IBEACONS
THE COOLEST APPLE TECHNOLOGY YOU’VE NEVER HEARD OF

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twitter backchannel
#iBeaconsXW15

iOS app store apps

ear
beacondo
tartle
A Brief History

Bluetooth Beacons are a signal to an app on a person's device that it has arrived in a given location

Apple's (interim) answer to NFC

iBeacons are a subset of Bluetooth Beacons that are designed for people discovering a geographic location

Originally designed to enhance the "retail" experience

Enhances the concepts of Geofencing and Microlocations

Will also find your keys
The iBeacon Specification & Protocol

BLE Packet Payload

- **Header**
- **MAC**
- **PDU (Data)**
- **Signal Strength**

iBeacon Frame (31 Bytes Max)

- **Prefix**: 92 bit
- **Proximity UUID**: 128 bit
- **Major**: 32 bit
- **Minor**: 32 bit

"I am an iBeacon" Identifies the organization and the device class (or not)

A group of related beacons (room, object type, building)

Individual beacon in a group (iPad 23, Room code)
"iBeacons" are devices that are compatible with a protocol defined by Apple. Two modes, Peripheral and Central. Single direction, simplex broadcast. Supports smart device location awareness.

A device running an iBeacon App.
An iBeacon is a device constantly broadcasting a single Bluetooth frame.
Bluetooth Low Energy (BLE, Bluetooth Smart, Bluetooth 4)

- Very low power requirements
- Broadcasts can be periodic or continuous
- Range can be specified
- Not affected by "noisy" Wifi
- Highly robust, low bandwidth
- Advertising & Communication (iBeacons are only Advertising)

Supporting OSes:
- iOS 5+
- Windows Phone 8.1
- Windows 8+
- Android 4.3+
- BlackBerry 10
- Linux 3.4+
- Unison OS 5.2
- Apple Watch OS
- OS X
So an iBeacon is:

A Bluetooth Low Energy device running in Central Mode

A simple protocol running on top of a standard Bluetooth 4.0 transmission

Detectable by any Bluetooth 4 compliant device

Set to Advertise only, no data exchange takes place

Designed to support location specific activities where GPS is impractical, three range modes (far, near and touching)

Integrated into iOS 7+
Example iBeacon Frames

**Prefix**
I Am An iBeacon 0201061AFF4C000215

**UUID (Proximity)**
I am an Estimote B9407F30-F5F8-466E-AFF9-25556B57FE6D

**Major**
I Am On A Fridge 00–0f

**Minor**
Specifically I Am On Fridge 23 00–23

Whiteware Discovery App!
iOS 7, 8 and iBeacons

App can register iBeacons to watch out for. iOS will post a notification when it encounters (or leaves) a known beacon.

Tapable buttons on the lock screen take you directly to your App.
A BLE Compliant device operates in one of these modes:

- **Peripheral (client)**
- **Central (server)**

A Central device *has* data, a Peripheral *wants* data.
Popular iBeacons

**Tile**
- [http://thetileapp.com](http://thetileapp.com)
- No battery
- App/Beacon Combo
- Notifies on entry/exit

**Gemtot**
- [http://passkit.com](http://passkit.com)
- Can broadcast multiple UUID/Maj/Min services
- Programmable
- Online
- Customisation

**Etimote Stickers**
- [http://estimote.com](http://estimote.com)
- Colourful
- Concealable
- Great Free SDK

**App/Beacon Combo**
- Notifies on entry/exit

**Can broadcast multiple UUID/Maj/Min services**

**Programmable**

**Online**

**Customisation**

**App creation**
Classroom Use
Cases
Monitoring entry and exit to a location. How many iPads have been removed from a room? Were they all returned?

Auto-configure a device for the use case in a specific classroom.

Space discovery app. Helping students understand which area of a library or laboratory they're in.

School map for visitors and students.

Attendance information, gathering device analytics for research.

Geocaching/scavenger hunts.
Time to play with some Apps!

1) Bluetooth must be turned on
2) Location services must be turned on (Settings -> Privacy -> Location Services)
3) Passbook needs to be authorized to use Location Services
4) Background App Refresh needs to be turned on (Settings -> General -> Background App Refresh)
Our First Beacon:

Dartle

Two operating modes, can act as a Beacon or identify another Dartle beacon

Good test of hardware compatibility with BLE 4.0 and your device

Allows you to experiment with range and deciding when you want to activate your beacon
Using Dartle:

An iBeacon aware "business card" in Passbook

We'll download a "Pass" for Passbook that recognizes a Beacon (we'll use Dartle as our test Beacon)

```
"beacons" : [
  {
    "major" : 1234,
    "minor" : 5678,
    "relevantText" : "Paul Cowan is nearby",
    "altText" : "He'd love you to buy him a coffee",
    "proximityUUID" : "10F86430-1346-11E4-9191-0800200C9A66"
  }
]
```

Download the .pkpass file on your iOS device from: http://bit.ly/pcowanpass or scan this code
"near" is similar to Dartle, but allows us to also add Actions that initiate some function on the detecting (Central) device.

- **Text**: Display a message
- **URL**: Open a web page
- **Image**: Display a photo from the Camera
- **Roll**: App: Attempt to launch another App on the device
Be Here

A classroom use case

The teacher's iPad becomes a Beacon

Alerts the teacher that a student has entered the room

Allows a student to ask for help, showing the teacher a queue of student requests
Building an app in Beacondo
To Download the mLearning Day App

1) Open Safari on your iOS Device


3) Tap the link to install the App on your device
Using Casper

Example 1: Locking laptops that leave the classroom

Example 2: Performing authorised admin tasks on a Mac via specific beacons

These work, I promise!
Beacon Launcher

Let's try a simple automation exercise using a free Mac app and Dartle.
Paul's Magic Remote

A probably useless implementation of iBeacons
Questions