iOS Accessibility

Making great accessible apps

Session 122

Chris Fleizach
iOS Accessibility Team

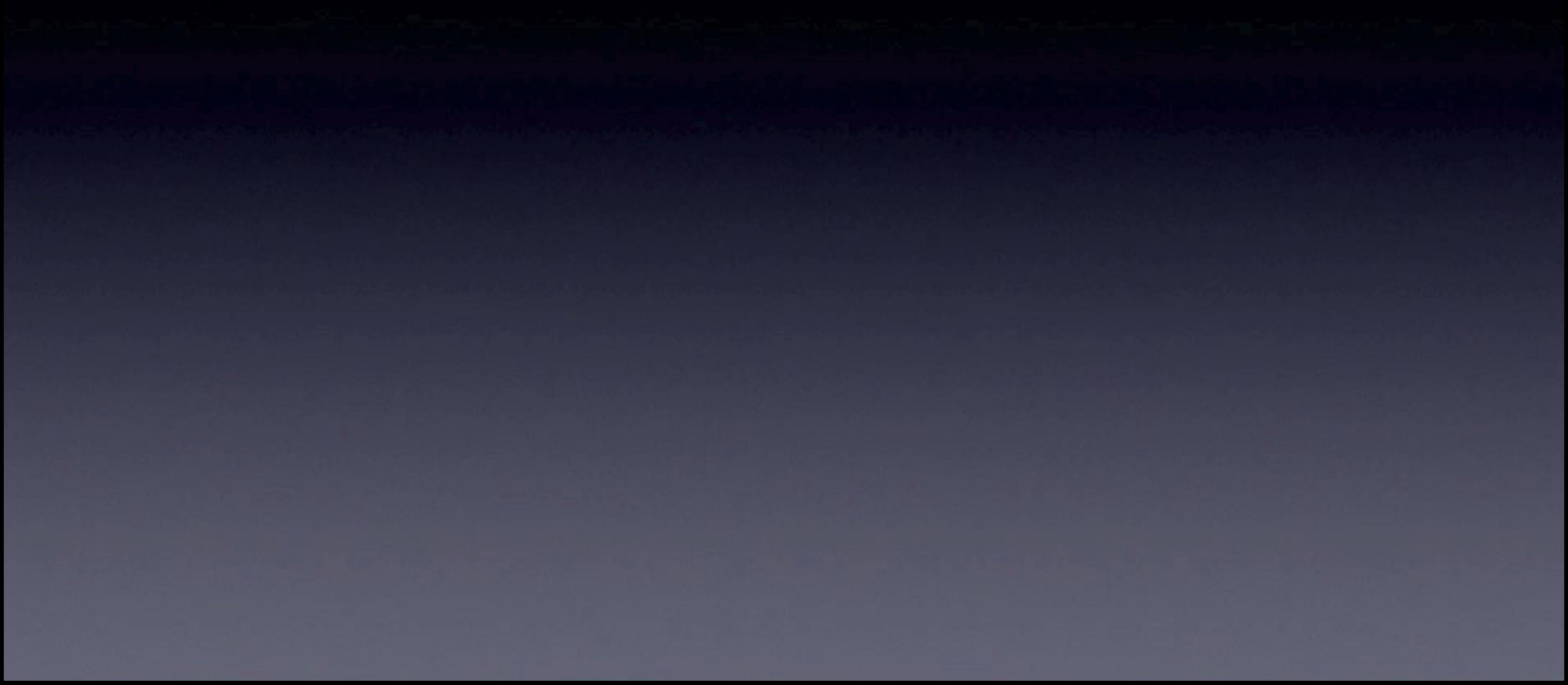
These are confidential sessions—please refrain from streaming, blogging, or taking pictures

Accessibility

- Technology creates possibility
  - Closed captioning
  - Braille displays
  - Assisted input
  - *Many others…*

Video

WearaBraille



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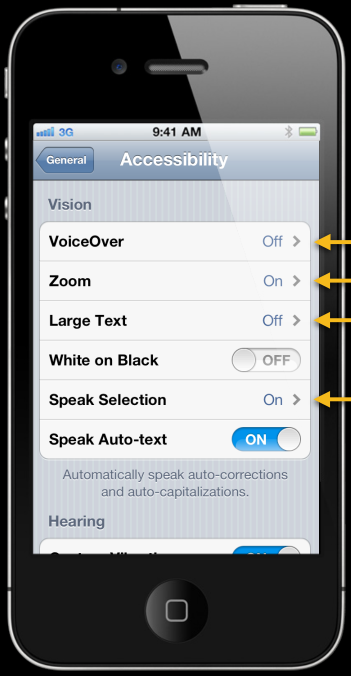
iOS Accessibility in iOS 5

- Equal access through alternative input and output
  - Low vision
  - Blindness
  - Hearing
  - Motor and physical

Accessibility Settings

Many new features in iOS 5



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General Accessibility

Vision

VoiceOver Off

Zoom On

Large Text Off

White on Black OFF

Speak Selection On

Speak Auto-text ON

Automatically speak auto-corrections and auto-capitalizations.

Hearing

VoiceOver
Screen reader for visually impaired

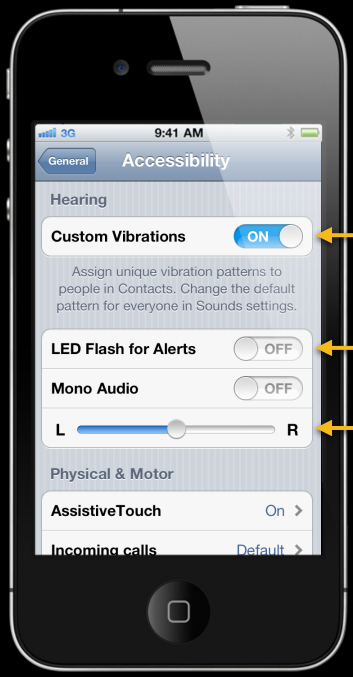
Zoom
Screen magnification

Large Text
Increase the font size in certain apps

Speak Selection
Select text and hear it spoken

Accessibility Settings

Many new features in iOS 5



Custom Vibrations ON

Assign unique vibration patterns to people in Contacts. Change the default pattern for everyone in Sounds settings.

LED Flash for Alerts OFF

Mono Audio OFF

AssistiveTouch On

Incoming calls Default

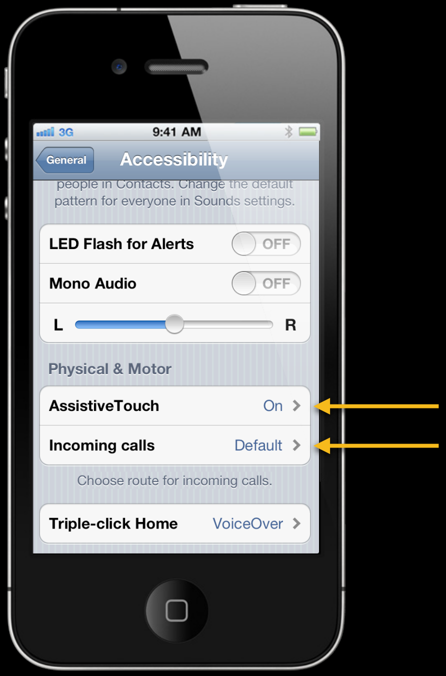
Custom Vibrations
Set custom vibrations for incoming calls

LED Flash for Alerts
Flash the camera LED on calls or alerts

Left-Right Balance
Control the balance of stereo output

Accessibility Settings

Many new features in iOS 5



people in Contacts. Change the default pattern for everyone in Sounds settings.

LED Flash for Alerts OFF

Mono Audio OFF

L R

Physical & Motor

AssistiveTouch On

Incoming calls Default

Choose route for incoming calls.

Triple-click Home VoiceOver

AssistiveTouch

Use adaptive hardware to control iOS

Route Incoming Calls

Automatically route call audio to a Bluetooth headset or the phone speaker

Demo

iOS 5 Accessibility

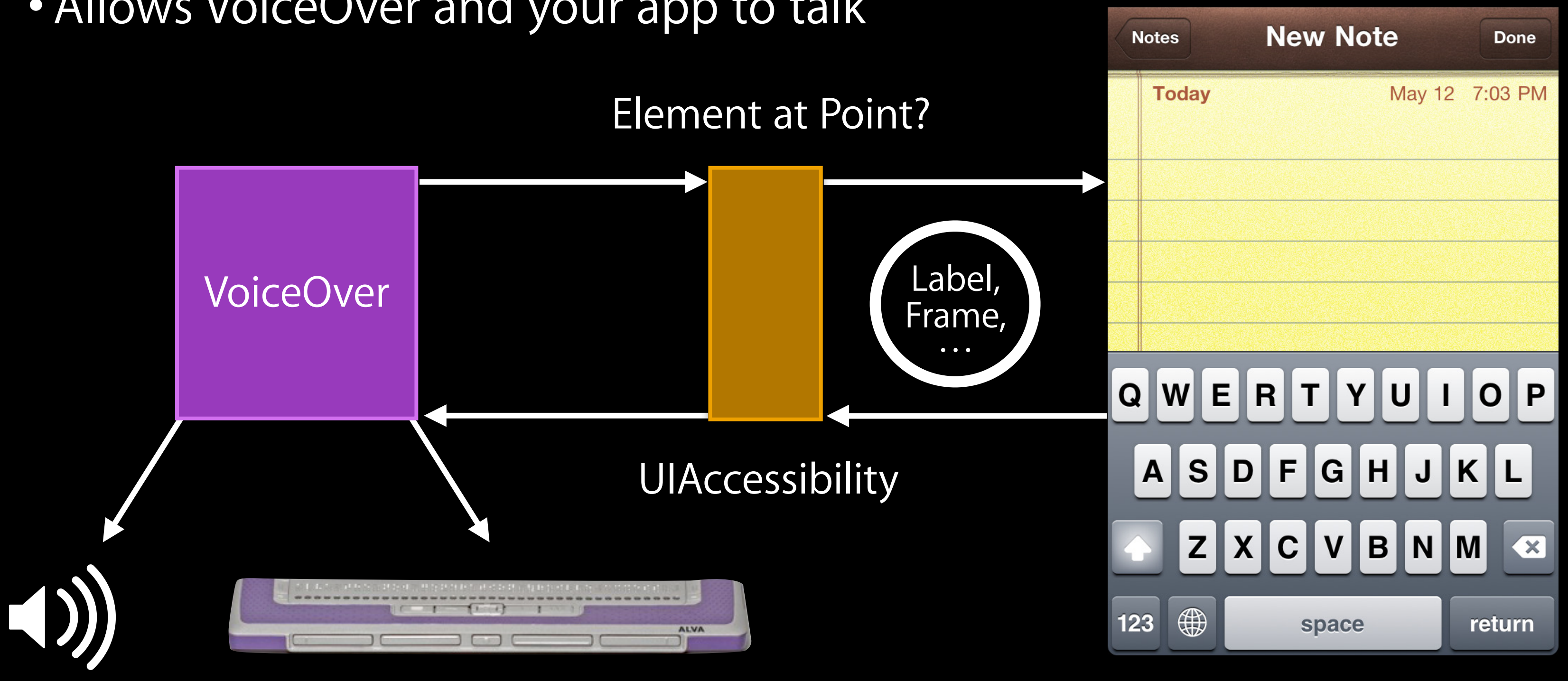
Dynamic Controls DX2 control system with iPortal

What You’ll Learn

- How to make apps accessible
  - UIAccessibility API
    - Basic
    - New
    - App-specific
- How to make accessibility apps
  - Examples
  - Tips and tricks
  - Best practices

UIAccessibility

- Allows VoiceOver and your app to talk



Element at Point?

VoiceOver

Label,
Frame,
…

UIAccessibility

Adding Accessibility to Your App

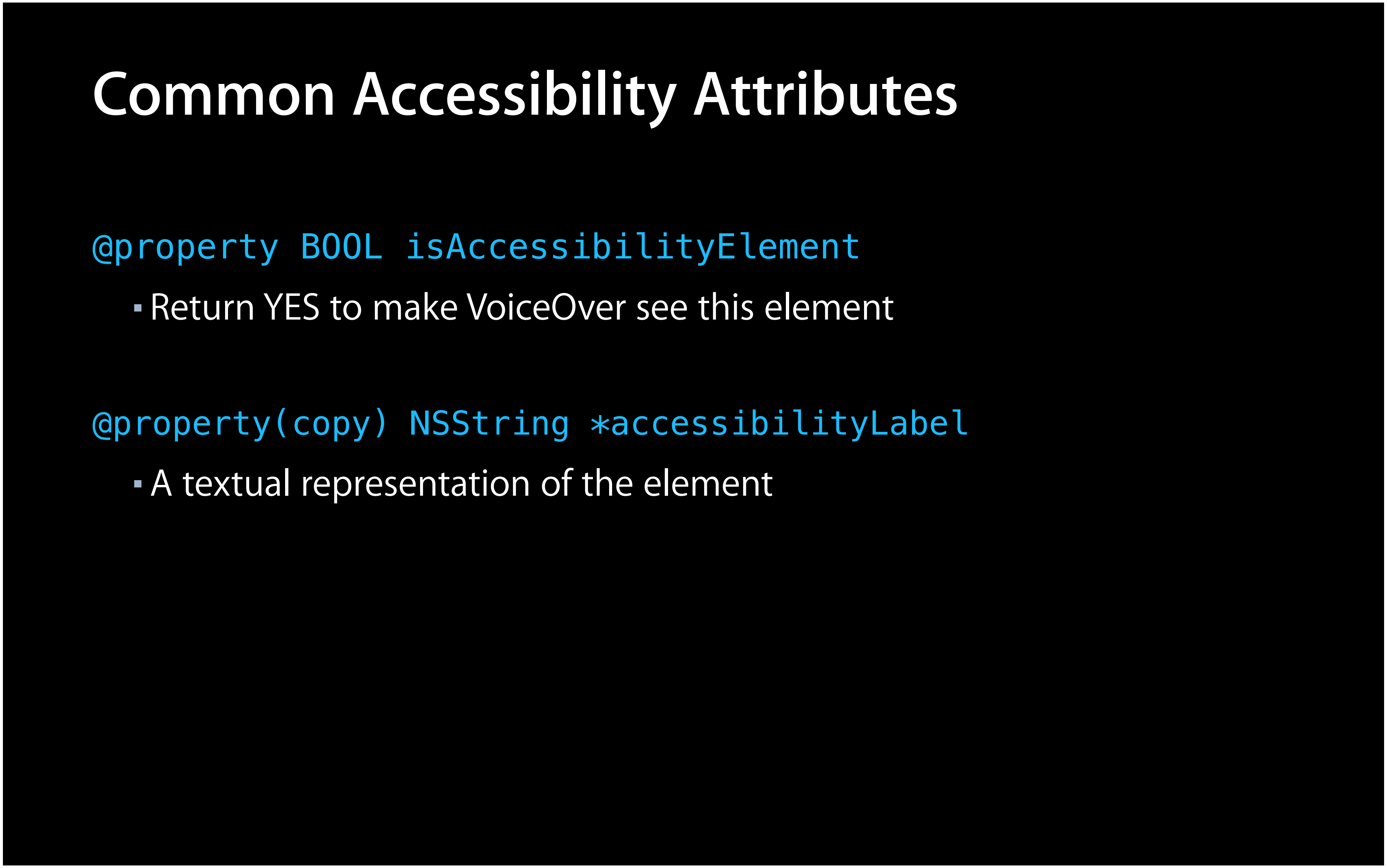
- Simple
- A lot comes for free
- Most of the time:“Just add labels”

UIAccessibility API: Attributes

- Attributes convey information
- VoiceOver transforms that information

```
UIImageView *view = [[UIImageView alloc] initWithImage:image];
view.accessibilityLabel = @”Apple Logo”;
```

“Apple Logo, Image”



Common Accessibility Attributes

```
@property BOOL isAccessibilityElement
```

- Return YES to make VoiceOver see this element

```
@property(copy) NSString *accessibilityLabel
```

- A textual representation of the element

Accessibility Attributes

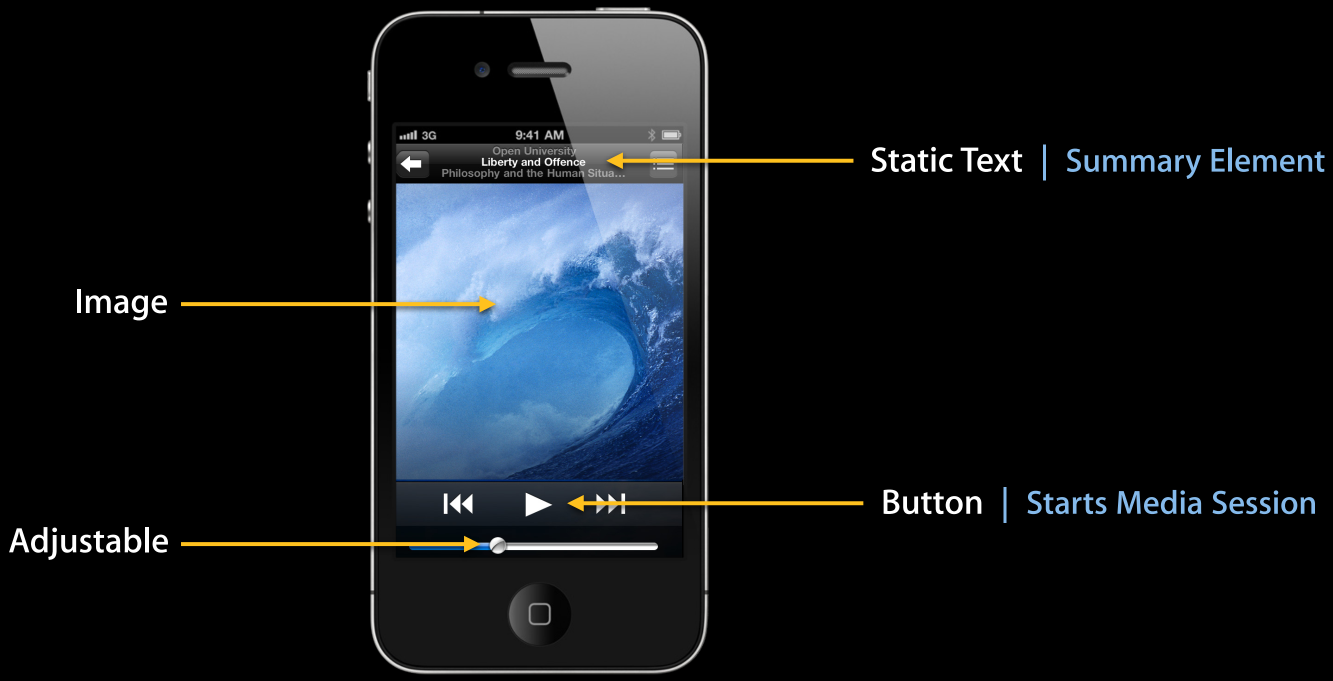
```
@property(copy) NSString *accessibilityHint
```

- Optional
- Provides more information to aid VoiceOver users

```
@property UIAccessibilityTraits accessibilityTraits
```

- Defines behavior
- Bitmask of integers

Accessibility Traits



Static Text | Summary Element

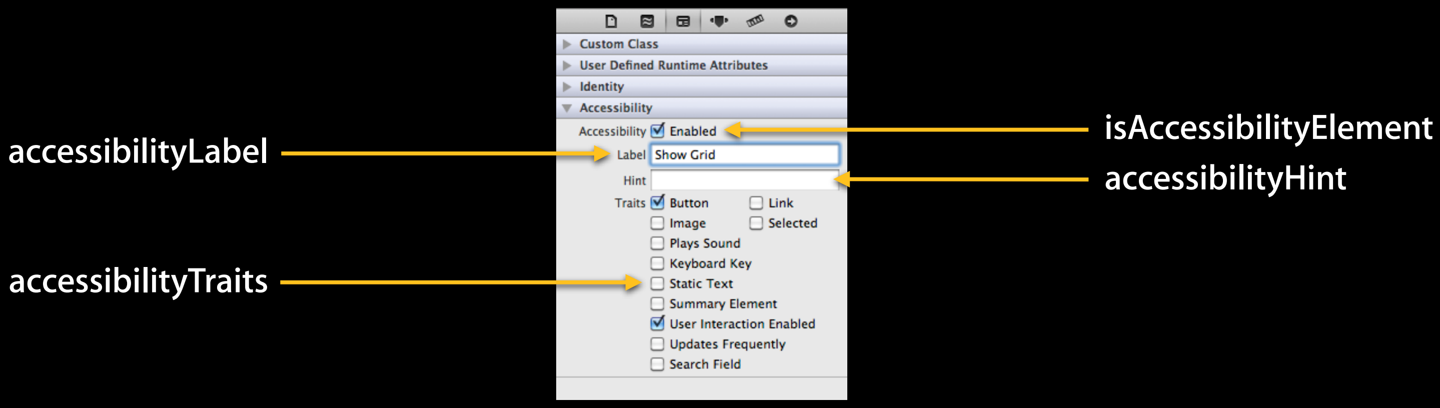
Image

Button | Starts Media Session

Adjustable

Accessibility in Interface Builder

Change static accessibility values



accessibilityLabel

accessibilityTraits

isAccessibilityElement

accessibilityHint

Accessibility ☑ Enabled

Label Show Grid

Hint

Traits ☑ Button ☐ Link
☐ Image ☐ Selected
☐ Plays Sound
☐ Keyboard Key
☐ Static Text
☐ Summary Element
☑ User Interaction Enabled
☐ Updates Frequently
☐ Search Field

Adding Accessibility in Code

If accessibility values do not change, use setters

```
- (void)awakeFromNib {

   UIControl *control = [[UIControl alloc] initWithFrame:frame];


   control.isAccessibilityElement = YES;
   control.accessibilityLabel = @"Play";


   [window addSubview:control];
   [control release];

}
```

Adding Accessibility in Code

If accessibility attributes change, override methods

```
@implementation ProductView

- (BOOL)isAccessibilityElement {
    return YES;
}

- (NSString *)accessibilityLabel {
    if (isMac())
       return @"Mac";
    else if (iPhone())
       return @"iPhone";
    ...
}
@end
```

Notifications

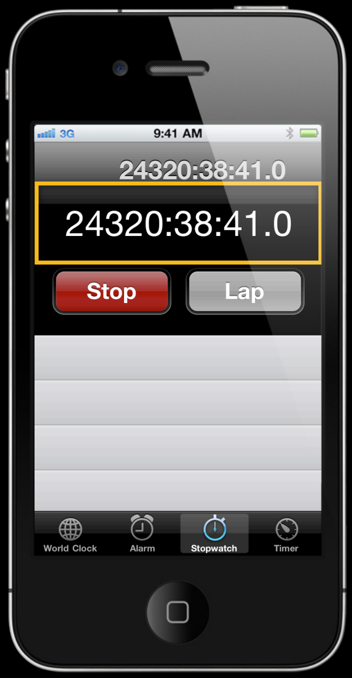
Tell VoiceOver something happened

- When a few items change, VoiceOver should “update”

```
UIAccessibilityPostNotification(
    UIAccessibilityLayoutChangedNotification,
    nil);
```

- When the screen changes, VoiceOver should “reset”

```
UIAccessibilityPostNotification(
    UIAccessibilityScreenChangedNotification,
    nil);
```



Demo

Introduction to VoiceOver and UIAccessibility

Using UIAccessibility for Greatness

- Apps can become very accessible with basic attributes
- Apps that go beyond basic controls need more power
- New API in iOS 5 solves previously hard problems

New Accessibility API

```
@property BOOL accessibilityViewIsModal
```

- Tells VoiceOver to ignore sibling views and anything inside those views

```
@property BOOL accessibilityElementsHidden
```

- Tells VoiceOver to ignore all elements contained within

New Accessibility API

```
@property CGPoint accessibilityActivationPoint
```

- The point where VoiceOver will simulate a touch event

```
- (BOOL)accessibilityPerformEscape
```

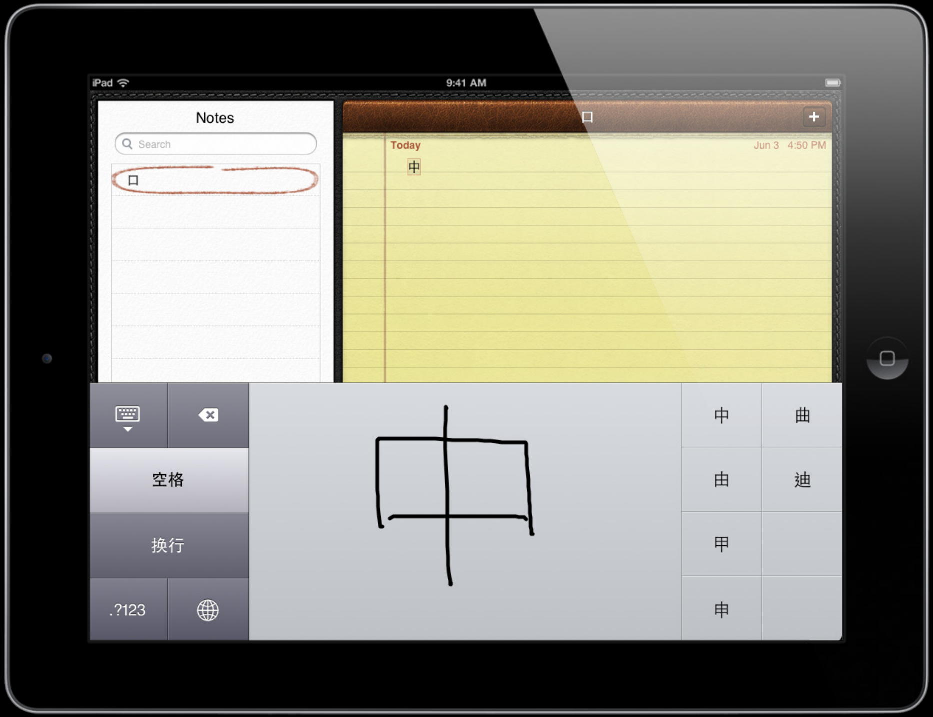
- Allows VoiceOver to cancel or exit a modal state

Demo

Using new API

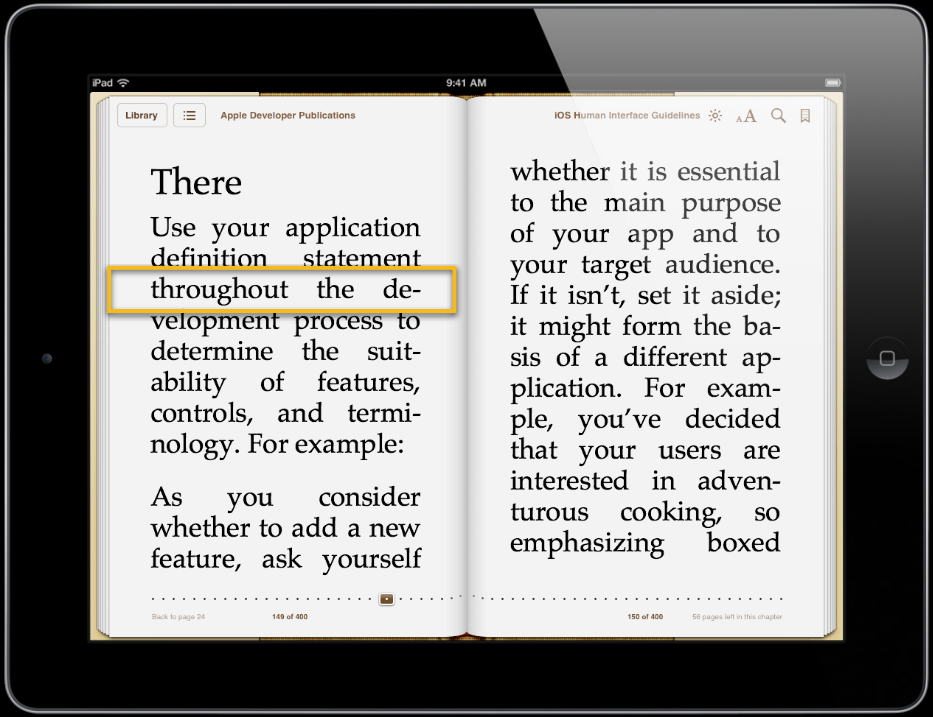
App-Specific API

- VoiceOver provides unique behavior for certain apps
  - iBooks
  - Interactive elements



Content Reading Protocol

- Used for long-form content
  - Magazines
  - News articles
  - Multipage books
- VoiceOver will:
  - Touch-to-speak line by line
  - Automatically turn pages
  - Continue reading from any line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iOS Human Interface Guidelines
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56 pages left in this chapter

There

Use your application definition statement throughout the development process to determine the suitability of features, controls, and terminology. For example:

As you consider whether to add a new feature, ask yourself whether it is essential to the main purpose of your app and to your target audience. If it isn't, set it aside; it might form the basis of a different application. For example, you've decided that your users are interested in adventurous cooking, so emphasizing boxed

UIAccessibilityReadingContent

Exposes content of a page, based on line numbers

```
- (NSString *)accessibilityPageContent
```

- Provide the content of the entire page

```
- (NSInteger)accessibilityLineNumberForPoint:(CGPoint)point
```

- Provide a line number for a point. (Point in view coordinates)

```
- (NSString *)accessibilityContentForLineNumber:(NSInteger)lineNumber
```

- Provide string for the line

```
- (CGRect)accessibilityFrameForLineNumber:(NSInteger)lineNumber
```

- Provide bounding box for the line. (Frame in screen coordinates)

Turning Pages

While reading, pages should turn automatically

- The content view returns the trait

```
- (UIAccessibilityTraits)accessibilityTraits {
     return UIAccessibilityTraitCausesPageTurn;
}
```

Turning Pages

While reading, pages should turn automatically

- Handle the page turn

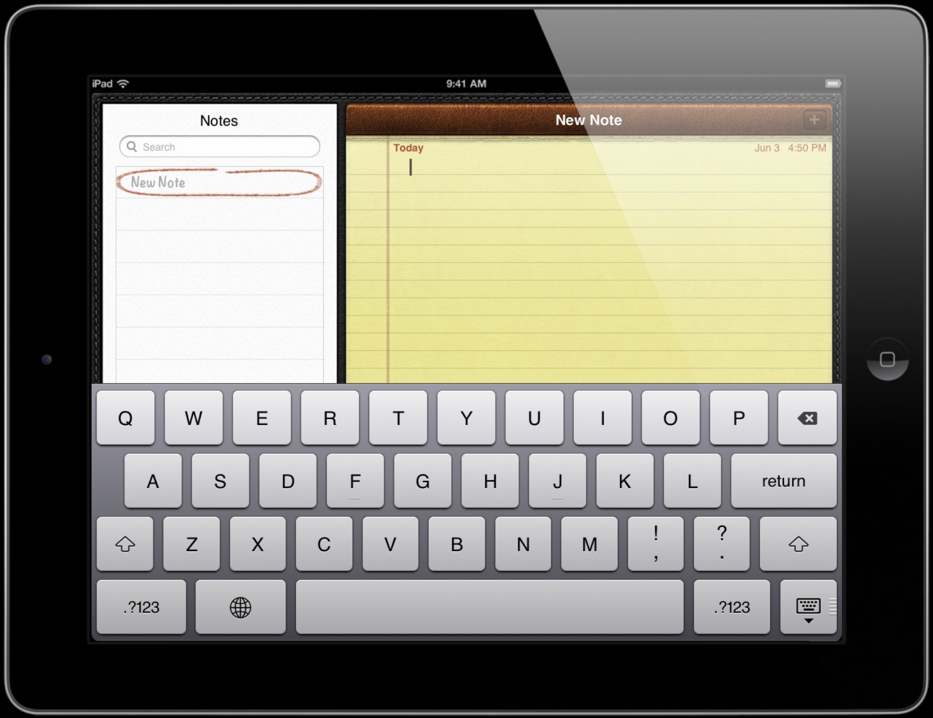
```
- (BOOL)accessibilityScroll:(UIAccessibilityScrollDirection)direction {
  if (direction == UIAccessibilityScrollDirectionNext) {

    [self turnToPage:self.currentPage+1];

    UIAccessibilityPostNotification(
        UIAccessibilityPageScrolledNotification, nil);

    return YES;
  }

  ...
```

Demo

Reading material

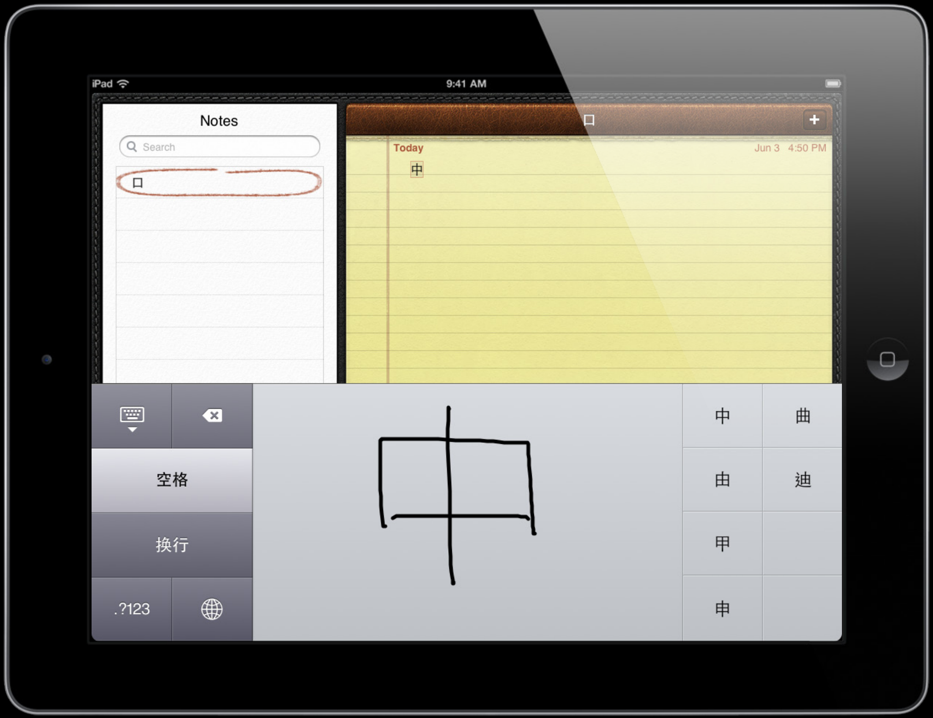
Interactivity

- VoiceOver intercepts all gestures
- Provides a safe environment for exploration



Interactivity

- This is a problem for interactive elements



Direct Interaction

`UIAccessibilityTraitAllowsDirectInteraction`

- Allows the safety net to be lifted in that region
- User can switch between exploring and interaction

Demo

Direct interaction

Accessibility Apps

- Growing market for dedicated apps
- Aid with tasks unique to users with a disability

Vision

LookTel Money Reader

Communication

Proloquo2Go

Useful API for Accessibility Apps

```
BOOL UIAccessibilityIsVoiceOverRunning()
```

- Is VoiceOver on?

```
- (void)accessibilityElementDidBecomeFocused
```

- Did VoiceOver focus move to an element?

```
UIAccessibilityAnnouncementNotification
```

- Tell VoiceOver to speak something

Best Practices

- Use short, concise labels

✓ Good: “Add city”

✗ Bad: “Adds a city to the list of cities”

Best Practices

- Don’t include the type information in the label

✓ Good: “Remove city”

✗ Bad: “Remove city button”

Best Practices

- Use localized strings for labels and hints

✓ VoiceOver works in over 30 languages

Summary

- Add accessibility
  - Increases user base
  - Great feedback from users
- Apps for users with disabilities
  - Incredible innovation awaits
  - Warms my heart

Related Sessions

Design Patterns to Simplify Mac Accessibility	Pacific Heights Thursday 3:15–4:15PM
Combining Web Accessibility and Automation on iOS	Nob Hill Friday 10:15–11:15AM

Labs

Accessibility Lab	Application Frameworks Lab B Thursday 4:30PM–6:00PM

More Information

Bill Dudney
User Experience Evangelist
dudney@apple.com

Documentation
Accessibility Programming Guideline for iPhone OS
Search on http://developer.apple.com/ for Accessibility

UIAccessibility Protocol Reference
Search on http://developer.apple.com/ for UIAccessibility

VoiceOver User Manual
http://support.apple.com/manuals/iphone

Apple Developer Forums
http://devforums.apple.com

WWDC2011