



This class, mobile app basics, and Hybrid apps Secure Mobile IoT Application Development

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University of Nebraska at Omaha

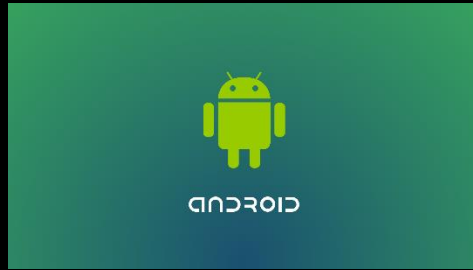
Secure Mobile IoT Development—Lecture 1

Welcome to IA8080-001

What is this class?

Short story: We will be making mobile apps and IoT apps.

Ok so what will we cover?



(Review)



(Review)

IoT and Wearable Development

Technologies

Ok so what will we cover?

- Software Engineering: Architecting and design (review)
- Software project management and Team dynamics (review)
- Hardening and secure coding in the IoT SDLC
- Bluetooth LE (smart) protocol
- Hybrid App development
- Native App development
- Wearables and IoT Security issues
- IoT Pen. testing

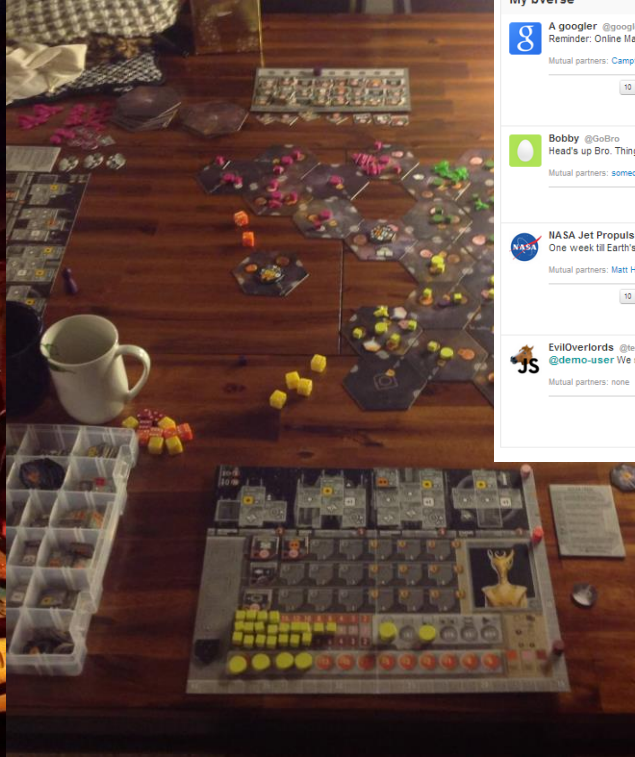
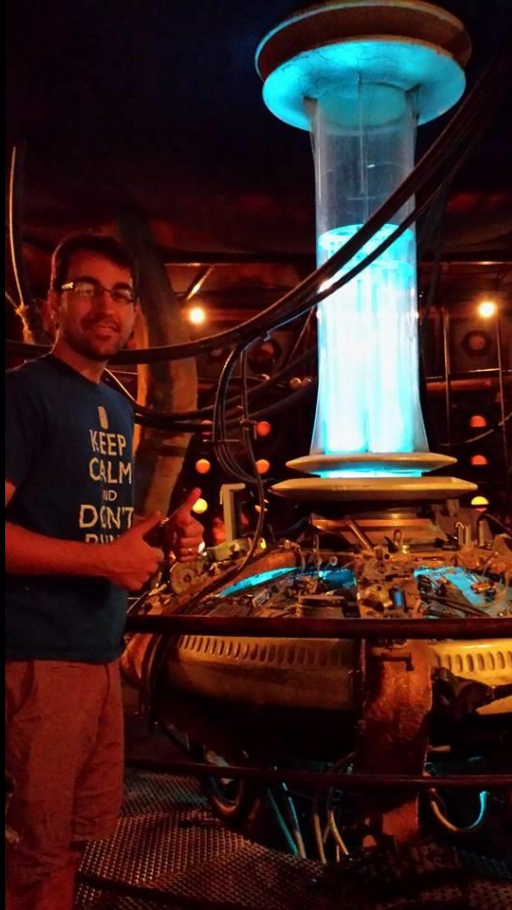
Who am I

- I'm a nerd, a philosopher, an artist, a board gamer, and a software engineer.
- I'm here to challenge you. Life is meaningless if you never know (and push) your limits.
'Non est ad astra mollis e terris via' – (There is no easy way from the earth to the stars) – Seneca

and Why should you trust me?

- I've made stuff (mostly highly interactive and visual web apps).
- I've also helped students make stuff and seen the looks of pride on their faces when they make stuff they never thought they could make.
- I believe in you and want to see you succeed.

Who am I



CYBERTRUST Hello demo-user Log out

Home Email 6 Web 4 bVerse Social Network 4 Your status

My bVerse

A googler @googler
Reminder: Online Marketing 101 starts July 22! Sign up to learn the basics of online advertising
4 minutes ago
Mutual partners: Campfire Woods, NASA, Posik Timber, and 6 others
[10 9 8 7 6 5 4 3 2 1] (Trust) (Trust) Example Accept Msg (Don't trust) (Don't trust) Example Reject Msg
How trustworthy is this?

Bobby @GoBro
Head's up Bro. Things are changing.
4 minutes ago
Mutual partners: someone, and someone.
[10 9 8 7 6 5 4 3 2 1] (Trust) Yes (Don't trust) Boo
How trustworthy is this?

NASA Jet Propulsion Laboratory @NASAJPL
One week til Earth's July 19 #WaveAtSaturn. View these charts to know when & where to look: 1. usa.gov/12TMUd
4 minutes ago
Mutual partners: Matt Hale, Dr Who, The Sun, and A Googler
[10 9 8 7 6 5 4 3 2 1] (Trust) (Trust) Example Accept Msg (Don't trust) (Don't trust) Example Reject Msg
How trustworthy is this?

EvilOverlords @terriblecompany
@demo-user We should do business... follow me back and we can partner up.
4 minutes ago
Mutual partners: none

demo-user View my profile page
160 POSTS 31 BUSINESS PARTNERS 27,391 FOLLOWERS
© 2013 bVerse About Help Terms Privacy



Who are you?

- Something quirky about yourself
- Something you find interesting
- What motivates you?



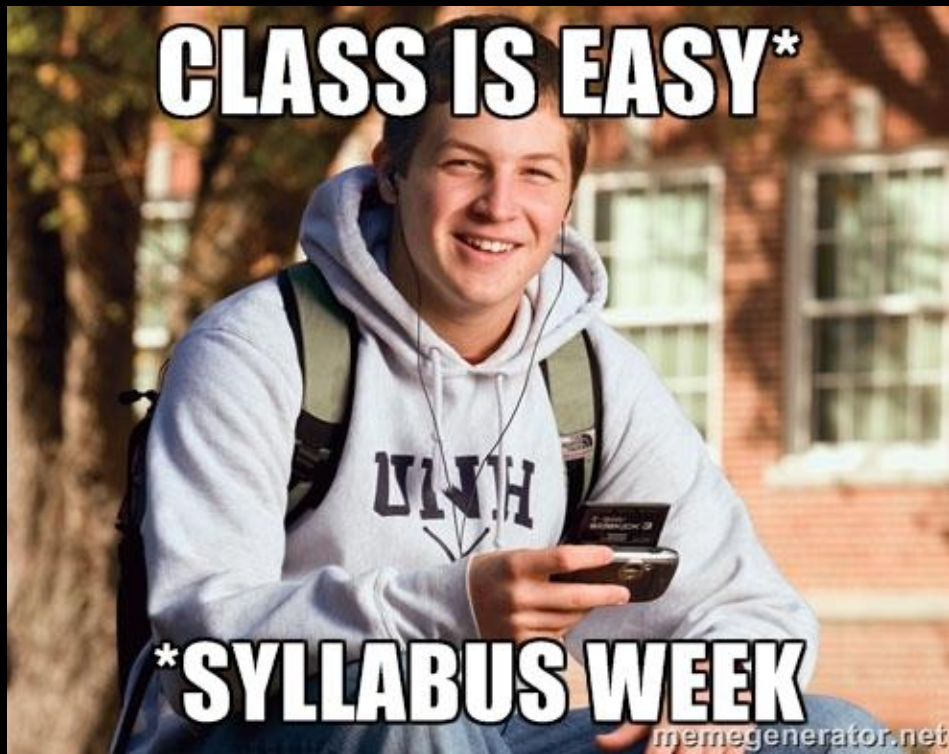
- What do you want to do after you graduate?

BRACE YOURSELF



**SYLLABUS WEEK
IS COMING**

CLASS IS EASY*



***SYLLABUS WEEK**

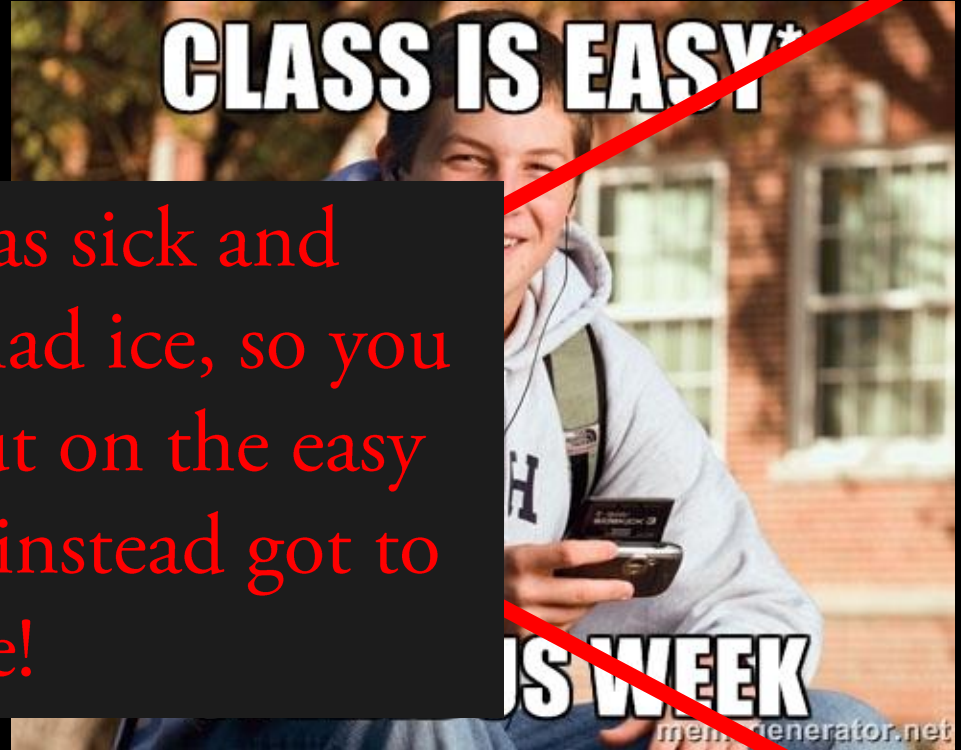
memegenerator.net

Hint: Syllabus time

BRACE YOURSELF



CLASS IS EASY*



Sadly I was sick and
then we had ice, so you
missed out on the easy
class and instead got to
stay home!

Hint: Syllabus time

Today's Class: Not spending the entire class on the syllabus

Foreword: Stuff you need to get, what to expect in this class

Content Part 1: Types of mobile apps

- Statistics: threat vectors and vulnerabilities

- Hybrid apps, native apps, web apps, oh my (architectures)

Content Part 2: More about hybrid apps and intro to first project

- Native Containers

- Internal Web apps

- Cordova

- Attack surface

Hands-on Part 3: Getting started

Foreword:

Stuff you need for this class:

No books

A smartphone or tablet, preferably Android, needs to be BLE capable

~~Ubertooth One (\$115)~~ (I will provide these this year)

~~<http://hackerwarehouse.com/product/ubertooth-one/>~~

MetaWear (\$40)

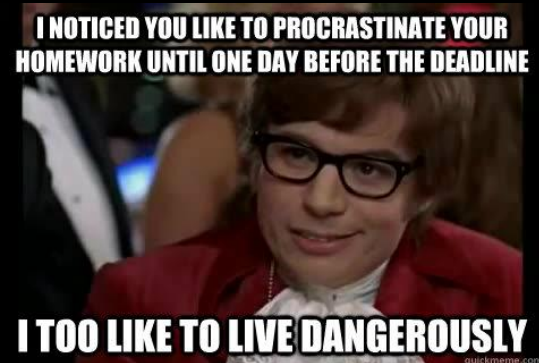
(R, RPRO, RG, C, or CPRO will work, R is the cheapest)

<https://store.mbientlab.com/product-category/application/wearables/>

Foreword:

What to expect from this class

- Mostly project development and lab time with a bit of lecture
- Hands-on step-by-step tutorials and then a freestyle project of your own
- No tests
- Lots of projects (don't procrastinate)
- self-referential (bad) humor in slides

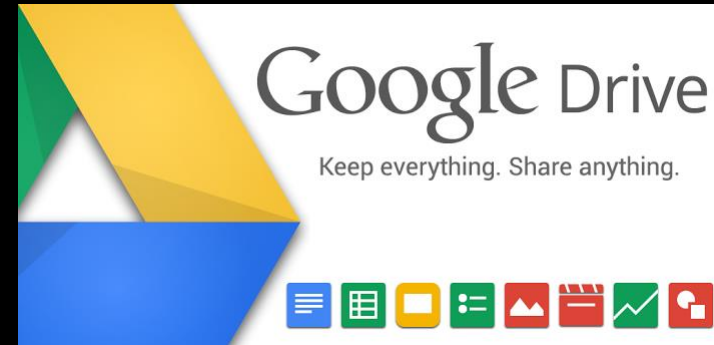


Part1:

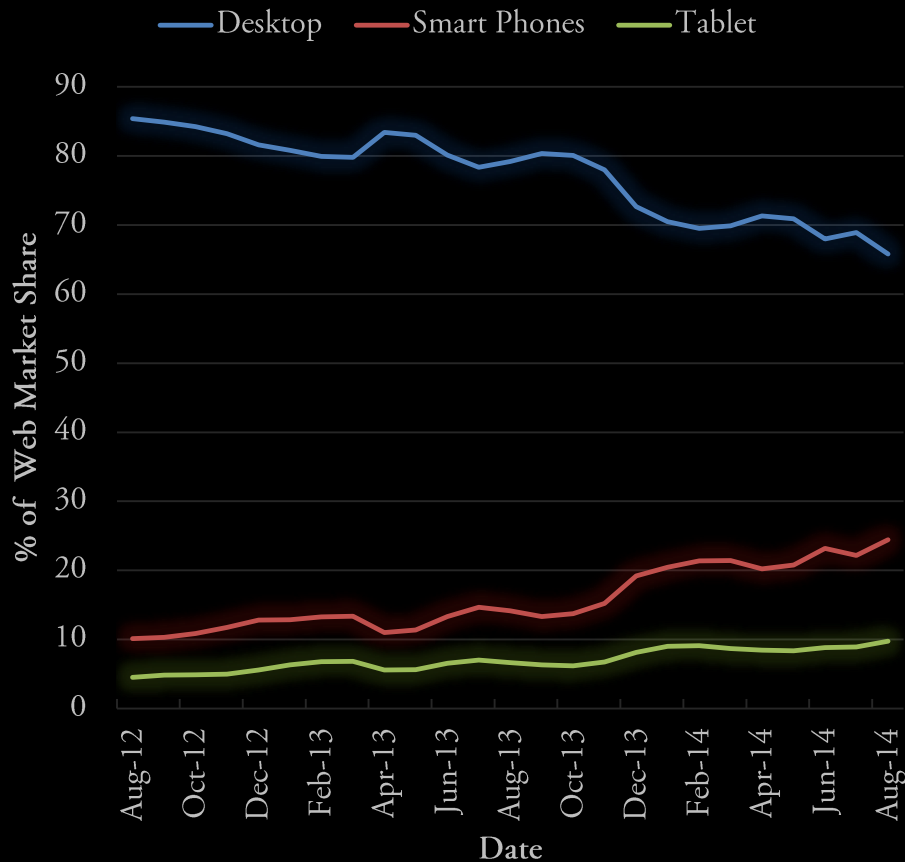
Lets talk a little about the different types of mobile apps.



(nearly) All companies have a mobile app.
You probably use them, **daily**.



The Growth of Mobile



Face reality as it is, not as it was or
as you wish it to be

- Jack Welch (former GM CEO)

As a user, you expect mobile apps to be:

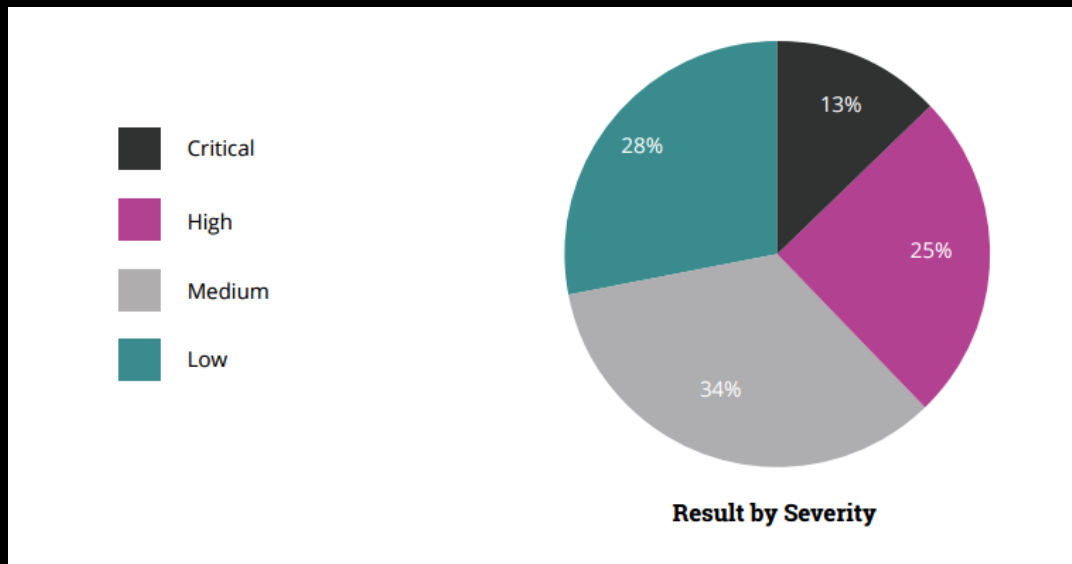
fast, responsive, connected, and secure

Despite your expectations...

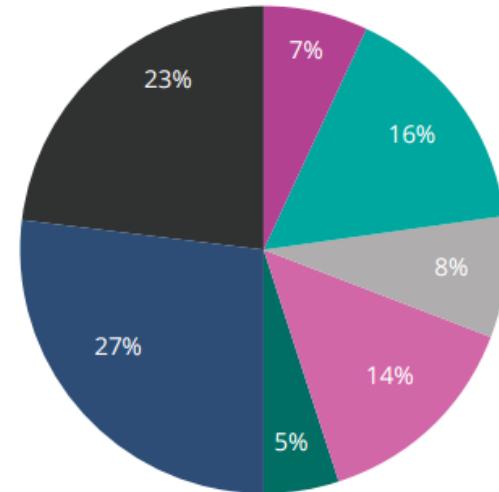
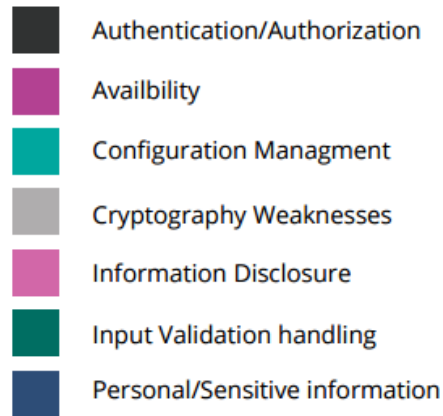
Most mobile applications have vulnerabilities*

*9.041 Vulnerabilities per app on average

...decomposition by criticality



...decomposition by type

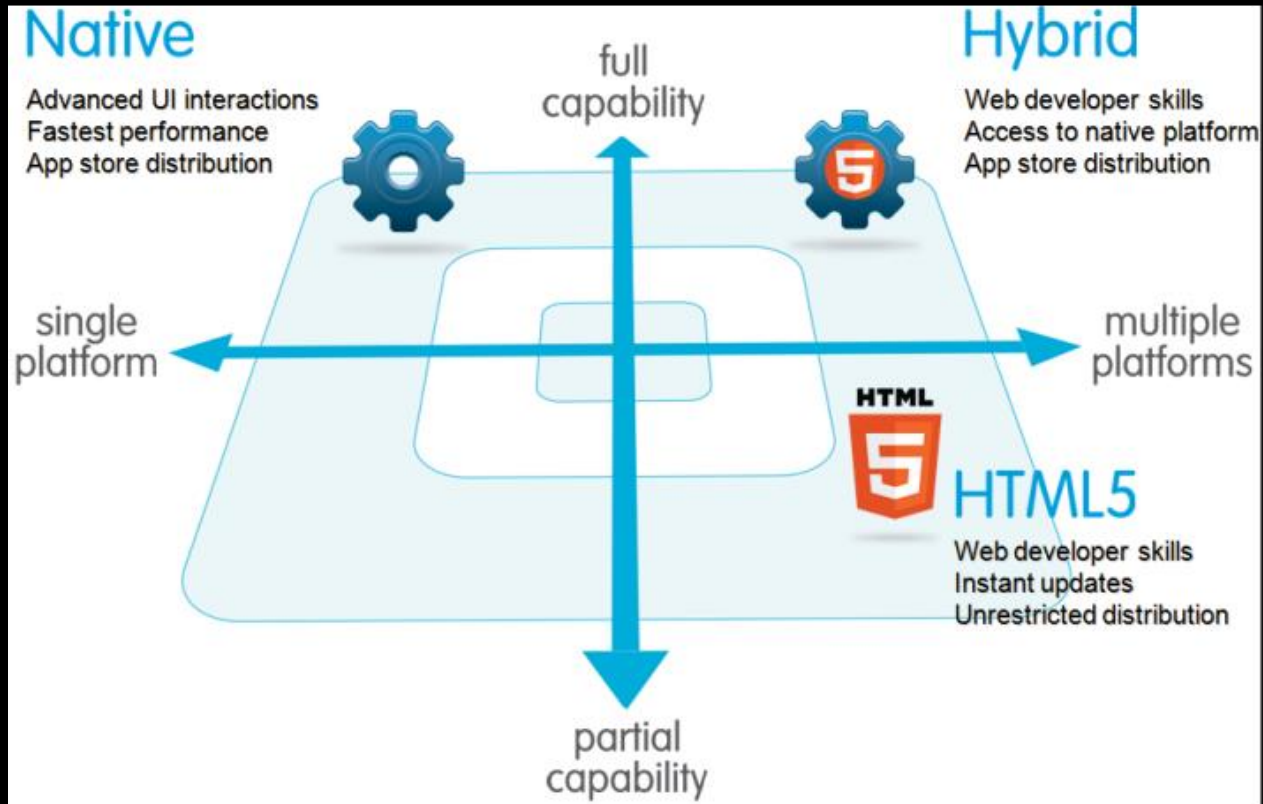


Results by risk category

There are three main types of mobile apps



Landscape of types



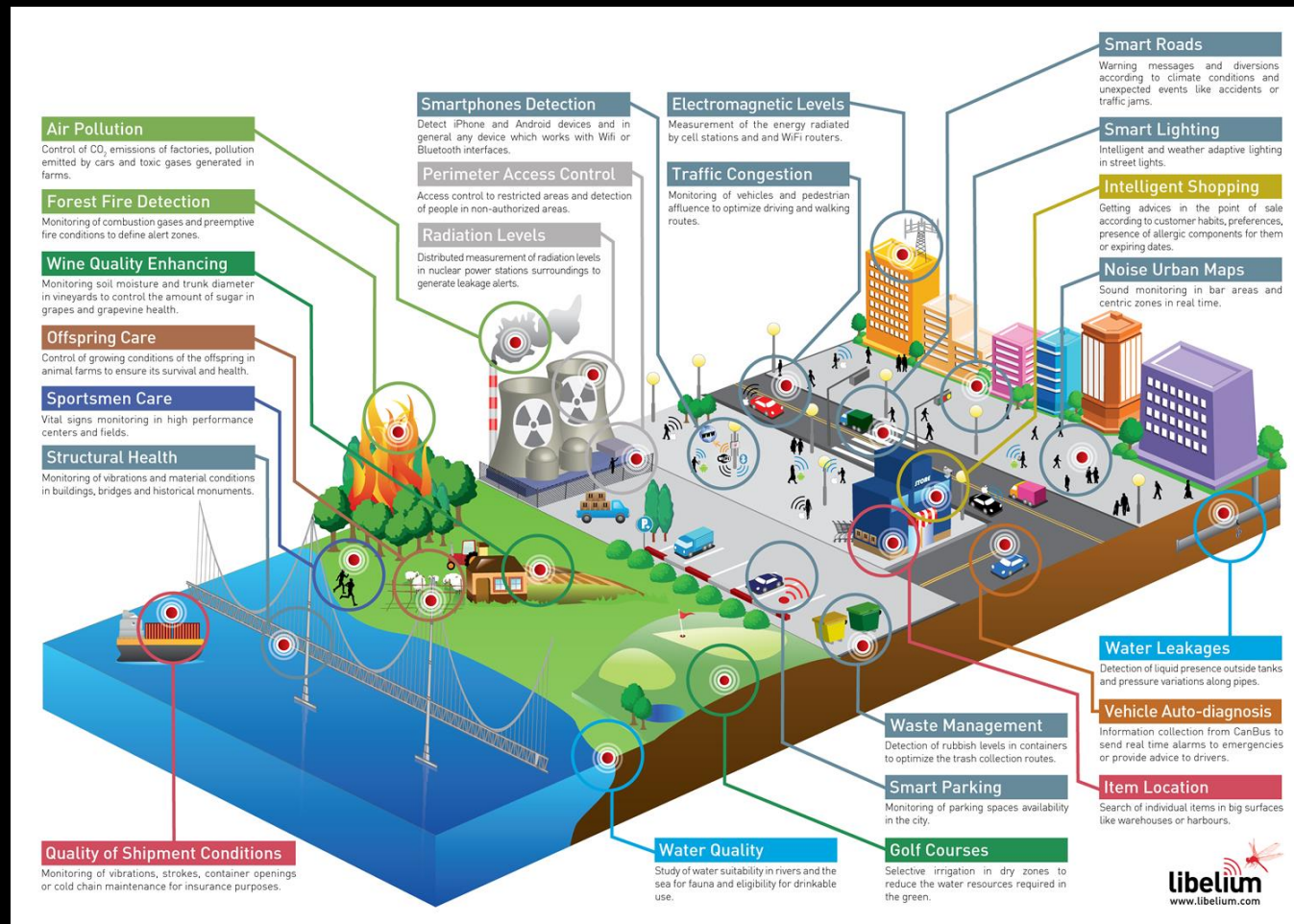
We will cover native and hybrid apps in this class.
If you are interested in pure web apps, that was last semester.



What is the internet of things and
why should you care?

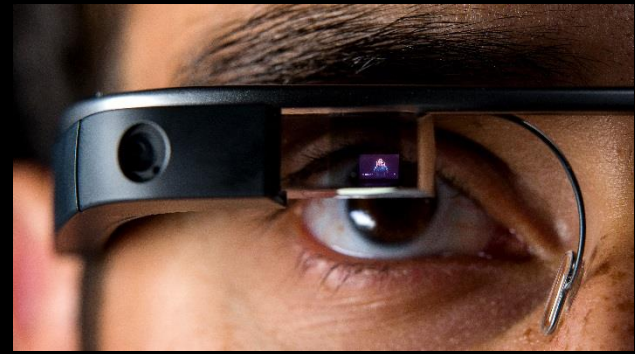
What is the internet of things?

Sensors Embedded Everywhere



What is the internet of things?

fitbit
surge™



GLASS

Including on your wrist, in your clothes, on your face...

NIKEFUEL



UP
by JAWBONE™



What is the internet of things?

And lots of:



Face reality as it is, not as it was or as you wish it to be
- Jack Welch (a favorite quote of mine obviously)

Reality: There are many security issues raised by a connected world
(we will come back to these IoT topics)

For now...lets start with mobile apps
Part2:

More about Hybrid Apps

In this class, you're going to build several mobile apps.

Your first app will be a hybrid app that works with

ember

+



Later you'll create a native app
and then you will come up with your own app idea
(either native or hybrid)

On to hybrid apps...



On to **hybrid** apps...



NATIVE CONTAINERS



iOS - xCode/Objective-C

Android - Eclipse/Java

Windows - Visual Studio/C#

MOBILE WEB

HTML

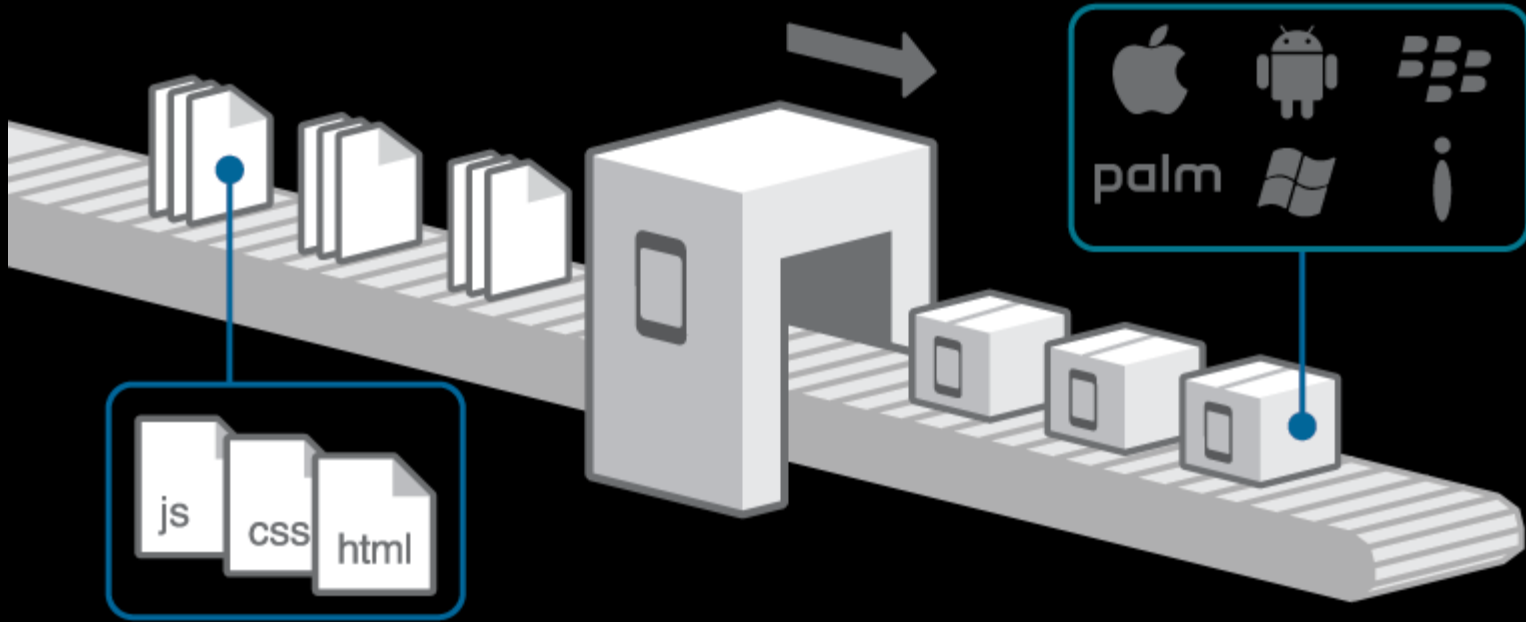


HTML

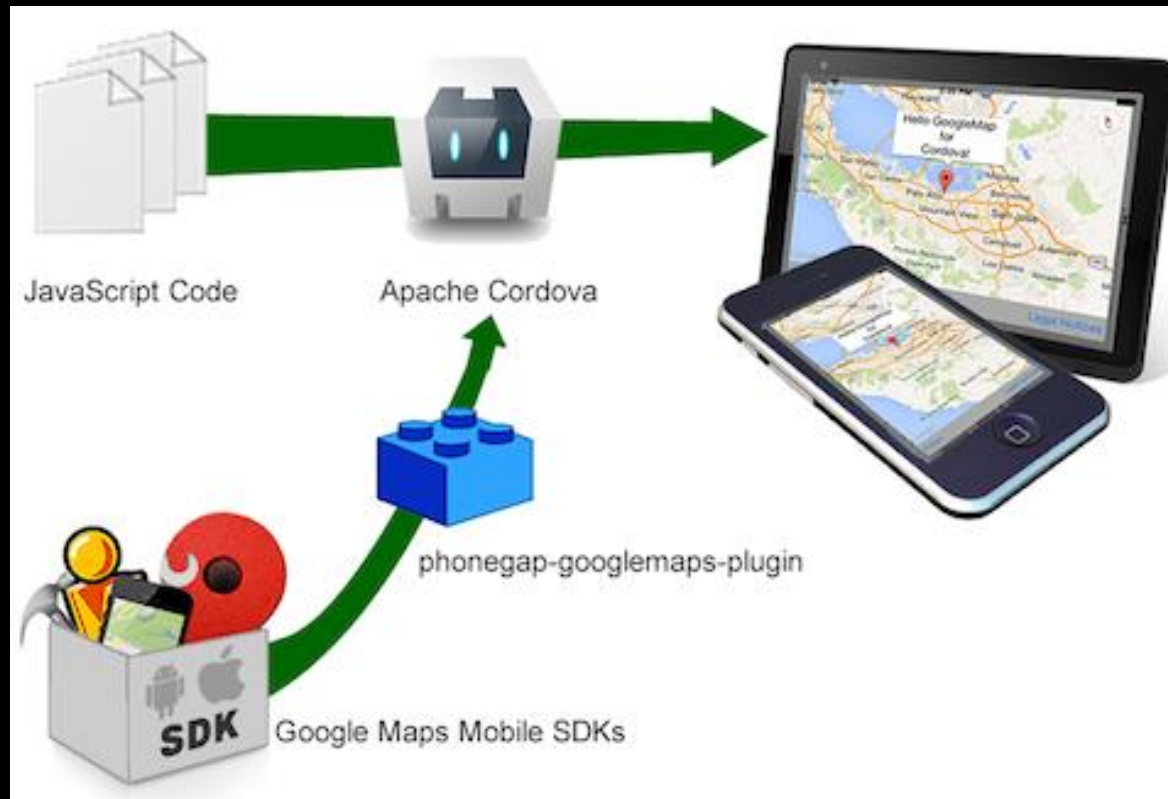
CSS

JavaScript

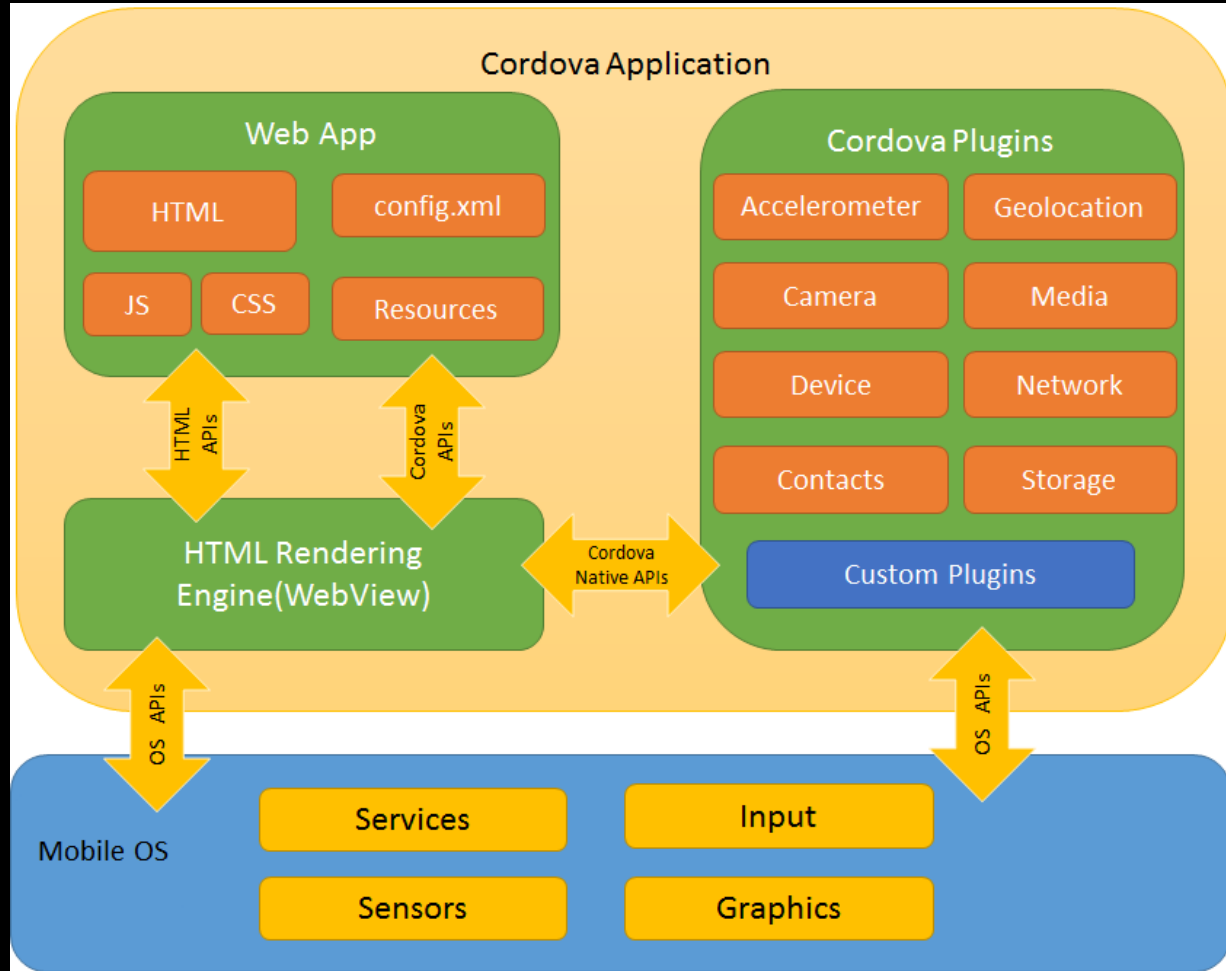
Cordova Paradigm



Cordova Paradigm



Cordova Architecture

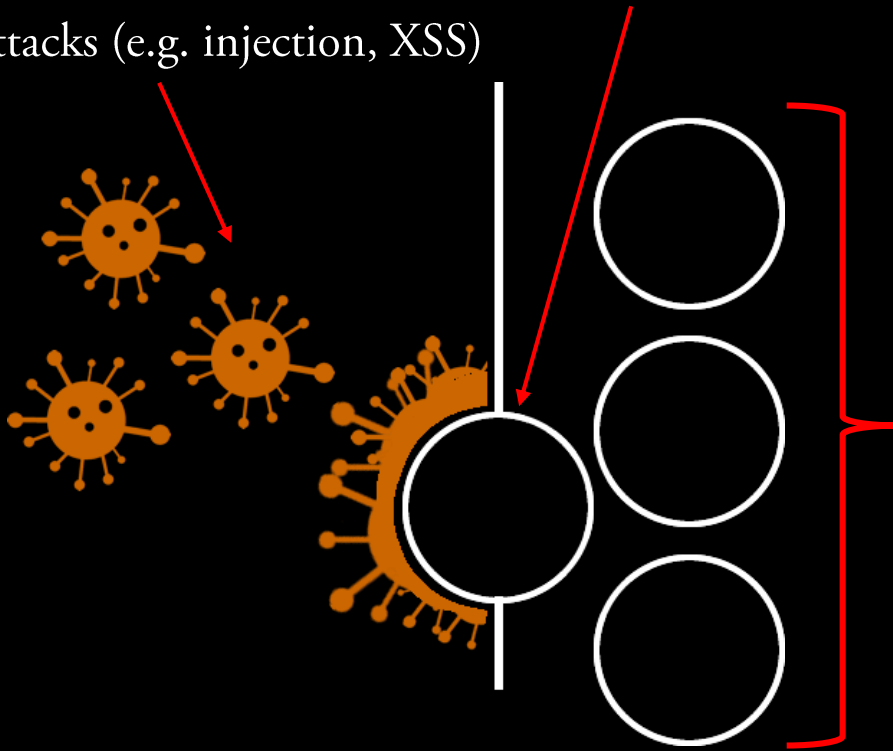


Hybrid apps have unique security challenges

Browser Container

Ideal Web app on a mobile device

Attacks (e.g. injection, XSS)

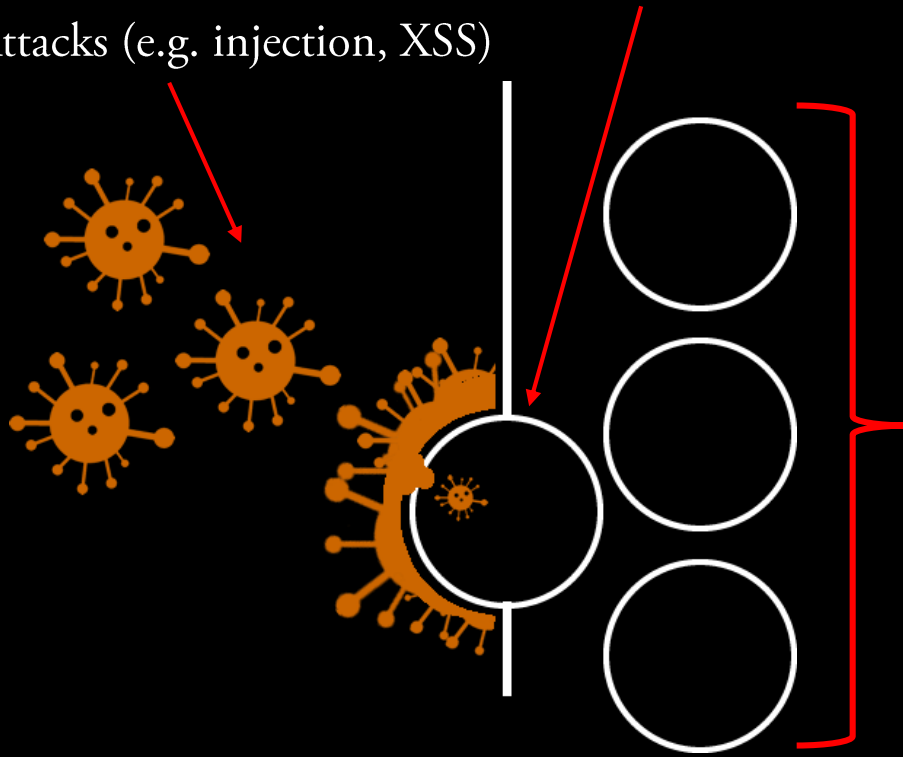


Other OS features/capabilities

Browser Container

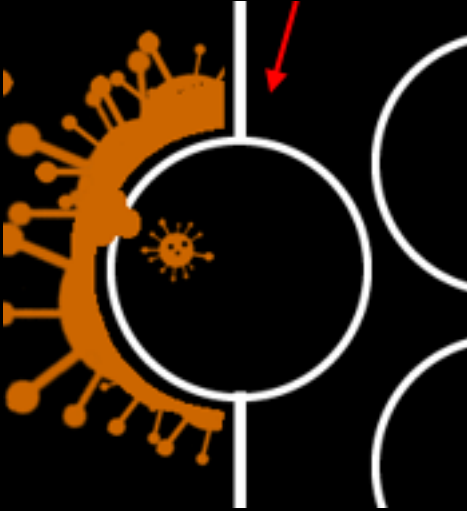
Vulnerable Web app

Attacks (e.g. injection, XSS)



Other OS features/capabilities

At least it's a sandbox...



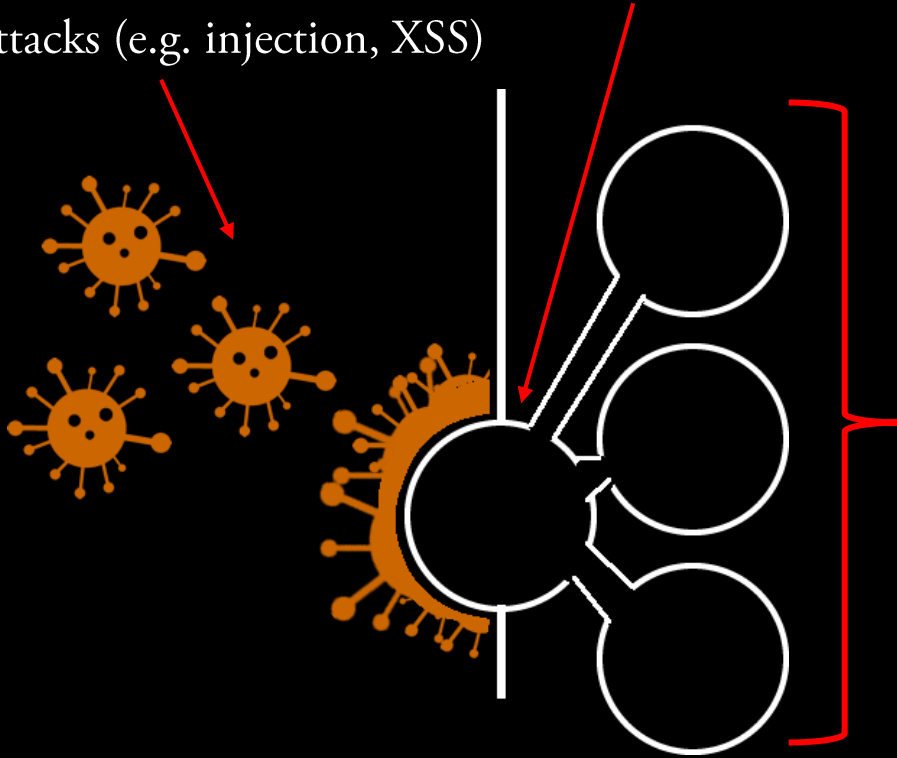
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Browser Container

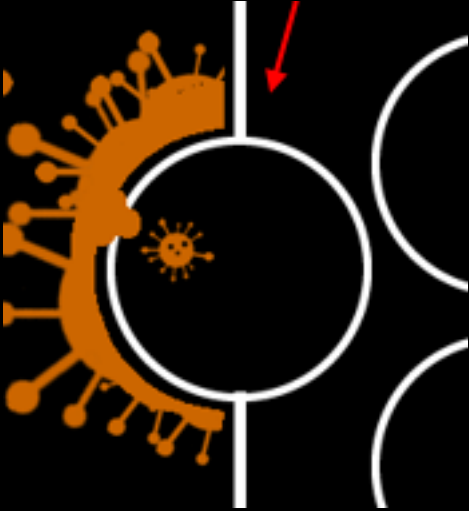
Ideal Hybrid app

Attacks (e.g. injection, XSS)



Other client services now exposed by hybrid app

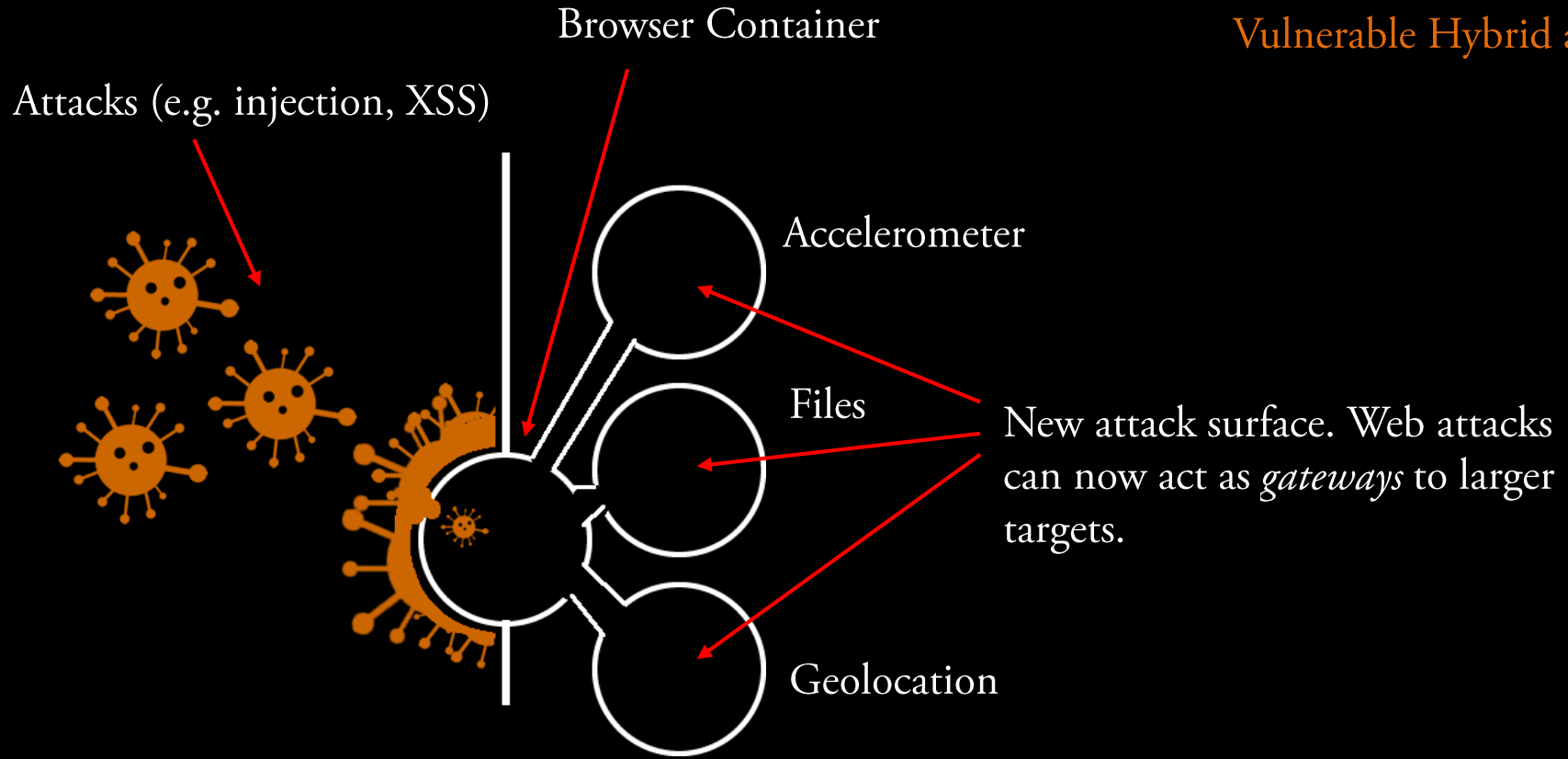
Hybrid Reality



=



Vulnerable Hybrid app



Part 3: Get Started!

see (very detailed) development guide
(goto: <https://github.com/MLHale/CYBR8480>)

ASK QUESTIONS!



Questions?

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