# CS 646 Android Mobile Application Development
Spring Semester, 2015
Doc 20 BaaS, WebView
Apr 9, 2015

## Big Nerd Ranch Chapters

Parse is not covered in the Big Nerd Ranch text

WebView is covered in Chapter 31

Parse

# Backend as a Service - BaaS

or Mobile Backend as a Service - MBaaS

Provide backend services with little or no effort by app developer

- Store Data
- Files
- Notification
- Business logic
- Integration with social networks
- Usage analysis tools
- Multi-platform - iOS, Android, Web, etc

# Some BaaS Venders

Kii cloud
Kumulos
ShepHertz
Kinvey
Parse
cloudbase.io
FatFractal
StackMob
Applicasa
QuickBlox
BaasBox
apiOmat
Google





Source http://en.wikipedia.org/wiki/Backend_as_a_service, April 27, 2013

# Parse

http://parse.com

Backend for iOS & Android Apps

NoSQL database

Handles network connection

You don't write any backend code

Perhaps easiest BaaS for beginners

# Example - Creating and saving

```
ParseObject newTeacher = new ParseObject("Instructor");
newTeacher.put("firstName", "Peter");
newTeacher.put("lastName", "Gun");
newTeacher.put("email", "bullet@gun.com");
newTeacher.put("office", "GMCS 723");
newTeacher.put("phone", "619-594-0000");
newTeacher.save();

ParseObject comment = new ParseObject("Comment");
comment.put("text", "Sample Comment");
comment.put("date", new Date().toString());
comment.put("parent", newTeacher);
comment.save();
```

No backend code written for this app





The two object newTeacher and comment are now saved on Parse server and can be accessed by other devices

# Fetching Objects

```
ParseQuery getInstructor = new ParseQuery("Instructor");
    getInstructor.whereEqualTo("lastName", "Gun");
    ParseObject gun = getInstructor.getFirst();

    ParseQuery comments = new ParseQuery("Comment");
    comments.whereEqualTo("parent", gun);

    List<ParseObject> commentList = comments.find();
    for (ParseObject comment : commentList) {
          do something with each comment
    }
```

# Parse Apps, IDs & Client Keys

You create a Parse App to store data for each app

You get an app ID and client key for each Parse App

Android app

- Needs the app ID and client key to access the data for that app
- App can only access data in that app

```
Parse.initialize(this, "AppId", "ClientKey");
```

# "Tables"

If does not exist creates Instructor "Table" on parse server

```
ParseObject newTeacher = new ParseObject("Instructor");
newTeacher.put("firstName", "Peter");
newTeacher.put("lastName", "Gun");
newTeacher.put("email", "bullet@gun.com");
newTeacher.put("office", "GMCS 723");
newTeacher.put("phone", "619-594-0000");
newTeacher.save();
```

## Parse web data view

Classes

+ Row | - Row | + Col | - Col | More ▾ | 1 - 20 of 29 rows

- Comment 2915
- GameScore 3
- Installation 0
- Instructor 29
- User 1

| objectId | email string | firstName string | id number | instructorId num… | lastName string |
|---|---|---|---|---|---|
| kw7RVTAtTX | bullet@gun.com | Peter | kw7RVTAtTX | (empty) | Gun |
| GPsWiF02Su | G.E.Whittenburg… | Gene | GPsWiF02Su | 28 | Whittenburg |
| CLSXcWV… | carol.venable@sd… | Carol | CLSXcWVcDT | 27 | Venable |
| suHjspB4VY | Snyder1@mail.sd… | Will | suHjspB4VY | 26 | Snyder |
| XDB3AwKidQ | psager@mail.sds… | Paul | XDB3AwKidQ | 25 | Sager |
| BE0Ihv9NpF | drno@mail.sdsu.edu | Nathan | BE0Ihv9NpF | 24 | Oestreich |
| LE018d7gjA | sharon.lightner@s… | Sharon | LE018d7gjA | 23 | Lightner |

# Data Types Supported for Parse Values

String
int
bool
java.util.Date
byte[]
JSONObject.NULL
JSON Array
JSON Object

newTeacher.put(key, value);

# Files

Can store files up to 10 MB

# Saving Options

```
newTeacher.save();

newTeacher.saveInBackground();
    Perform saving on background thread

newTeacher.saveEventually();
    If don't have network connection cache locally
    Save when have network connection
```

# Users

You can create users

Data can be made private to a user

# Access Control Lists (ACL)

Using ACL per object or per class can

Restrict who can read and/or write to an object on server

# Push Notifications

Supports push notifications

App receives notification even if not running

Works for iOS and Android

Can send notification using

- App
- Web
- REST

```
ParsePush push = new ParsePush();
push.setMessage("Red Sox win 7-0!");
push.sendInBackground();
```

# Twitter & Facebook integration

They have it

Did not try it

# Rate Your Instructor Example

Moved all the data from server for assignment 2&3 to Parse objects

Issues

- No server side logic
- Ratings was computed on server

Milliseconds to read 450 comments from server

| My Server | Parse Serer |
|---|---|
| 464 | 848 |
| 389 | 815 |
| 410 | 934 |
| 440 | 678 |

Milliseconds to write 10 comments to server

| My Server | Parse Serer |
|---|---|
| 610 | 7469 |
| 479 | 6811 |
| 412 | 6813 |
| 475 | 6789 |

# Web

# WebKit Browser - WebView

Can Embed a web view in your activities view

```
WebView webview = (WebView) findViewById(R.id.webView);

webview.loadUrl("http://www.cs.sdsu.edu/");
```

Must add Internet uses-permission to manifest

```
<uses-permission android:name="android.permission.INTERNET" />
```

# WebView

Supports

- CSS
- JavaScript
- Cookies
- HTML 5 Video
- Page Cache
- Web SQL Database API
- HTML 5 Web Storage API
- Page zooming
- Browsing history

Can interact with

- Errors
- Loading of pages
- Loading of JavaScript

# Can Load HTML/Images/JavaScript locally

```
WebView webview = (WebView) findViewById(R.id.webView);

String summary = "<html><body>You scored <b>192</b> points.</body></html>";
webview.loadData(summary, "text/html", "UTF8");
```

# WebViewClient

Used to deal with events that impact rendering of content
It also stops JavaScript from opening pages in Web Browser

```
WebView webview = (WebView) findViewById(R.id.webView);

webview.setWebViewClient(new WebViewClient());

webview.loadUrl("http://www.cs.sdsu.edu/");
```

# JavaScript can call Your Java methods

```
public class WebAppInterface {
    Context mContext;

    /** Instantiate the interface and set the context */
    WebAppInterface(Context c) {
        mContext = c;
    }

    /** Show a toast from the web page */
    @JavascriptInterface
    public void showToast(String toast) {
        Toast.makeText(mContext, toast, Toast.LENGTH_SHORT).show();
    }
}
```

# JavaScript can call Your Java methods

```
WebView webView = (WebView) findViewById(R.id.webview);
webView.addJavascriptInterface(new WebAppInterface(this), "Android");
```

```
<input type="button" value="Say hello" onClick="showAndroidToast('Hello Android!')" />

<script type="text/javascript">
    function showAndroidToast(toast) {
        Android.showToast(toast);
    }
</script>
```

# Web Apps Optimized For Mobile

CSS & JavaScript

Makes UI elements look mobile like

# Hybrid Apps

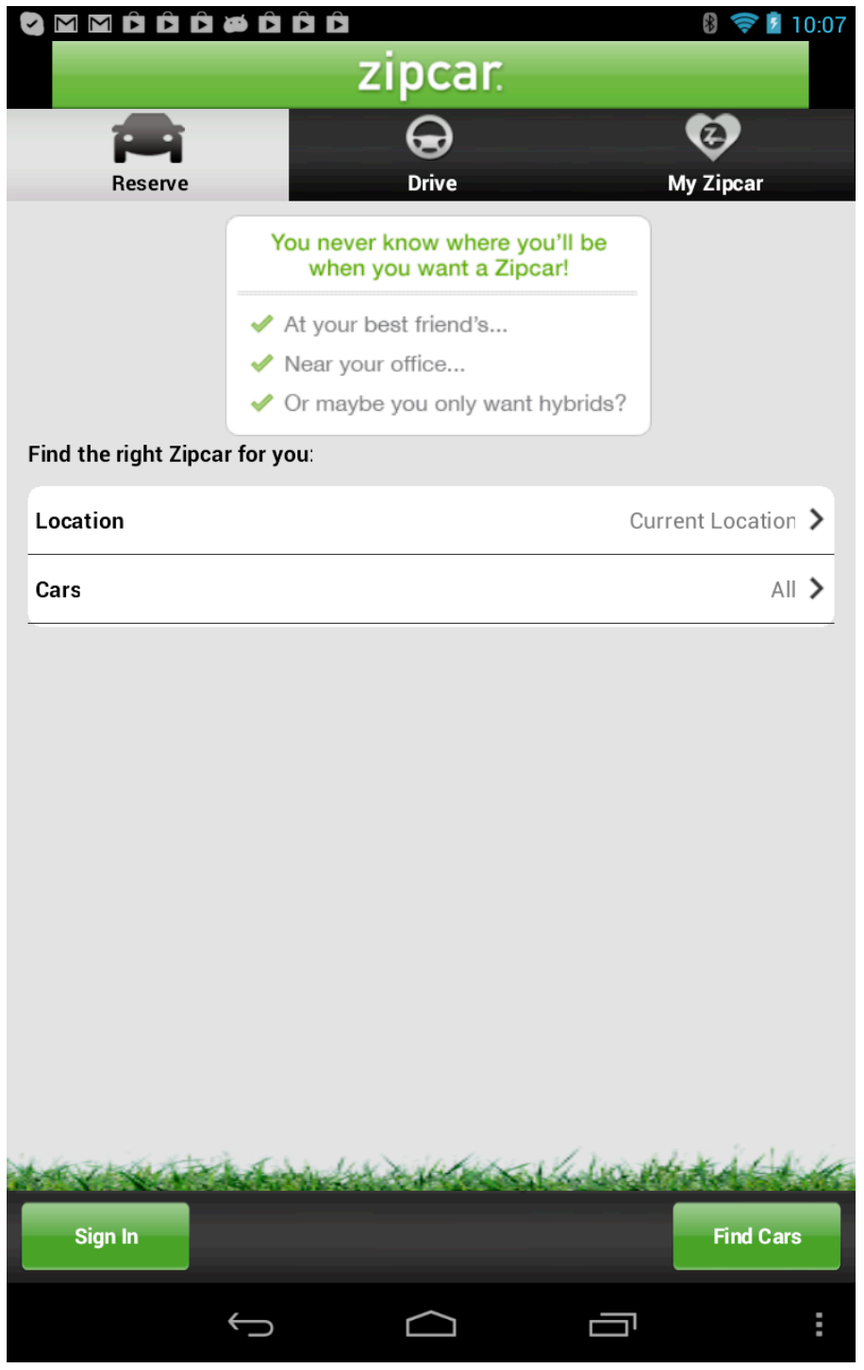
Implement app using

- HTML
- JavaScript
- CSS

Use WebView to dislay/Run App

HTML/JavaScript/CSS

Can be local to app



# Development Language

Symbian - C++

iOS - Objective C

Android - Java

Blackberry - Java

# Cross-platform native mobile apps

Mobile SDK supports web view in native app

iPhone, Android, Blackberry, Symbian, Bada

Make entire app in web views

Wrap in native app

Same code base for all platforms

# Cross-platform Development Systems

Titanium Appcelertor (HTML5, CSS3 and Javascript)

http://www.appcelerator.com/

PhoneGap (HTML5, CSS3 and Javascript)

http://www.phonegap.com/

RhoMobile (Ruby)

http://rhomobile.com/

WidgetPad (HTML5, CSS3 and Javascript)

http://widgetpad.com/

MoSync (C/C++)

http://www.mosync.com/

Etc.

# Why This is Important to Native Apps

Parts of a view can be HTML/Javascript/CSS

buttons, widgets, small fragments

Change part of Interface without resubmitting app to store

A/B testing

# Facebook React Native

Introduced Jan 2015

Video http://tinyurl.com/pt7myek

Uses Javascript to control native widgets

Greatly simplifies standard MVC

# Android Fragmentation

Updating the Android OS on existing phones cost Handset manufactures money

Don’t make any money on those updates

So they don’t update

Many Android phones have same OS for the lifetime of the device

Security holes

Programmers wait a years to use new features

# Android Fragmentation & Play Store

Move classes/services/functionality from Android SDK to the Playstore

Playstore is an app

- Can be updated independently from the OS
- Google can update older phones directly

Programmers can use new features sooner

Process of accessing the features changes

Android clones do not have access to the features

# WebView & Play Store

WebVew on play store is in beta

Current WebView class will remain in Android SDK

Future enhancements/bug fixes will occur in WebView class provided via play store