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Mobile Applications

Cordova Introduction

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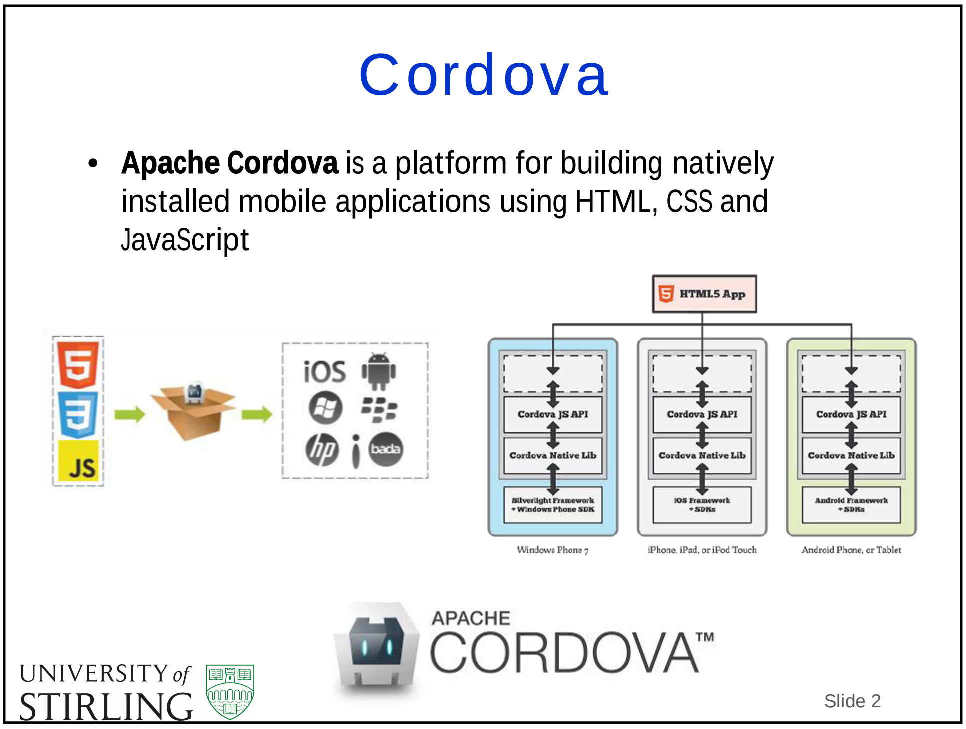

Cordova

- **Apache Cordova** is a platform for building natively installed mobile applications using HTML, CSS and JavaScript

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Cordova: History

- Apache Cordova was originally called Phonegap build by Nitobi
- Open-source & free software from the beginning (MIT License), Apache License now
- Nitobi was then acquired by Adobe and donated the PhoneGap codebase to the Apache Software Foundation (ASF)
- PhoneGap is still a product of Adobe. It is a distribution of Apache Cordova.
- Apache Cordova is the engine that powers PhoneGap.

APACHE CORDOVA™

Cordova: Principles

- Apps written by Cordova are hybrid apps.
- There are three kinds of apps: native apps, web apps and hybrid apps.

Native apps:

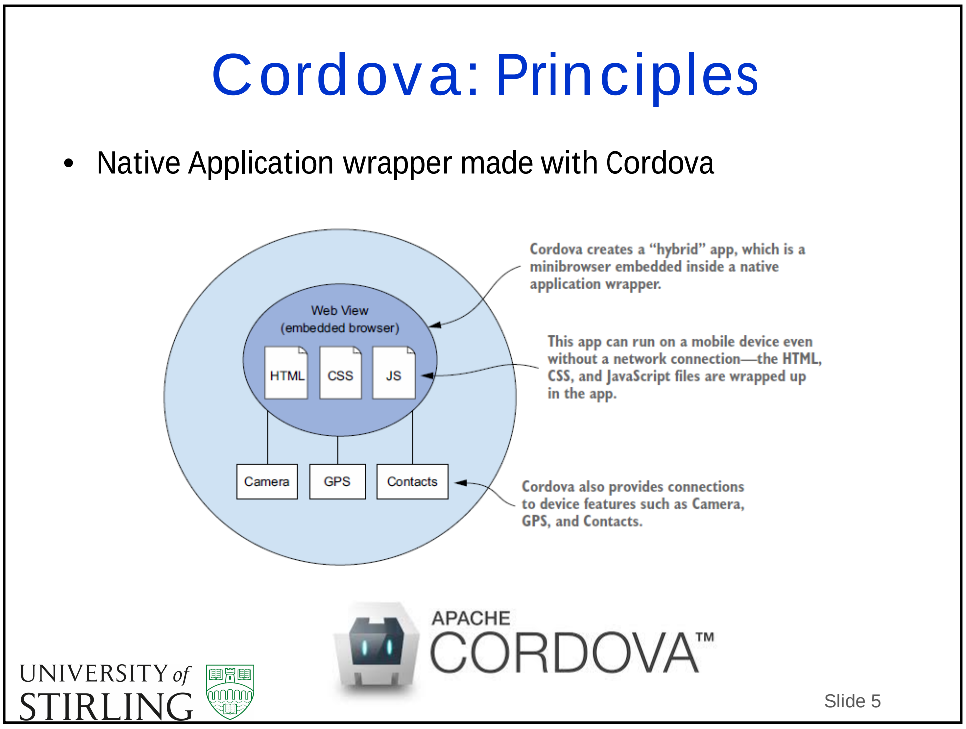
- They are apps developed for one particular device (e.g. Android) and is installed directly onto the device itself. Users of native apps usually download them via app stores. You may run the apps without Internet connection (e.g. the Camera app).

Web apps:

- They are essentially web sites but look and feel like native apps. They are typically built using HTML5, CSS and JavaScript. They require a browser and Internet connectivity to run (i.e. you must online). You do not need to install anything (e.g. app.ft.com)

Hybrid apps:

- They are partly native apps, partly web apps. Like native apps, they live in an app store and can take advantage of the many device features available (e.g. local storage, phone books, camera, geolocation, …). Like web apps, they rely on HTML5+CSS+JS for layout rendering.



Cordova: Principles

- Native Application wrapper made with Cordova

Web View
(embedded browser)

HTML

CSS

JS

Camera

GPS

Contacts

Cordova creates a "hybrid" app, which is a minibrowser embedded inside a native application wrapper.

This app can run on a mobile device even without a network connection—the HTML, CSS, and JavaScript files are wrapped up in the app.

Cordova also provides connections to device features such as Camera, GPS, and Contacts.

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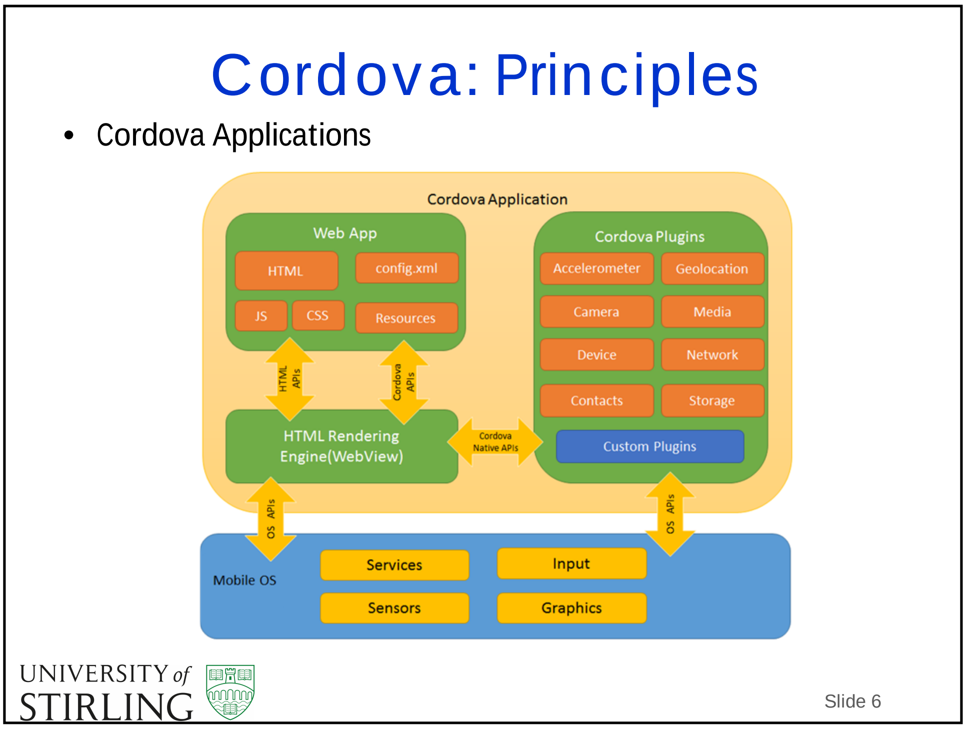

Cordova: Principles

- Cordova Applications

Cordova Application

Web App

HTML

config.xml

JS

CSS

Resources

HTML APIs

Cordova APIs

HTML Rendering Engine(WebView)

Cordova Native APIs

Cordova Plugins

Accelerometer

Geolocation

Camera

Media

Device

Network

Contacts

Storage

Custom Plugins

OS APIs

OS APIs

Mobile OS

Services

Input

Sensors

Graphics

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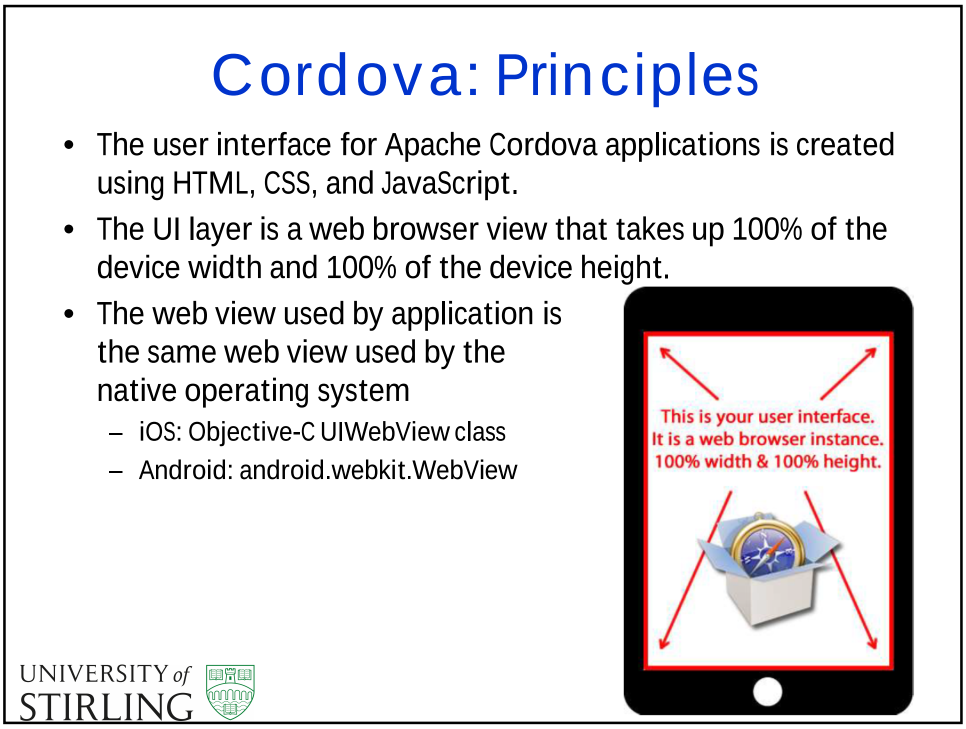
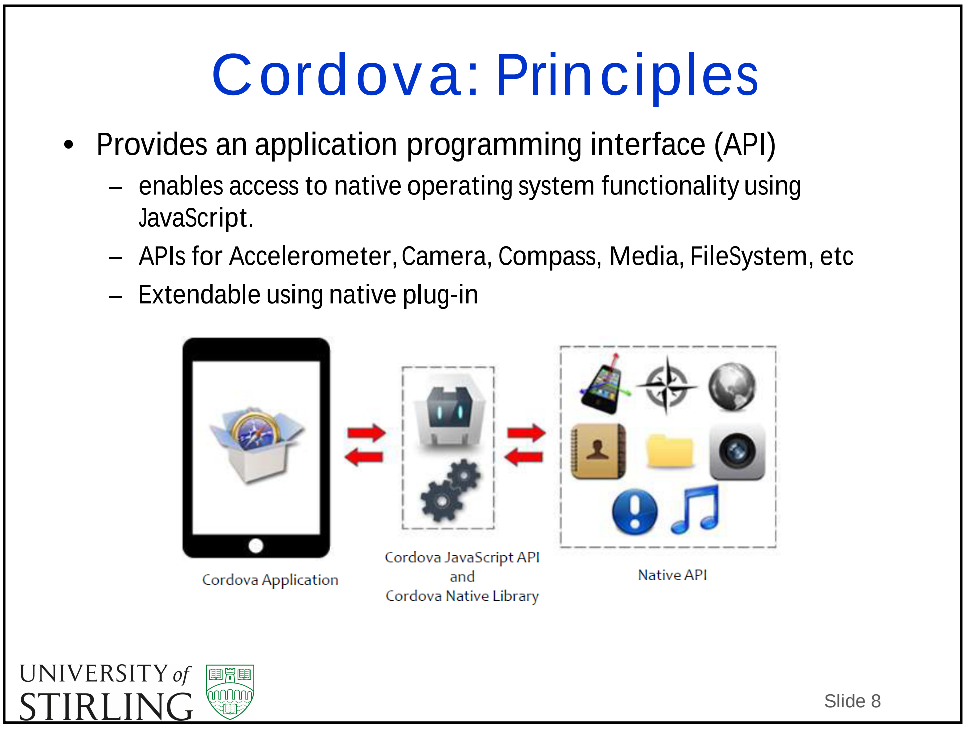


Cordova: Principles

- The user interface for Apache Cordova applications is created using HTML, CSS, and JavaScript.
- The UI layer is a web browser view that takes up 100% of the device width and 100% of the device height.
- The web view used by application is the same web view used by the native operating system
  - iOS: Objective-C UIWebView class
  - Android: android.webkit.WebView

This is your user interface.
It is a web browser instance.
100% width & 100% height.



Cordova: Principles

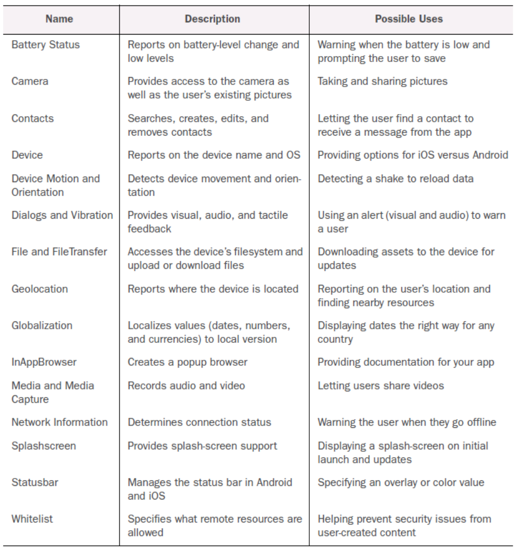
- Provides an application programming interface (API)
  - enables access to native operating system functionality using JavaScript.
  - APIs for Accelerometer, Camera, Compass, Media, FileSystem, etc
  - Extendable using native plug-in

Cordova Application

Cordova JavaScript API
and
Cordova Native Library

Native API

Cordova: Plug-Ins



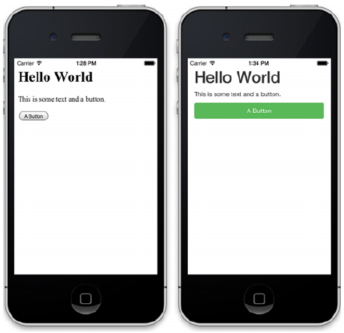
Name	Description	Possible Uses
Battery Status	Reports on battery-level change and low levels	Warning when the battery is low and prompting the user to save
Camera	Provides access to the camera as well as the user's existing pictures	Taking and sharing pictures
Contacts	Searches, creates, edits, and removes contacts	Letting the user find a contact to receive a message from the app
Device	Reports on the device name and OS	Providing options for iOS versus Android
Device Motion and Orientation	Detects device movement and orientation	Detecting a shake to reload data
Dialogs and Vibration	Provides visual, audio, and tactile feedback	Using an alert (visual and audio) to warn a user
File and FileTransfer	Accesses the device's filesystem and upload or download files	Downloading assets to the device for updates
Geolocation	Reports where the device is located	Reporting on the user's location and finding nearby resources
Globalization	Localizes values (dates, numbers, and currencies) to local version	Displaying dates the right way for any country
InAppBrowser	Creates a popup browser	Providing documentation for your app
Media and Media Capture	Records audio and video	Letting users share videos
Network Information	Determines connection status	Warning the user when they go offline
Splashscreen	Provides splash-screen support	Displaying a splash-screen on initial launch and updates
Statusbar	Manages the status bar in Android and iOS	Specifying an overlay or color value
Whitelist	Specifies what remote resources are allowed	Helping prevent security issues from user-created content

Cordova: What's included?

- Cordova provides three main components
  - Command line interface tool (CLI): create projects, compile code to mobile platforms,
  - Access to hardware features
  - Ability to support future features (plugins)
- Cordova uses client side web technology
  - Can use millions of HTML, CSS, Javascript libraries and frameworks

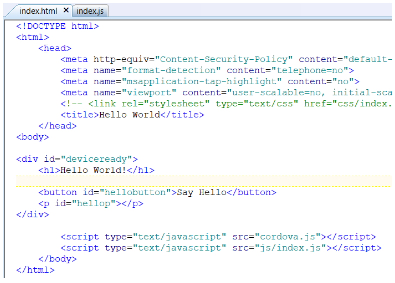
Cordova: What’s NOT included?

- UI framework
- Cordova will take basic HTML, as you code it, and display it
- HTML (and CSS) may not be mobile optimised
  - May be difficult for people to use on a device
  - Buttons may be too small to click
  - Text may be hard to read
- No magic fix!
- Best to use a UI Javascript framework
  - Bootstrap
  - jQuery
  - IONIC

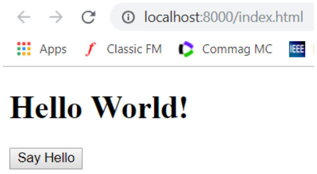


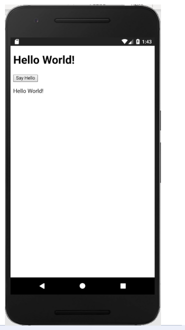
Cordova: First App

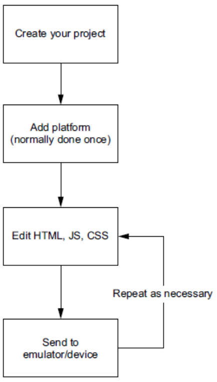
- Most basic level: HTML + Javascript

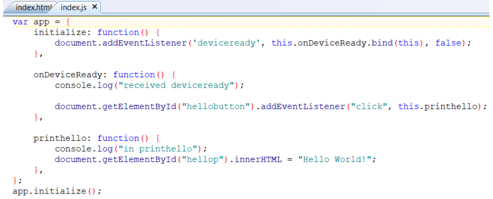


```
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Security-Policy" content="default-
        <meta name="format-detection" content="telephone=no">
        <meta name="msapplication-tap-highlight" content="no">
        <meta name="viewport" content="user-scalable=no, initial-sca
        <!-- <link rel="stylesheet" type="text/css" href="css/index.
        <title>Hello World</title>
    </head>
<body>

<div id="deviceready">
    <h1>Hello World!</h1>

    <button id="hellobutton">Say Hello</button>
    <p id="hellop"></p>
</div>

        <script type="text/javascript" src="cordova.js"></script>
        <script type="text/javascript" src="js/index.js"></script>
    </body>
</html>
```





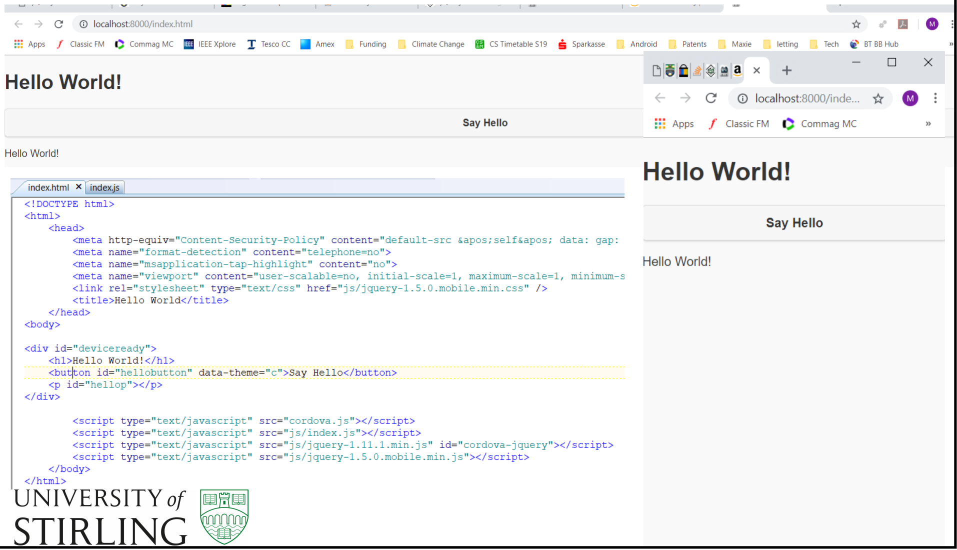




```
var app = {
    initialize: function() {
        document.addEventListener('deviceready', this.onDeviceReady.bind(this), false);
    },

    onDeviceReady: function() {
        console.log("received deviceready");

        document.getElementById("hellobutton").addEventListener("click", this.printhello);
    },

    printhello: function() {
        console.log("in printhello");
        document.getElementById("hellop").innerHTML = "Hello World!";
    },
};
app.initialize();
```

Cordova: First App + jQuery

- Most basic level: HTML + Javascript + jQuery mobile = responsive



Hello World!

Say Hello

Hello World!

```
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Security-Policy" content="default-src &apos;self&apos; data: gap:
        <meta name="format-detection" content="telephone=no">
        <meta name="msapplication-tap-highlight" content="no">
        <meta name="viewport" content="user-scalable=no, initial-scale=1, maximum-scale=1, minimum-s
        <link rel="stylesheet" type="text/css" href="js/jquery-1.5.0.mobile.min.css" />
        <title>Hello World</title>
    </head>
<body>

<div id="deviceready">
    <h1>Hello World!</h1>
    <button id="hellobutton" data-theme="c">Say Hello</button>
    <p id="hellop"></p>
</div>

        <script type="text/javascript" src="cordova.js"></script>
        <script type="text/javascript" src="js/index.js"></script>
        <script type="text/javascript" src="js/jquery-1.11.1.min.js" id="cordova-jquery"></script>
        <script type="text/javascript" src="js/jquery-1.5.0.mobile.min.js"></script>
    </body>
</html>
```

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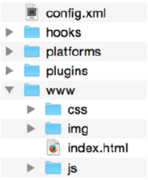
Cordova: Requirements

- NodeJS
- Cordova package
- jQuery (optional)
- Java 1.8
- Android Studio (with SDK and AVD and emulator)
- Browser (Chrome, Firefox)
- Text editor (or IDE)



```
config.xml
▶ hooks
▶ platforms
▶ plugins
▼ www
    ▶ css
    ▶ img
      index.html
    ▶ js
```

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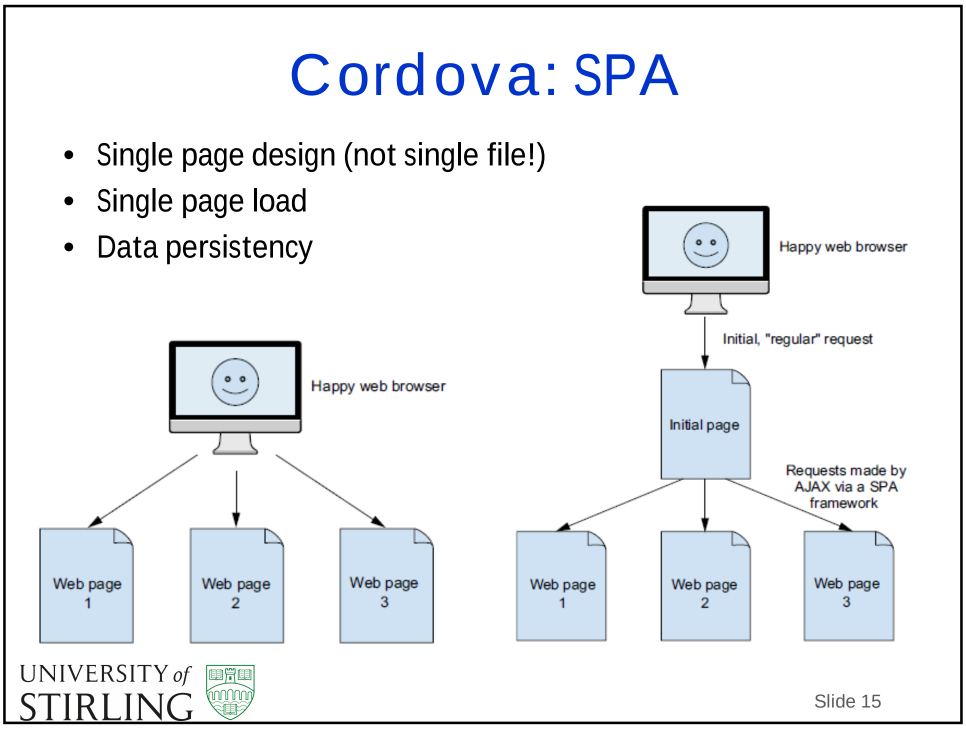

Cordova: SPA

- Single page design (not single file!)
- Single page load
- Data persistency

Happy web browser

Web page 1

Web page 2

Web page 3

Happy web browser

Initial, "regular" request

Initial page

Requests made by AJAX via a SPA framework

Web page 1

Web page 2

Web page 3

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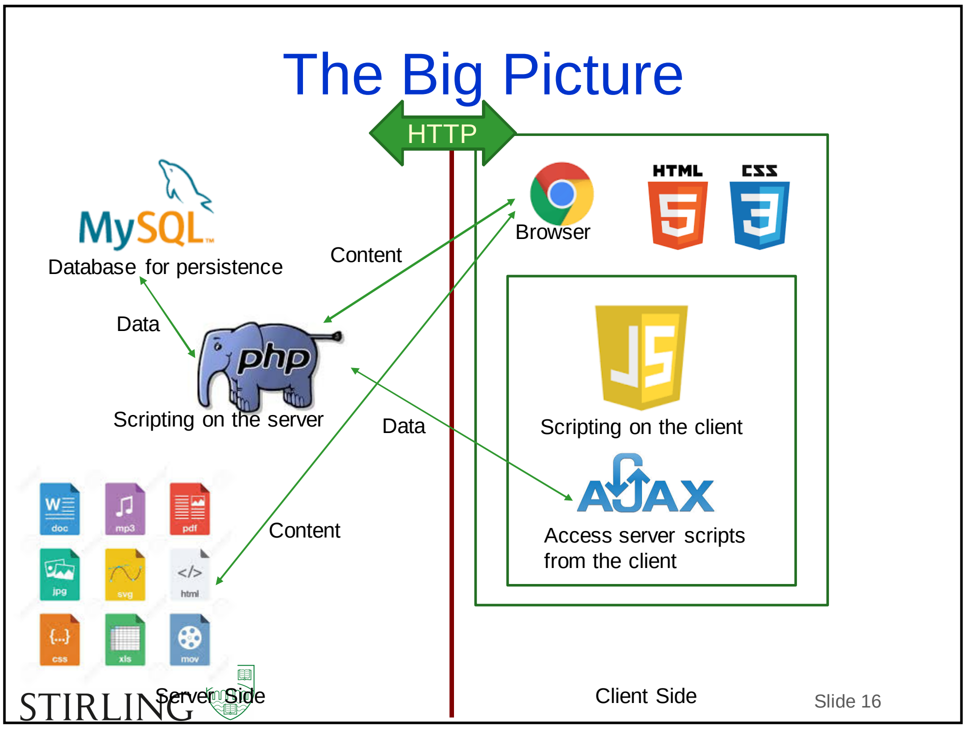

The Big Picture

HTTP

MySQL

Database for persistence

Data

Scripting on the server

Content

Data

Content

Browser

Scripting on the client

AJAX

Access server scripts from the client

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Server Side

Client Side

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