Designing Accessories for iOS and OS X

Session 700
Peter Langenfeld
Accessories Software Manager
Core OS

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

• New features in iOS 7
• New features in OS X 10.9
• Frameworks to interact with accessories
• Advances in Wi-Fi, AirPlay, Bluetooth, and Lightning connector
Health and Fitness

Home
USB Audio

• Core Audio framework
  • iOS and OS X
• USB Audio 2.0 standard
  • Input and output
• 16 bit linear PCM, 32 kHz, 44.1 kHz, and 48 kHz sampling rates required
• Multichannel audio available
• Volume synchronization available
Game Controller

• Game Controller framework
  ▪ iOS and OS X
• Standardized controls and layout
Game Controller

Extended Gamepad

Standard Gamepad
iPod Accessory Protocol (iAP)

- Media library access
- External Accessory protocol (EA)
  - Accessory app discovery and launch
- Location information
- Accessibility
  - VoiceOver
  - HID AssistiveTouch
MFi Licensing Program

Made for iPod iPhone iPad
MFi Licensing Program
MFi Licensing Program
MFi Licensing Program
MFi Licensing Program
MFi Licensing Program

• Technical information
• Components
• Tools
• Product certification
• Logos and compatibility icons
## Menu of Choices

<table>
<thead>
<tr>
<th></th>
<th>Audio</th>
<th>Communication with apps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi</td>
<td>AirPlay</td>
<td>Sockets</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>A2DP</td>
<td>External Accessory</td>
</tr>
<tr>
<td>Bluetooth 4.0 Low Energy</td>
<td>MFi hearing aids</td>
<td>Core Bluetooth</td>
</tr>
<tr>
<td>Thunderbolt</td>
<td>PCI Express</td>
<td>PCI Express</td>
</tr>
<tr>
<td>Lightning</td>
<td>USB audio</td>
<td>External Accessory</td>
</tr>
<tr>
<td>USB</td>
<td>USB audio</td>
<td>USB Device Interfaces</td>
</tr>
</tbody>
</table>
Wireless
Wi-Fi

• Software
  ▪ Networking sockets and ports available to all apps
  ▪ Bonjour services available to all apps

• Hardware
  ▪ Wi-Fi Alliance certification
  ▪ Dual-band operation
  ▪ Quality of Service Wireless Multimedia (WMM)
  ▪ IPv6 vs IPv4
Bonjour

• Zero configuration networking protocol suite
• Friendly name
  ▪ No IP address or URL needed for customer interaction
• Network service discovery
  ▪ Show only the devices you care about based on the functions provided
• mDNSResponder project
  ▪ http://www.macosforge.org/post/new-bonjour-releases/
Configuring Wi-Fi Accessories

• Wi-Fi information sharing
Configuring Wi-Fi Accessories

• Wi-Fi information sharing
• Wouldn’t it be nice if there was another way?
• A Wi-Fi only methodology
Configuring Wi-Fi Accessories
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Configuring Wi-Fi Accessories
AirPlay Audio
AirPlay Audio

• Enable Wi-Fi accessories to accept AirPlay audio streams
AirPlay Audio

• Enable Wi-Fi accessories to accept AirPlay audio streams
• AirPlay audio available for implementation on platform of choice
• AirPlay product definition, feature set, compliance, and certification programs all remain unchanged
Bluetooth Update

Brian Tucker
Manager, Wireless Software Engineering
451% increase in listed Bluetooth stereo speakers
451% increase in listed Bluetooth stereo speakers

Over 1 billion BLE total devices to ship by 2013
451% increase in listed Bluetooth stereo speakers

Over 1 billion BLE total devices to ship by 2013

Every major mobile OS manufacturer now supports BLE
Healthcare
Healthcare

- Huge growth seen in BLE based health care accessories
  - Quantified Self, i.e.: Blood Glucose, Heart Rate, etc.
  - Keeping Patient and Doctor connected
Healthcare

• Huge growth seen in BLE based health care accessories
  ▪ Quantified Self, i.e.: Blood Glucose, Heart Rate, etc.
  ▪ Keeping Patient and Doctor connected

• New Apple-designed Hearing Aid audio transport
  ▪ Integrated into iOS 7
  ▪ Used for both audio and data
Improved CoreBluetooth Backgrounding to make even better accessories

- App Preservation and Restoration
Sports and Fitness

Fitbit FLEX
Sports and Fitness

Fitbit FLEX  
Adidas Smart Ball
Sports and Fitness

- Fitbit FLEX
- Adidas Smart Ball
- 94Fifty Basketball
Sports and Fitness

• Long term accessory interaction
• iOS 7 CoreBluetooth App Preservation and Restoration

Fitbit FLEX
Adidas Smart Ball
94Fifty Basketball
Security

Kwikset Kevo
Security

Kwikset Kevo

Lockitron
Security

- Kwikset Kevo
- Lockitron
- August Smart Lock
iOS 7 CoreBluetooth State Preservation and Restoration is a perfect match for security use cases
Healthcare
Sports and Fitness
Security
Automation
Entertainment
Toys
Pay Systems
Time Services
Proximity
Entertainment
Entertainment

• Game Controllers
Entertainment

• Game Controllers
• Keyboards
Entertainment

• Game Controllers
• Keyboards
• Remotes
Entertainment

• Game Controllers
• Keyboards
• Remotes
• iOS 7 now natively supports HID over BLE accessories in iOS 7
Proximity
Proximity

• Security
Proximity

• Security
• Advertising
Proximity

• Security
• Advertising
• Location Services
Proximity

• Security
• Advertising
• Location Services
• Points of Interest
Proximity

• Security
• Advertising
• Location Services
• Points of Interest
• Native iOS to iOS BLE-based proximity services in iOS 7 through CoreLocation
<table>
<thead>
<tr>
<th>Industry</th>
<th>Image</th>
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<tbody>
<tr>
<td>Healthcare</td>
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What’s New in iOS 7

• CoreBluetooth App Preservation and Restoration
• BLE-based Proximity services
• iOS Hosted BLE profiles
  - HID over BLE
  - Alert notification
• Hearing Aid support
State of OS X Bluetooth
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<thead>
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<tr>
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<td>DUN 1.1</td>
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<td>File Transfer Protocol</td>
<td>FTP 1.1</td>
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<td>Object Push Profile</td>
<td>OPP 1.1</td>
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<td>Human Interface Device Profile</td>
<td>HID 1.1</td>
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<td>Headset Profile</td>
<td>HSP 1.0</td>
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### Bluetooth Low Energy

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<th>Role</th>
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<td>Low Energy Central Role</td>
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<td><strong>Low Energy Peripheral Role</strong></td>
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State of iOS Bluetooth
# State of iOS Bluetooth

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</tr>
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</tr>
<tr>
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</tr>
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</tr>
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<td>Device ID Profile</td>
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<tbody>
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</tr>
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</tr>
<tr>
<td>Audio Video Remote Control Profile</td>
<td>HID over GATT Profile</td>
</tr>
<tr>
<td>Human Interface Device Profile</td>
<td>Alert Notification Service</td>
</tr>
<tr>
<td>Personal Area Networking</td>
<td>Apple Notification Center Service</td>
</tr>
<tr>
<td>Device ID Profile</td>
<td>Current Time Service</td>
</tr>
<tr>
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<td></td>
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</tbody>
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**Custom**

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<th></th>
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Wired

Edwin Foo
iOS Accessories Engineering
Thunderbolt

• High speed data and high resolution video on one cable
• PCI Express and DisplayPort protocol
• Dual-channel, bi-directional 10 Gbps per port
• Up to 10 W for bus powered devices
• 20 times faster than USB 2.0 and up to 12 times faster than FireWire 800
• Daisy chain up to six devices per port
Thunderbolt

• Certification program ensures high quality devices
• Refer to Thunderbolt Device Driver Programming Guide on Apple website
USB 3.0

• Most Macs ship with USB 3.0 ports
• 900 mA power per port for device power and charging
• Up to 5 Gb/s of data throughput
• High performance storage devices should use UAS
• USB-IF certification recommended
Lightning

• Digital
• Reversible
• Positive insertion/removal
• Bi-directional power
• Data
  - USB Host Mode (Audio/MIDI, HID, iAP)
  - USB Device Mode (Audio, iAP)
  - Serial (iAP)
Headphone Remote and Mic

- Apps can receive remote control events
- Standardized microphone
Game Controller

• Game Controller framework
• iOS 7 and OS X 10.9
• Consistent control layouts
• Transport agnostic
• Prototypes in lab
• Additional Information
  - MFi Accessory Interface Specification
More Information

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Mark Tozer-Vilchez
Desktop Technologies Evangelist
tozer@apple.com
More Information

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

Developer Technical Support
http://developer.apple.com/support/technical/
<table>
<thead>
<tr>
<th>Session</th>
<th>Location</th>
<th>Date and Time</th>
</tr>
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<tbody>
<tr>
<td>Core Bluetooth</td>
<td>Nob Hill</td>
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<tr>
<td>Integrating with Game Controllers</td>
<td>Pacific Heights</td>
<td>Tuesday 3:15PM</td>
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<td>What’s New in Kext Development</td>
<td>Russian Hill</td>
<td>Wednesday 10:15AM</td>
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<td>Presidio</td>
<td>Thursday 11:30AM</td>
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<td>Advances in AirPrint</td>
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<td>Thursday 10:15AM</td>
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<td>iOS and OS X Accessories Lab</td>
<td>Tuesday 11:30AM</td>
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</tr>
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