Integration of Web services with Mobile Platform

INFS3202/7202 Guest Lecture

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Introduce myself

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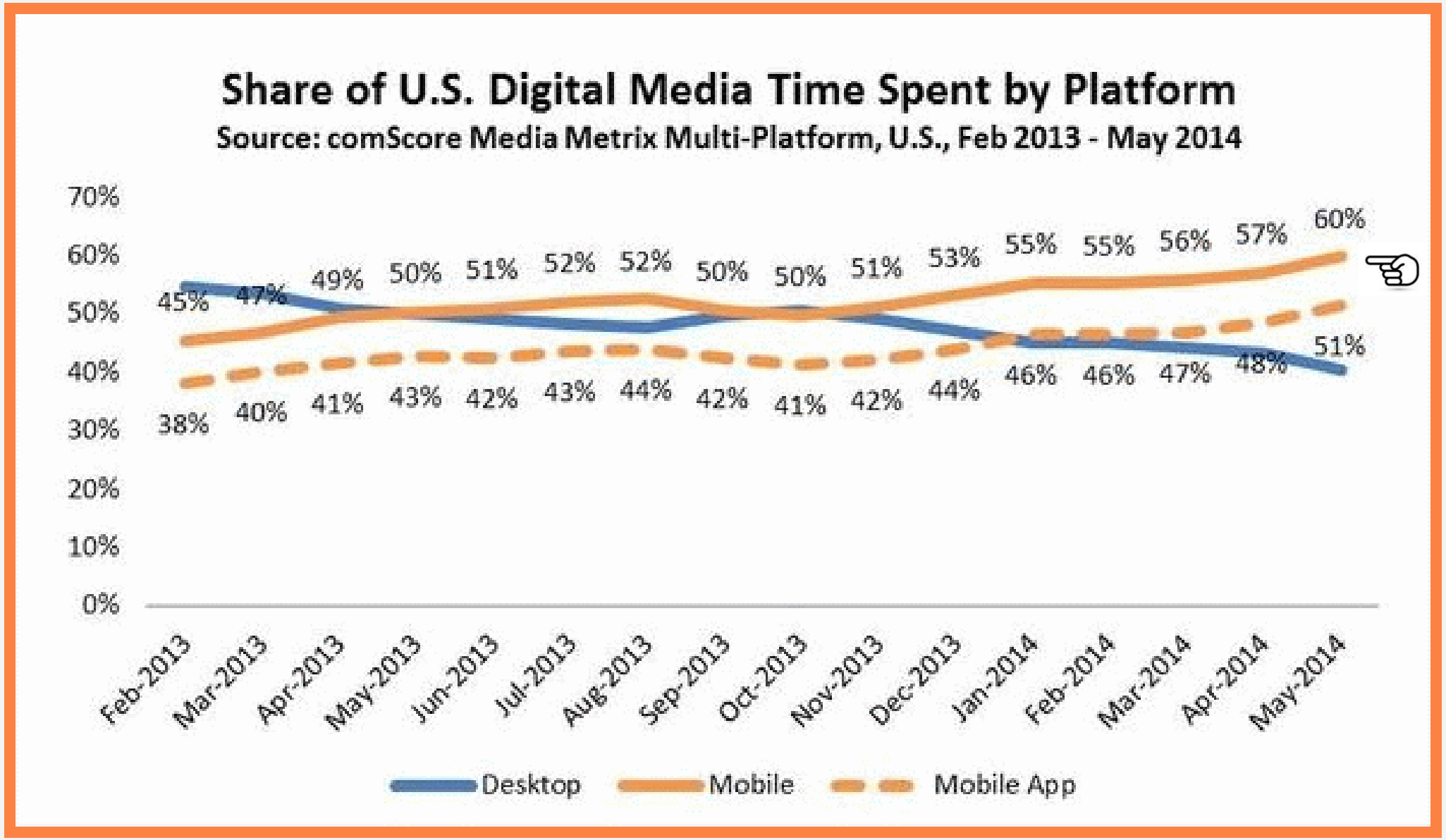
Outline

- **1. Mobile Platform**
- 2. Demo
- 3. Example app: A Simple iOS application
- 4. Example app: In-class survey v 1.0
- 5. Example app: In-class survey v 2.0
- 6. Review

1 Mobile Platform

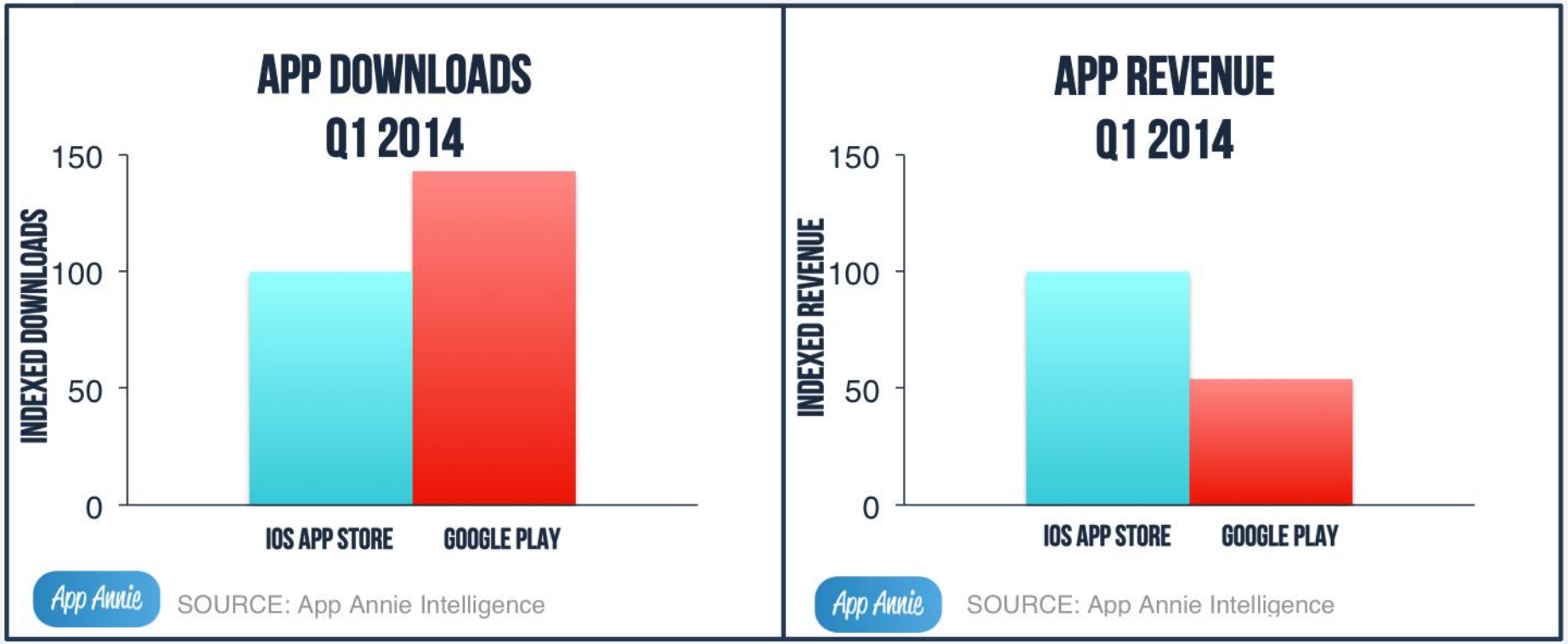
- Mobile has become a part of our life
- Mobile has taken an increasing part of online traffic


Share of U.S. Digital Media Time Spent by Platform
Source: comScore Media Metrix Multi-Platform, U.S., Feb 2013 - May 2014
70%
60%
50%
40%
30%
20%
10%
0%
45% 47% 49% 50% 51% 52% 52% 50% 50% 51% 53% 55% 55% 56% 57% 60%
38% 40% 41% 43% 42% 43% 44% 42% 41% 42% 44% 46% 46% 47% 48% 51%
Feb-2013
Mar-2013
Apr-2013
May-2013
Jun-2013
Jul-2013
Aug-2013
Sep-2013
Oct-2013
Nov-2013
Dec-2013
Jan-2014
Feb-2014
Mar-2014
Apr-2014
May-2014
Desktop
Mobile
Mobile App

Three main platforms

iOS v.s. Android v.s Windows Phone

Revenue➔



http://www.visionmobile.com/blog/2014/02/developer-economics-q1-2014/

Average revenue per app

Mobile OS	Median revenue per app per month
iOS	$500 - $1000
Android	$101 - $200
Windows Phone	$1 - $50
Windows 8	$1 - $50
Blackberry 10	$50 - $100
HTML5 Mobile	$200 - $350

http://codeeffective.com/mobile-platform-usage-analysis/

Outline

- 1. Mobile
- **2. Demo**
- 3. Example app: A Simple iOS application
- 4. Example app: In-class survey v 1.0
- 5. Example app: In-class survey v 2.0
- 6. Review

2

Demonstration

In-class Survey app demonstration

Scenarios:

- **Learning material automatic distribution**
- **Review/Feedback**

Application we are going to achieve today

Demo Time!

Outline

- 1. Mobile
- 2. Demo
- **3. Example app: A Simple iOS application**
  - Objectives
  - What do you need
  - Example 1
- 4. Example app: In-class survey v 1.0
- 5. Example app: In-class survey v 2.0
- 6. Review

3

A simple iOS application

3–1

Objective

- Create a simple iOS app which just load one web page

Preparation

- What **Exactly** do we need to create an iOS app?

3

A simple iOS application

3–2

- iOS development Environment
  - Mac
  - Xcode installed (IDE)
  - An Apple Developer account. $99/year
- Object-C
  - Object-Oriented language.
  - Similar to C
  - Swift

Xcode

3

A simple iOS application

3–3

- **Coding Time**
  - Approximately 15 mins

- **Architecture of iOS app**
  - MVC architecture
    - Model: model class
    - View: storyboard
    - Controller: ViewController class

Outline

- 1. Mobile
- 2. Demo
- 3. Example app: A Simple iOS application
- **4. Example app: In-class survey v 1.0**
  - Objectives
  - Introduce to iBeacon
  - Create iBeacon station and receiver
- 5. Example app: In-class survey v 2.0
- 6. Review

4

In-class survey app Example v1.0

4-1 Objectives

Question: How to improve the code into one we were showing in the demo?

Answer: iBeacon

4

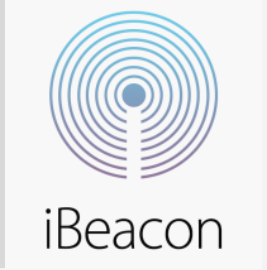
In-class survey app Example v1.0

4-2 Introduce to iBeacon

iBeacon: “Low-powered, low-cost technology that can notify nearby iOS 7 or 8 devices of their presence.”[1]

Features:

- Introduce by Apple in 2014
- Search neighborhood devices
- Notification when inside or outside of the range.
- Low energy device Bluetooth



More info: https://developer.apple.com/ibeacon/

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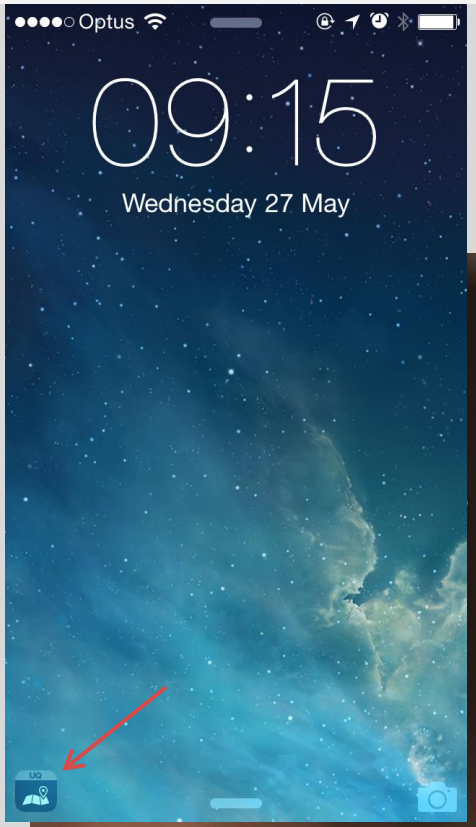
In-class survey app Example v1.0

4-2 Introduce to iBeacon

iBeacon: Next big thing?

- Indoor shopping with iBeacon



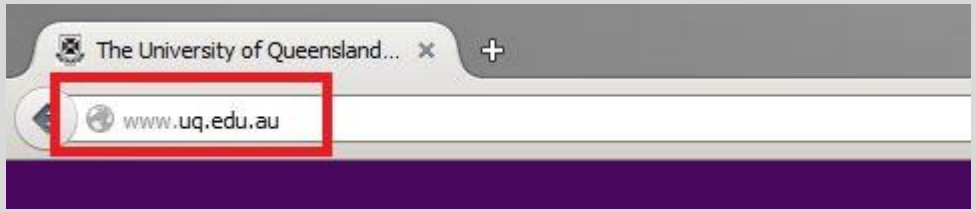
4

In-class survey app Example v1.0

4-3 A Few Tech terms needs to know

UUID: short for universal unique identifier

- Works like a web url or IP addr when you access the internet
- 128 bit string
- i.e. **B558CBDA-4472-4211-A350-FF1196FFE8C8**



4

In-class survey app Example v1.0

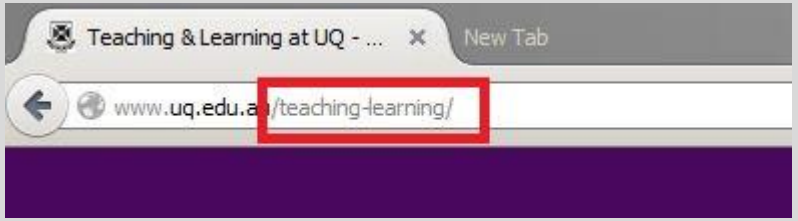
4-3 A Few Tech terms needs to know

Major and Minor Value:

- Help to identify iBeacon more precisely
- 16 bit unsigned Integer
- Sub Domain/Sub Directory

Within **1** UUID = 65535 * 65535
=4294836225 iBeacons!

<UUID, Major, Minor>



How to use iBeacon to improve the code ➔

4

In-class survey app Example v1.0

4-5 iBeacon Station

We are going to create two applications…

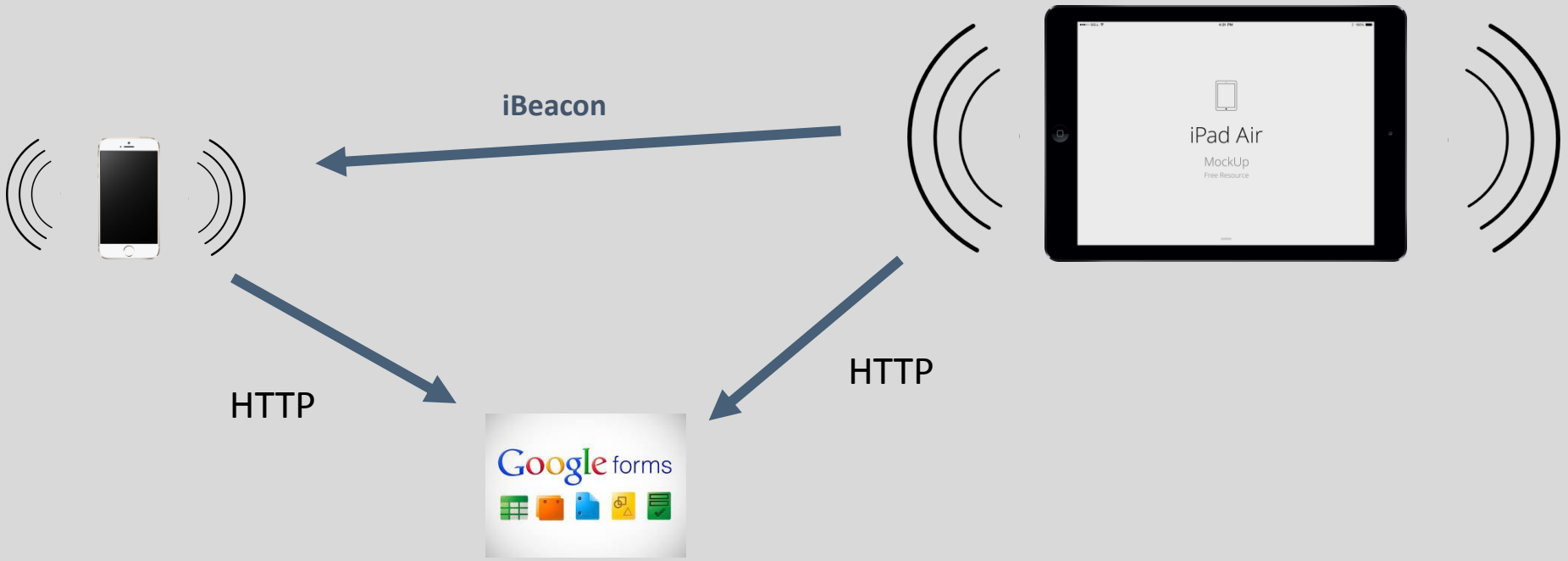
- iBeacon Station (iPad)
- iBeacon Receiver (iPhone)
- Architecture similar to C/S but in one-way direction

4

In-class survey app Example v1.0

4-5 iBeacon Station

- **Architecture/Workflow**



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In-class survey app Example v1.0

4-5 iBeacon Receiver

- **Workflow of iBeacon Receiver**
  - Google Survey Form Results
  - Change the URL to Google Form URL
  - Add necessary Libs
  - Implement code
- **Coding Time**
  - Approximately 15 mins

4

In-class survey app Example v1.0

4-5 iBeacon Station

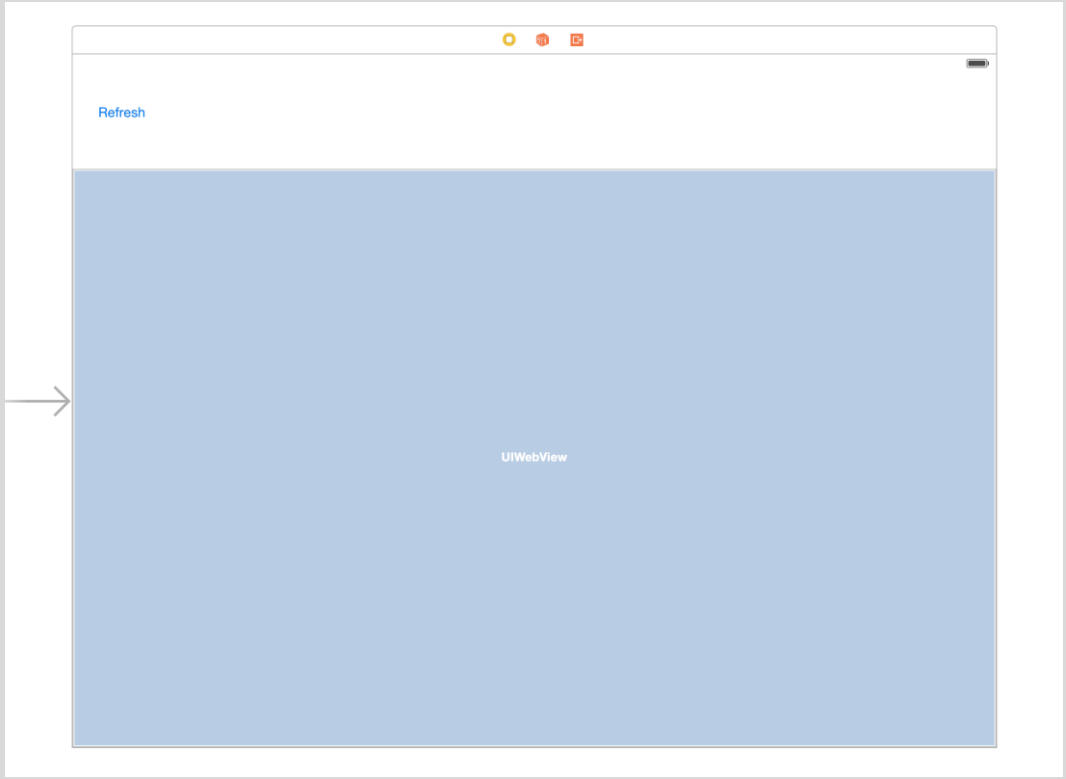
- **Workflow of iBeacon Station:**

- **Coding Time**
  - Use the code directly
  - https://github.com/arkilis/infs3202Example2

4

In-class survey app Example v1.0

4-5 iBeacon Station




```
//
//  ViewController.m
//  Station
//
//  Created by Ben Liu on 26/05/2015.
//  Copyright (c) 2015 Ben Liu. All rights reserved.
//

#import "ViewController.h"

@interface ViewController (){
    NSDictionary *beaconData;
    CBPeripheralManager *peripheralManager;
}

@end

@implementation ViewController

- (void)viewDidLoad {
    [super viewDidLoad];
    // Do any additional setup after loading the view, typically from a nib.


    // UUID
    NSString    *szUUID= @"B558CBDA-4472-4211-A350-FF1196FFE8C8";
    NSUUID      *uuid= [[NSUUID alloc] initWithUUIDString:szUUID];

    // Major and minor
    CLBeaconRegion *beaconRegion= [[CLBeaconRegion alloc] initWithProximityUUID:uuid
                                                                          major:7
                                                                          minor:4
                                                                     identifier:@"infs3202_7202_example2"];


    // Prepare to broadcast iBeacon
    beaconData= [beaconRegion peripheralDataWithMeasuredPower:nil];
    peripheralManager.= [[CBPeripheralManager alloc] initWithDelegate:self queue:nil options:nil];
}



-(void)peripheralManagerDidUpdateState:(CBPeripheralManager*)peripheral{
    // if the bluetooth is on
    if (peripheral.state == CBPeripheralManagerStatePoweredOn){
        [peripheralManager startAdvertising:beaconData];
    }
    // if the bluetooth is off
    else if (peripheral.state == CBPeripheralManagerStatePoweredOff){
        [peripheralManager stopAdvertising];
    }    // if the bluetooth is not supported
    else if(peripheral.state == CBPeripheralManagerStateUnsupported) {
        NSLog(@"Not supported");
    }
}



- (IBAction)btnFresh:(id)sender {
    // URL
    NSURL *url= [NSURL URLWithString:@"https://docs.google.com/spreadsheets/d/1ljYItOgjnQv0H3afrcDOypGmVBTepCZ6Mw40b88zPlU/"];
    NSURLRequest *urlRequest= [NSURLRequest requestWithURL:url];

    // Load
    [self.myWebView loadRequest:urlRequest];
}



- (void)didReceiveMemoryWarning {
    [super didReceiveMemoryWarning];
    // Dispose of any resources that can be recreated.
}

@end
```

https://github.com/arkilis/infs3202Example2/tree/master/infs3202Example2_iBeaonStation

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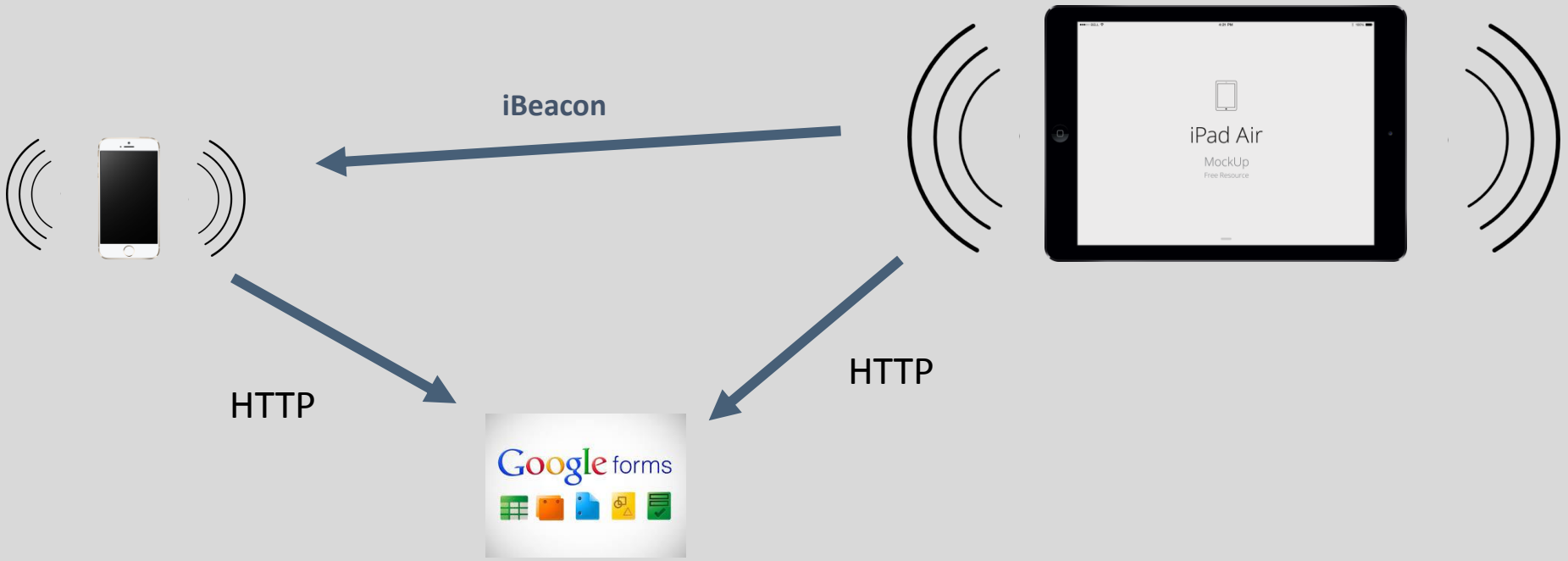
In-class survey app Example v1.0

4-5 iBeacon Station

- **Architecture/Workflow**



Outline

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- 3. Example app: A Simple iOS application
- 4. Example app: In-class survey v 1.0
- **5. Example app: In-class survey v 2.0**
  - Objectives
  - Create a RESTful Web service
- 6. Review

5

In-class survey app Example v2.0

5-1

- **But it is not perfect**
- **The obvious drawback of Example 2**
  - URL Hardcoded
  - Have to recompile once change the URL
- **Question: How to load URL dynamically**
- **Answer: RESTful Web Service**

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In-class survey app Example v2.0

5-3 What is RESTful web service

- **Representational State Transfer (RESTful)**
  - **Definition:** Lightweight web service, which is a stateless, client-server, cacheable communications protocol
  - **Features:**
    - Based on HTTP protocol
    - Easy/Flexiable to deploy

Example Code

- **Python Library: web.py**
- Web.py is a python web framework.
- Github: https://github.com/webpy/webpy.git

- **Example**
  - **http://54.210.200.34:8080/urls**
  - **Slides/homework**

← Github https://github.com/arkilis/infs3202Example3

```
ec2-user@ip-172-31-23-24:~/ws
#!/usr/bin/env python
import web
import json

ary_urls=[
{
'name':'survey',
'uuid':'B558CBDA-4472-4211-A350-FF1196FFE8C8',
'urlview': 'https://docs.google.com/forms/d/1YBzQ3I86FR5VNtg4eNSG_4alIb3PPV
'urlres': 'https://docs.google.com/spreadsheets/d/11jYItOgjnQv0H3afrcDDypGm
'major':7,
'minor':4
},
{
'name':'blank',
'uuid':'B558CBDA-4472-4211-A350-FF1196FFE8C8',
'urlview': 'about:blank',
'urlres': 'about:blank',
'major':7,
'minor':5
},
{
'name':'homework',
'uuid':'B558CBDA-4472-4211-A350-FF1196FFE8C8',
'urlview':'https://docs.google.com/forms/d/1nbovAJ4kfFby1tnSAB_5eMt1tZ-j8Yt
'urlres':'https://docs.google.com/spreadsheets/d/1DpR0RKATDhrCbUJslQiZgfExM
'major':7,
'minor':6
},
{
'name':'slides',
'uuid':'B558CBDA-4472-4211-A350-FF1196FFE8C8',
'urlview': 'https://docs.google.com/presentation/d/1PBFt0A-N7hxW4pXOKNu9de2
'urlres': 'https://docs.google.com/presentation/d/1PBFt0A-N7hxW4pXOKNu9de2M
'major':7,
'minor':7
},
]

urls = (
    '/urls',        'list_urls',
    '/urls/(.*)',   'get_url'
)

app = web.application(urls, globals())

class list_urls:
    def GET(self):
        return json.dumps(ary_urls)

class get_url:
    def GET(self, name):
        for e in ary_urls:
            if e['name'] == name:
                return str(e['urlview'])


if __name__ == "__main__":
    app.run()

```

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In-class survey app Example v2.0

5-6 Implement REST into our app

- **Change the static URL to REST URL for iBeacon Station/Receiver**

- **Challenge for you**
- https://github.com/arkilis/infs3202Example3

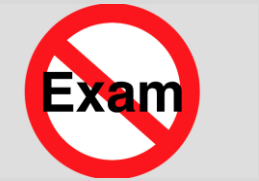
6

Recap

6

- **Mobile platform**
- **iOS**
  - How to create an iOS application
  - iBeacon
- **Web Service**
  - RESTful (using python and web.py)

This is not required in the exam



6 Recap

skills

Github

- Example 1:
  - https://github.com/arkilis/infs3202Example1
- Example 2:
  - https://github.com/arkilis/infs3202Example2
- Demo:
  - https://github.com/arkilis/infs3202Example3

Thank you