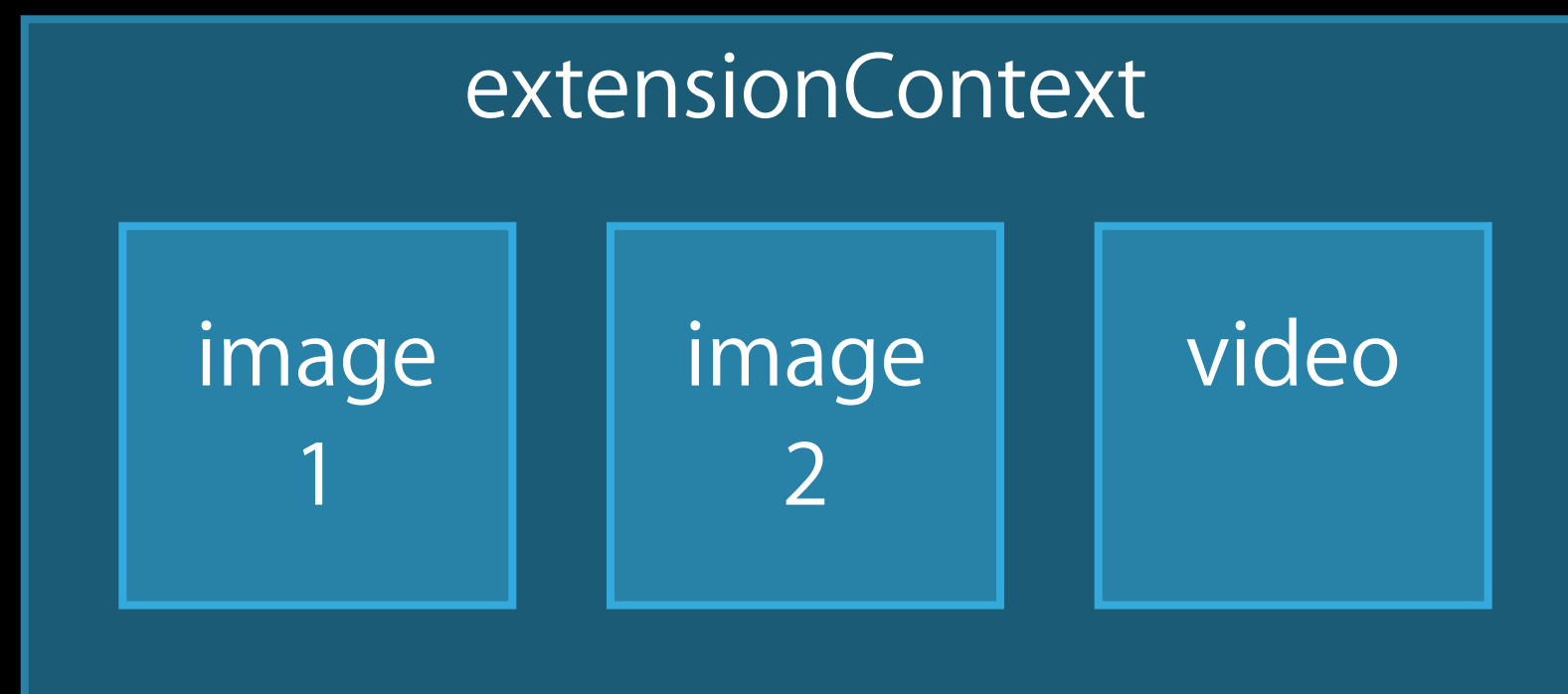
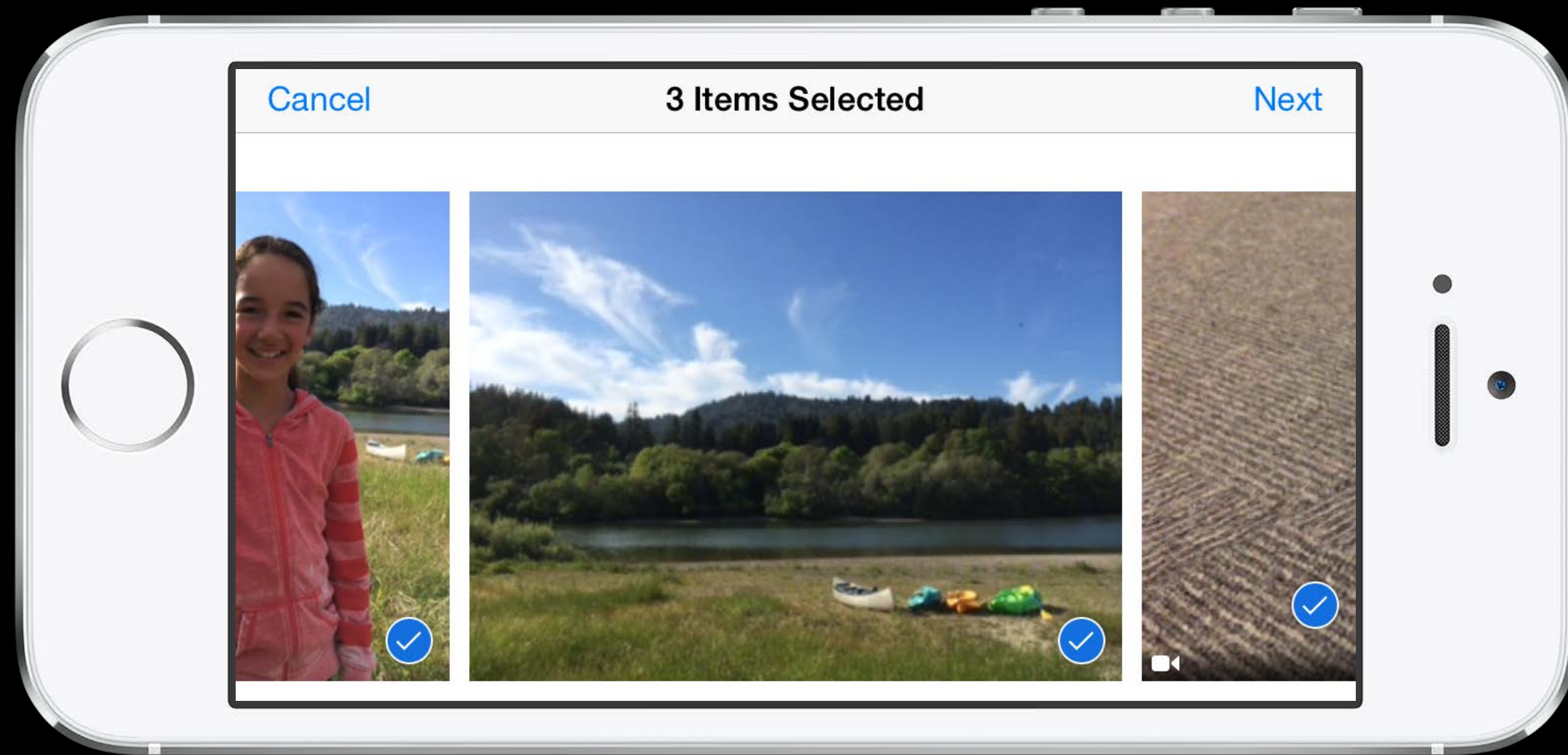
CFBundleDisplayName



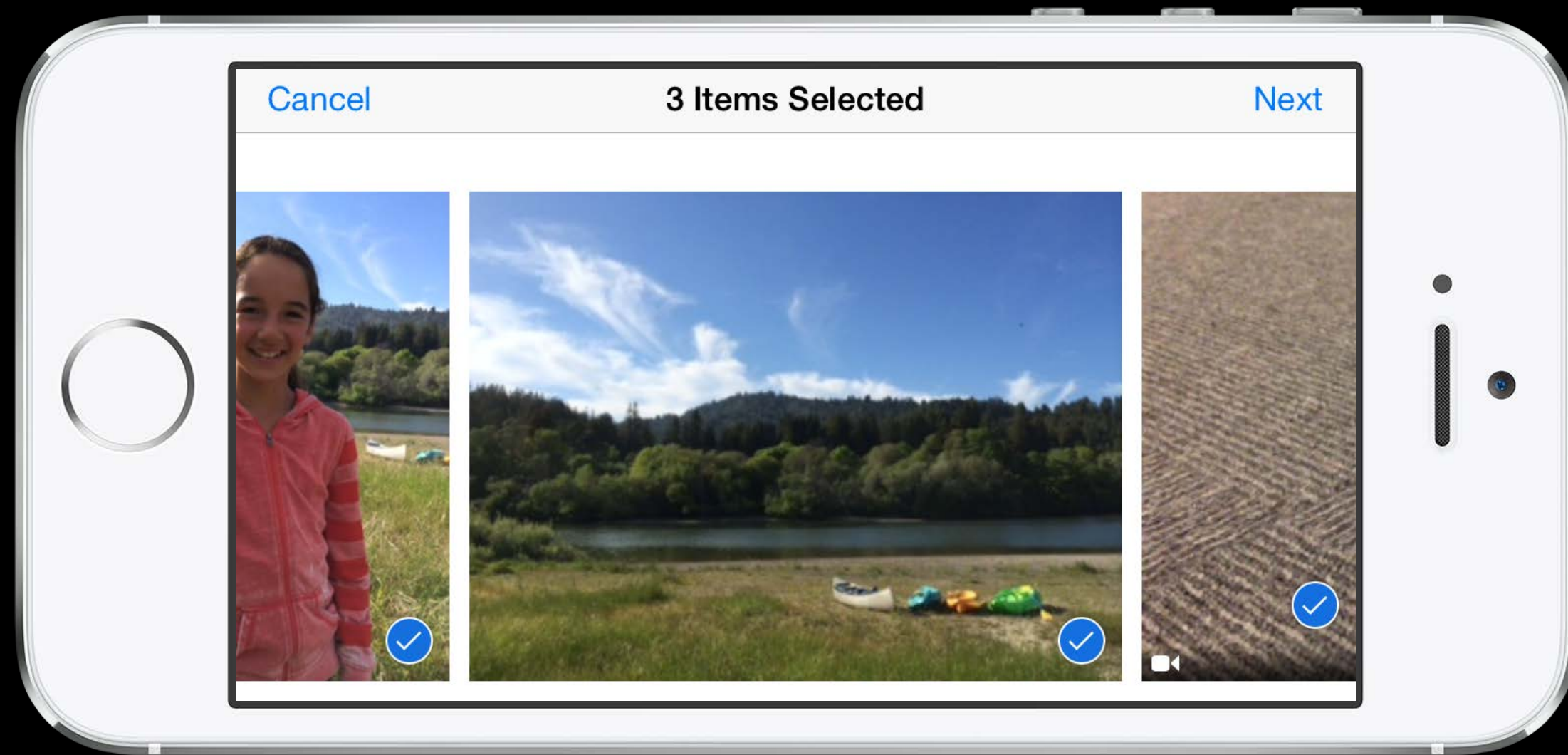
Activation Rules



Activation Rules



Activation Rules



Social Network
Extension



Photo Sharing
Extension

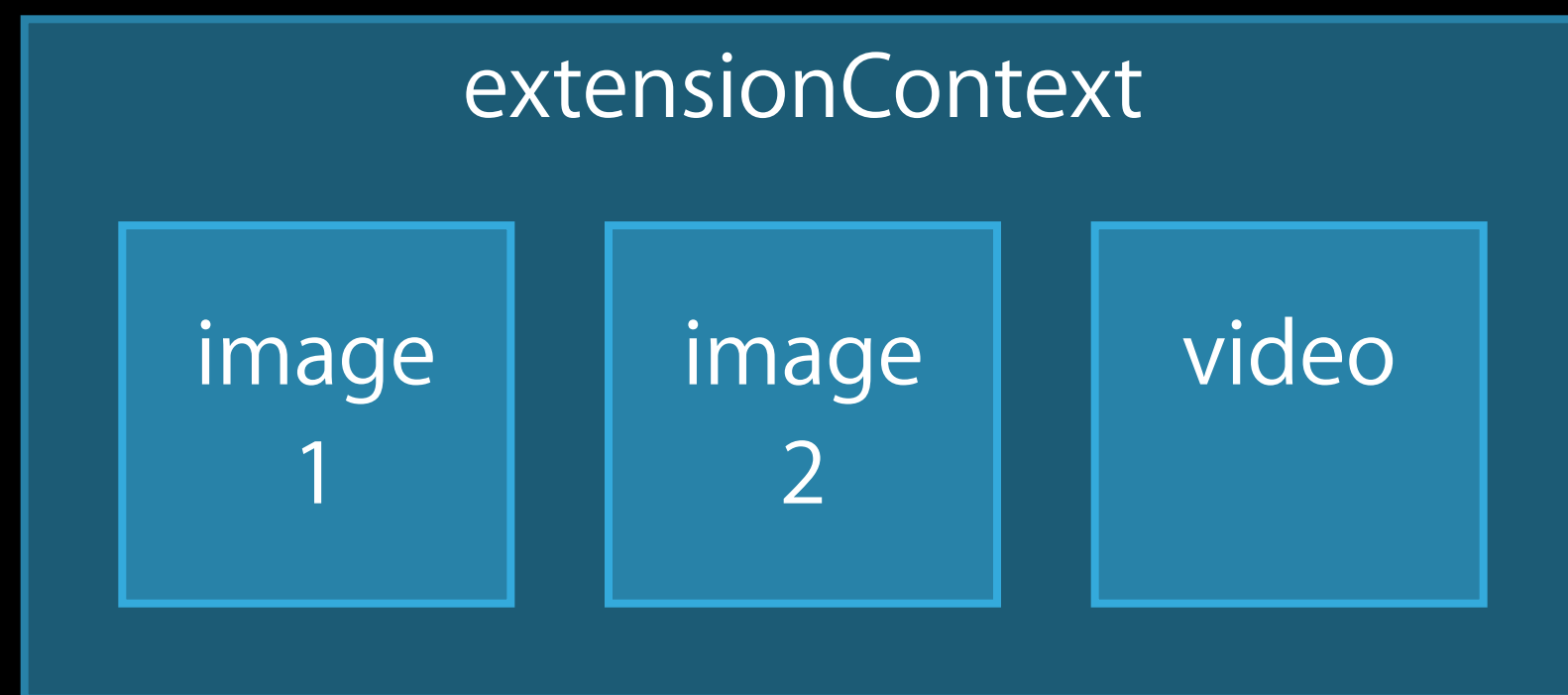
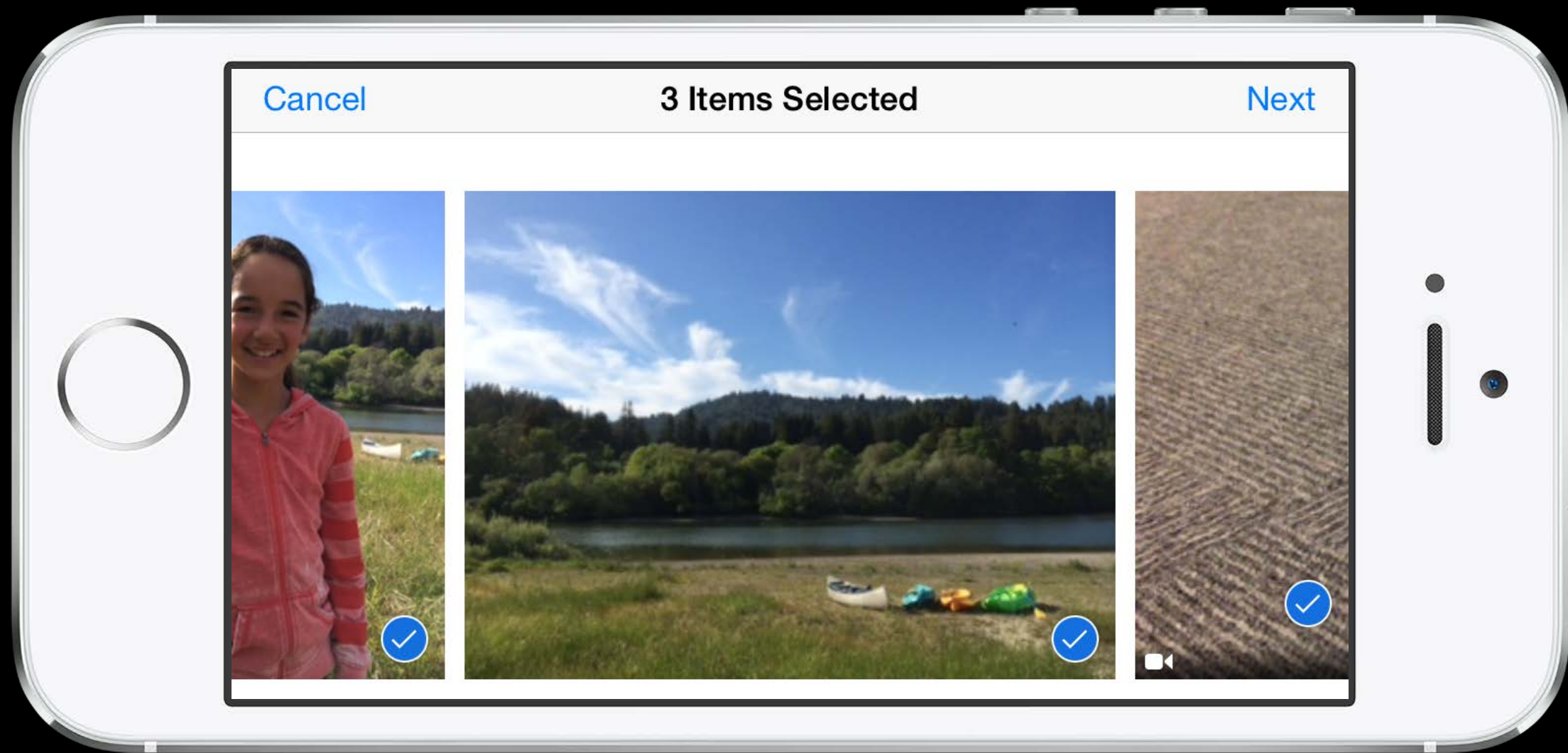


Microblog
Extension



Video Sharing
Extension

Activation Rules



???



Social Network Extension



Photo Sharing Extension



Microblog Extension



Video Sharing Extension

Activation Rules

Predicate

▼ NSExtension	↕	Dictionary	(4 items)
▼ NSExtensionAttributes		Dictionary	(1 item)
NSExtensionActivationRule		String	SUBQUERY(extensionItems, \$extensionItem, SUBQUERY(\$exter

Activation Rules

Predicate

▼ NSExtension	↕	Dictionary	(4 items)
▼ NSExtensionAttributes		Dictionary	(1 item)
NSExtensionActivationRule		String	SUBQUERY(extensionItems, \$extensionItem, SUBQUERY(\$exter

```
SUBQUERY(extensionItems, $extensionItem,  
SUBQUERY($extensionItem.attachments, $attachment, ANY  
$attachment.registeredTypeIdentifiers UTI-CONFORMS-TO "public.image").@count  
== 1).@count == 1 OR SUBQUERY(extensionItems, $extensionItem,  
SUBQUERY($extensionItem.attachments, $attachment, ANY  
$attachment.registeredTypeIdentifiers UTI-CONFORMS-TO "com.adobe.pdf").@count  
== 1).@count == 1
```

Activation Rules

Condensed rules

▼ NSExtension	↕	Dictionary	(4 items)
▼ NSExtensionAttributes		Dictionary	(1 item)
▼ NSExtensionActivationRule		Dictionary	(6 items)
NSExtensionActivationSupportsText		Boolean	YES
NSExtensionActivationSupportsImageWithMaxCount		Number	10
NSExtensionActivationSupportsVideoWithMaxCount		Number	1
NSExtensionActivationSupportsFileWithMaxCount		Number	0
NSExtensionActivationSupportsWebURLWithMaxCount		Number	1
NSExtensionActivationSupportsWebPageWithMaxCount		Number	0

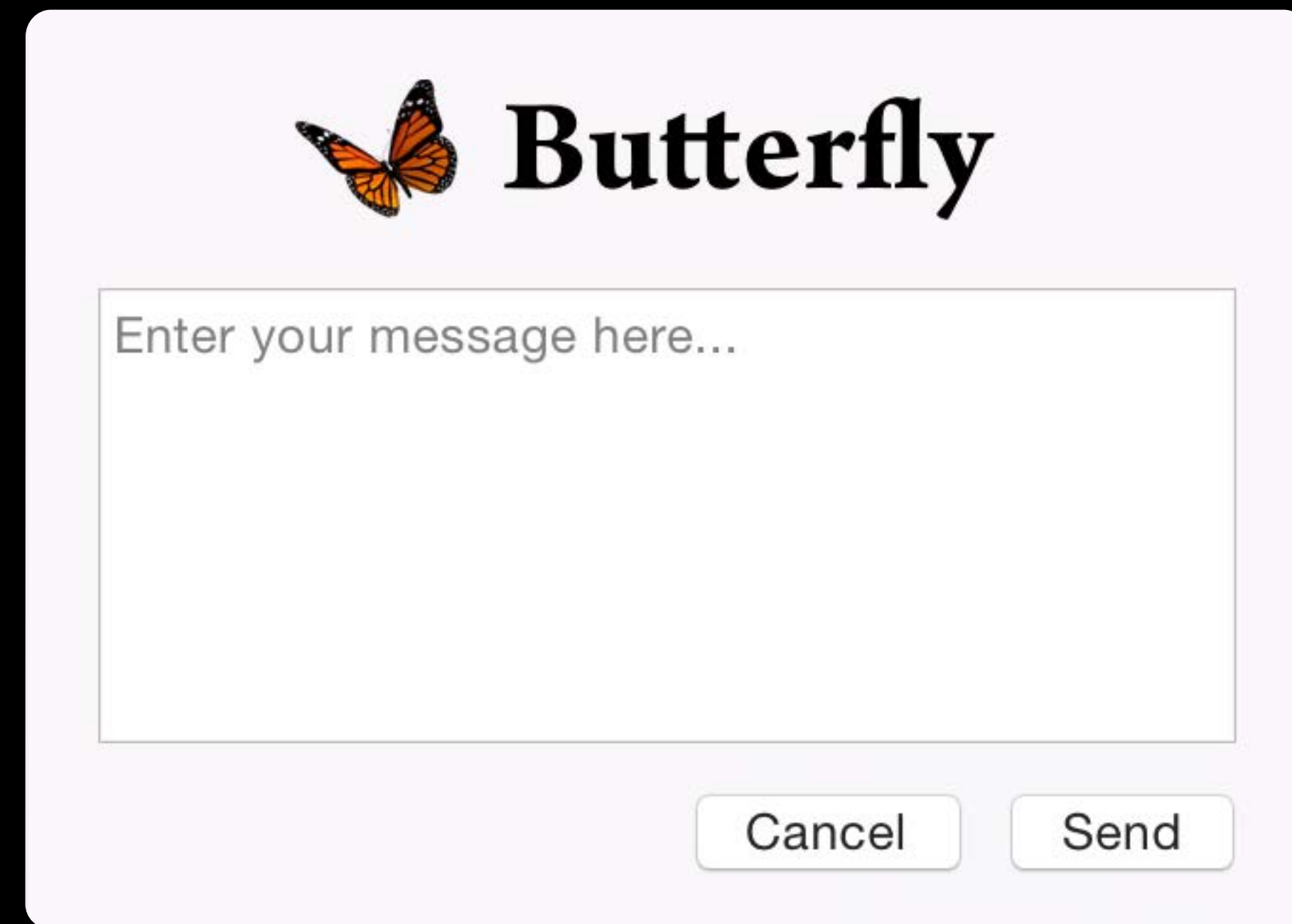
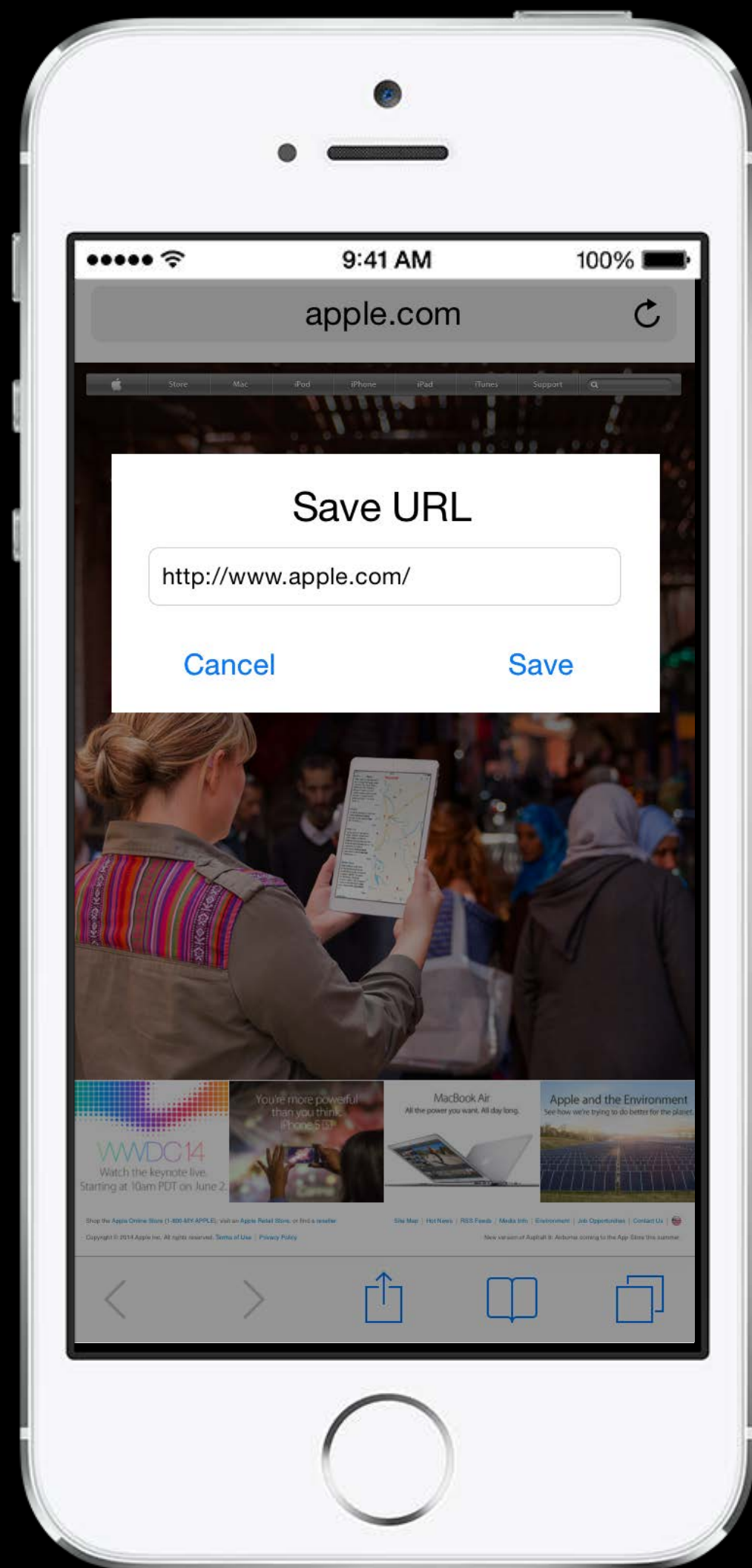
Activation Rules

Web content

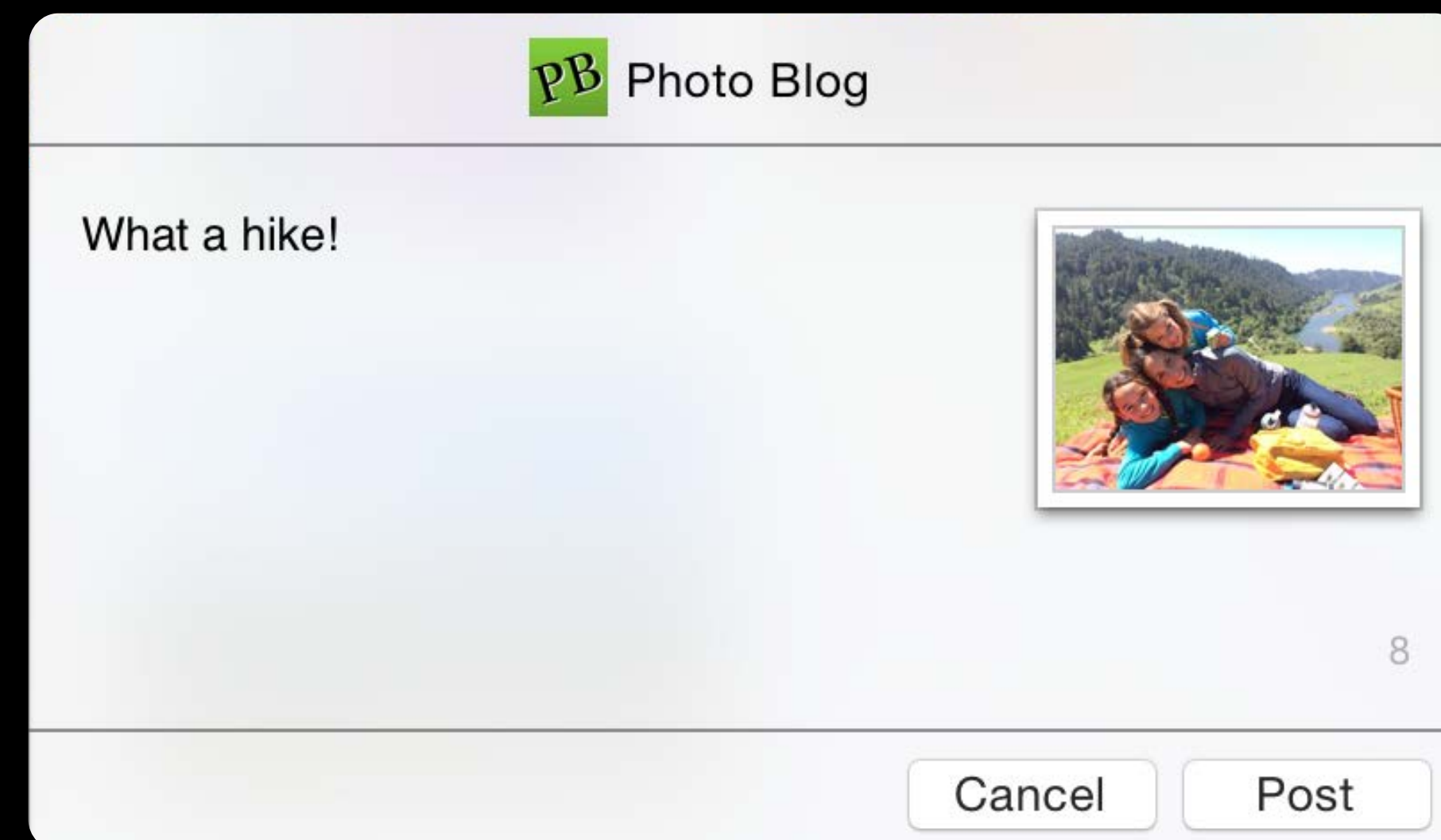
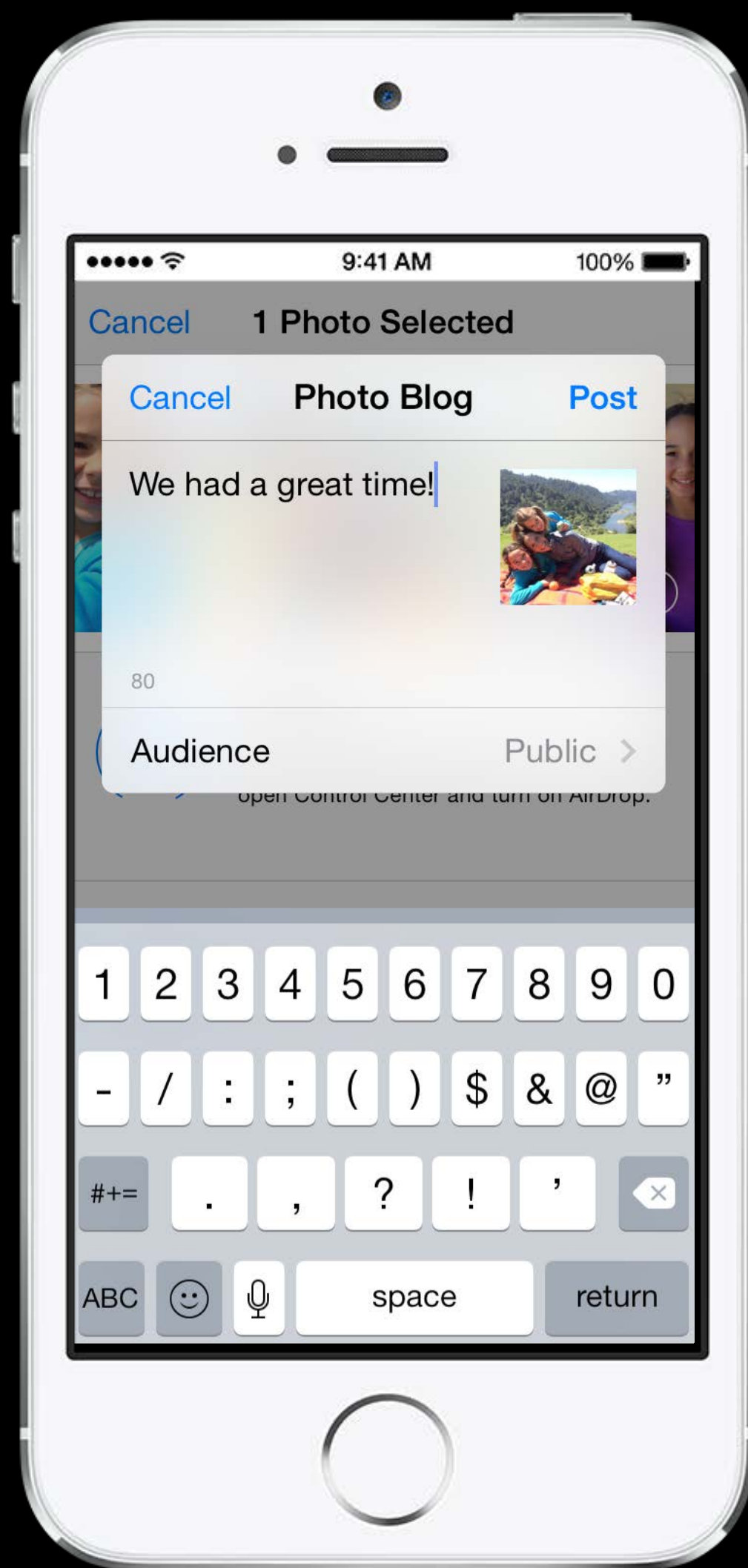
`NSExtensionActivationSupports`[WebURL](#)`WithMaxCount`

`NSExtensionActivationSupports`[WebPage](#)`WithMaxCount`

Implement Your ViewController subclass UI/NSViewController



Implement Your ViewController subclass SLComposeServiceViewController



Upload

NSURLSession

```
- (void)didSelectPost {
    NSString *confName = @"com.example.photouploader.backgroundconfiguration";
    NSURLSessionConfiguration *conf =
        [NSURLSessionConfiguration backgroundSessionConfiguration:confName];

    NSURLSession *session = [NSURLSession sessionWithConfiguration:conf
        delegate:self delegateQueue:nil];

    NSURLRequest *request = [self requestForExtensionItems];
    NSURLSessionUploadTask *upload = [session uploadTaskWithStreamedRequest:request];
    [upload resume];

    [self.extensionContext completeRequestReturningItems:nil completionHandler:nil];
}
```

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- (void)didSelectPost {
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    [upload resume];

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```


Completion

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- (void)didSelectPost {
    NSString *confName = @"com.example.photoblog.backgroundconfiguration";
    NSURLSessionConfiguration *conf =
        [NSURLSessionConfiguration backgroundSessionConfiguration:confName];

    NSURLSession *session = [NSURLSession sessionWithConfiguration:conf
        delegate:self delegateQueue:nil];

    NSURLRequest *request = [self requestForExtensionItems];
    NSURLSessionUploadTask *upload = [session uploadTaskWithStreamedRequest:request];
    [upload resume];

    [self.extensionContext completeRequestReturningItems:nil completionHandler:nil];
}
```

Cancellation

```
- (void)didSelectCancel {  
    NSError *error = [NSError errorWithDomain:NSCocoaErrorDomain  
                                code:NSUserCancelledError userInfo:nil];  
    [self.extensionContext cancelRequestWithError:error];  
}
```

Cancellation

```
- (void)didSelectCancel {  
    NSError *error = [NSError errorWithDomain:NSCocoaErrorDomain  
                                code:NSUserCancelledError userInfo:nil];  
    [self.extensionContext cancelRequestWithError:error];  
}
```

Performance

Display your Share UI quickly!

SLComposeServiceViewController

`-presentationAnimationDidFinish`

Demo

Photo blog extension

Share Extensions

SLComposeServiceViewController for standard UI

UI/NSViewController for custom UI

Activation rules

Use Background NSURLSession

Summary

Extend both iOS and OS X

Today Widgets

Share extensions

More Information

Jake Behrens

App Frameworks Evangelist

behrens@apple.com

Documentation

App Extension Programming Guide

<http://apple.com>

Apple Developer Forums

<http://devforums.apple.com>

Related Sessions

-
- Creating Extensions, Part 2 Mission Wednesday 11:30AM
-

Labs

-
- Extensions Lab Frameworks Lab A Tuesday 3:15PM
 - Extensions Lab Frameworks Lab B Thursday 2:00PM
-

 WWDC14