

# **TURNING SENSORS INTO SIGNALS.**

**Humanizing IoT with  
Old Smartphones and the Web.**

*Dietrich Ayala & Rabimba Karinjai*

*Open IoT Summit*

*San Diego, April 4, 2016*



mozilla

**THERE'S A LOT GOING ON...**

SO MANY DEVELOPER BOARDS

SO MANY CLOUD SERVICES

SO MANY LIBRARIES

SO MANY APIs

SO MANY...

**THERE'S A WAR**

**GOING ON**

**FOR YOUR MIND.**

**(BUT THAT'S A TALK FOR ANOTHER DAY.)**

**THINGS TODAY.**

PAYING LOTS OF MONEY  
TO HAND YOUR WHOLE LIFE  
OVER TO A FOR-PROFIT  
CORPORATE CLOUD.

**USER CONTROL**

**EASE OF USE**

**PRIVACY**

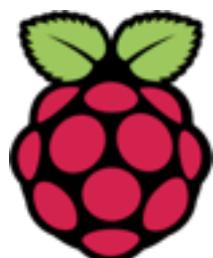
**CLOUD**

**PERSONALIZATION**

**GENERAL FEATURES**



**MAKER / DIY**



**KICKSTARTER /  
STARTUPS**



HomeKit



**MASS MARKET  
CONSUMER**

**THERE IS NO IOT.**

*THERE ARE PEOPLE.*

*THERE ARE PROBLEMS.*

*THERE IS AIR.*

*THERE IS DIRT.*

*AND THERE ARE RADIO WAVES.*

***THE IOT DEVICE  
THAT WILL RULE  
THEM ALL...***

A photograph of a woman with blonde hair, smiling, lying on a light-colored wooden floor. She is surrounded by numerous electronic devices, including several laptops (laptop, tablet, and smartphone), a keyboard, and a small television screen displaying a portrait of a man. The devices are scattered around her, creating a sense of abundance.

**ALL OF THEM.**

*Credit: Jeremy Keith*

**WHO ARE YOUR PEOPLE?**

**WHAT IS THEIR PROBLEM?**

# **REAL TALK.**

*I DON'T HAVE ENOUGH MONEY.*

*I DON'T HAVE ENOUGH TIME.*

*I'M HUNGRY. I'M LONELY.*

*ME OR MY PEOPLES ARE SICK.*

*I'M AWAY FROM HOME.*

*MY GOVERNMENT IS HUNTING ME.*

***I HAVE BASIC  
PROBLEMS.***

***AUTOMATED SHOPPING DOESN'T MAKE MY LIST OF PROBLEMS.***

**I'M AT WORK.**

*I WANT TO KNOW  
IF THE POWER  
WENT OUT AT  
HOME.*

4:40 PM

Saturday, April 2



IF

4:40 PM

sensorium: Warning: Power lost at home!

Rendering with Markers...



70° in San Diego

4:28 PM

Mostly Sunny

20 cards

Sat, Apr 2 • Full-time



Nightly



Gmail



Slack



Instagram



Google



Maps



Twitter



Vine





Today

Notifications

Today



IF now  
sensorium: New Bluetooth Device  
Detected: "alan's iPhone"

**I'M TRAVELING.**

***I WANT TO KNOW***

***IF A STRANGER***

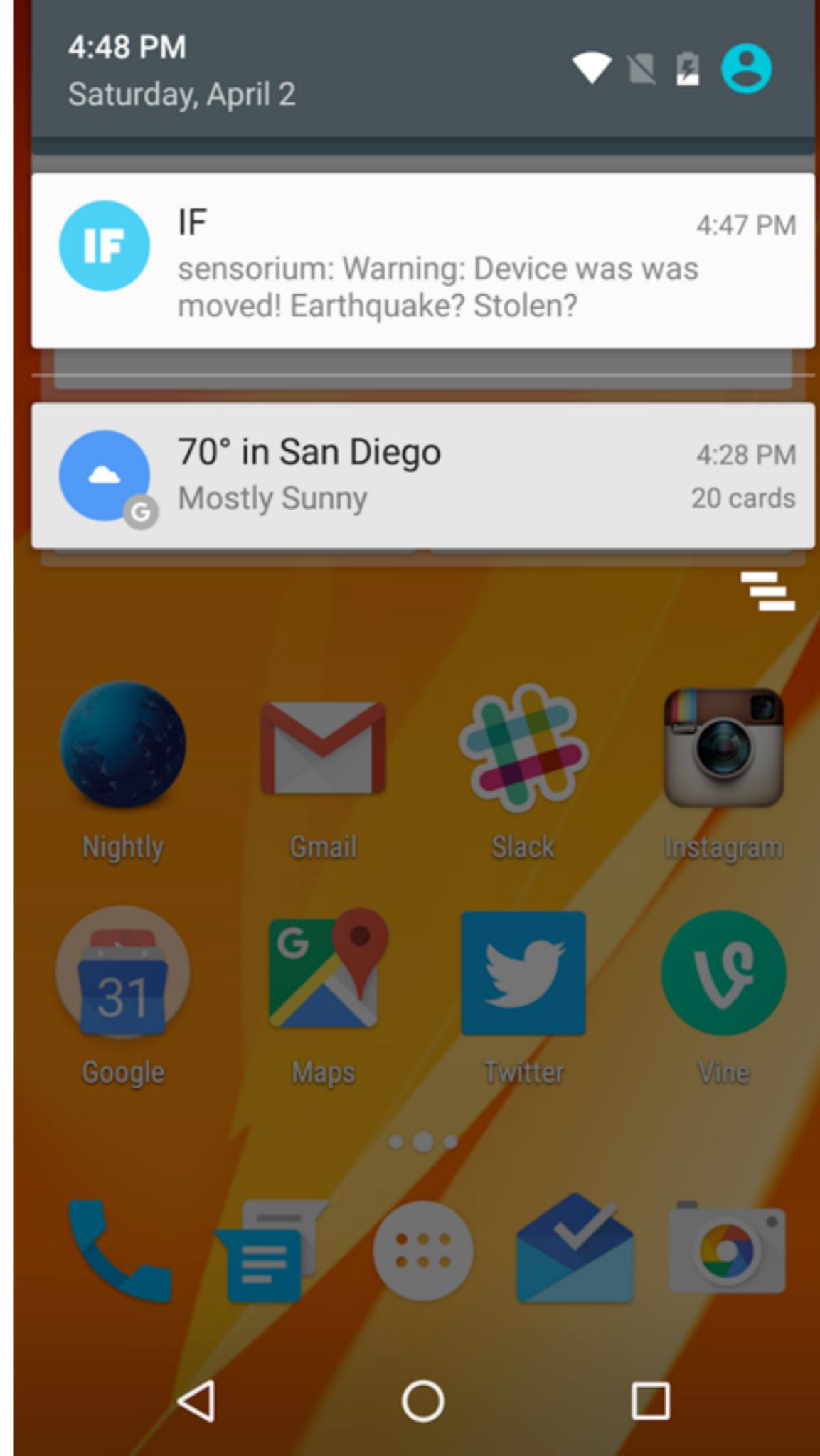
***ENTERS MY***

***HOME.***

# **PHYSICAL AWARENESS.**

**DO APPLIANCES  
KNOW IF THEY  
MOVED OR NOT?**

**WHAT DOES IT  
MEAN IF THEY  
MOVED?**



Today

Notifications

Today



IF now

sensorium: Warning: It's 9am and there's  
been no sound for two hours.

**GRANDMA LIVES  
ALONE NOW.**

**IF SHE'S NOT UP  
AND AROUND BY  
9AM, THEN  
SOMETHING MIGHT  
BE WRONG.**

# **UGH, NOT AGAIN.**

## **FRIGGIN COMCAST.**

5:11 PM

Saturday, April 2



IF

IF

5:10 PM

sensorium: I'm sending you this text  
because the wi-fi internet connection has  
been lost.

San Diego



70°

Barcelona

Real Madrid

Sat, Apr 2 · Full-time



Nightly



Gmail



Slack



Instagram



Google



Maps



Twitter



Vine

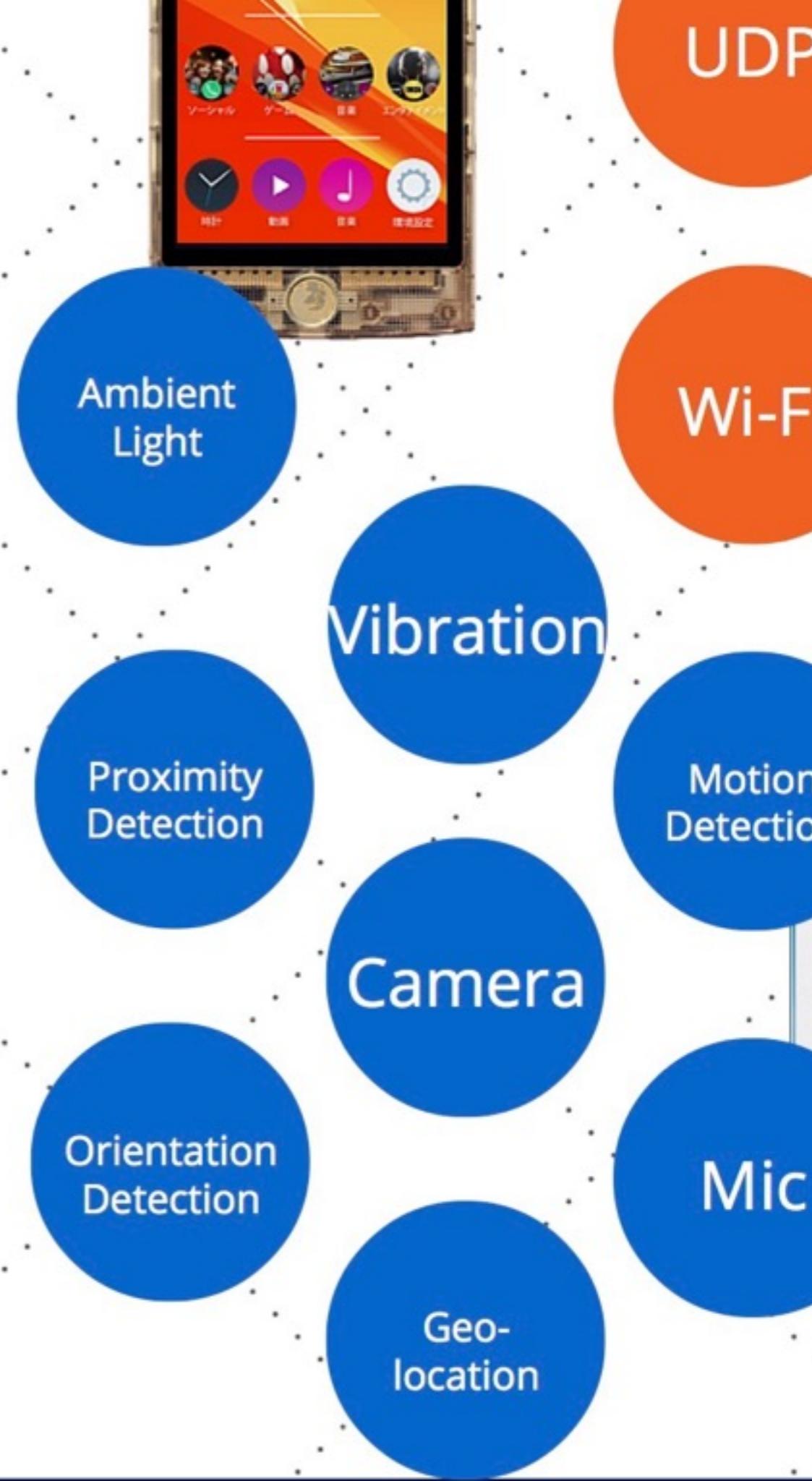


**YOU CAN DO  
THESE THINGS  
WITH CONTEXT.**

**YOU CAN GET  
CONTEXT FROM  
SMARTPHONE  
DEVICE APIs.**

# PHYSICAL APIs

ACCELEROMETER  
ORIENTATION  
PROXIMITY DETECTION  
AMBIENT LIGHT DETECTION  
POWER / BATTERY



# MEDIA APIs

MICROPHONE  
CAMERA  
SPEECH RECOGNITION  
SPEECH SYNTHESIS  
A SPEAKER



UDP

Wi-Fi

Motion  
Detection

Mic

Ambient  
Light

Vibration

Proximity  
Detection

Camera

Orientation  
Detection

Geo-  
location

# RADIO APIs

BLUETOOTH (LE/SMART)

NFC

GEOLOCATION

WI-FI

NFC

I2C

SPI

BLE

GPIO

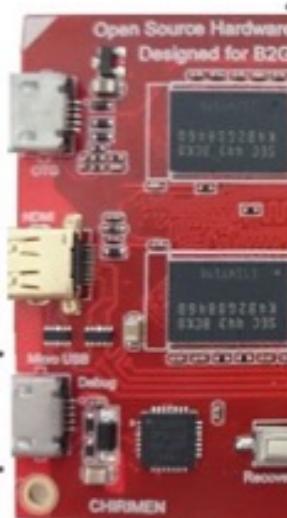
EXEC

File System

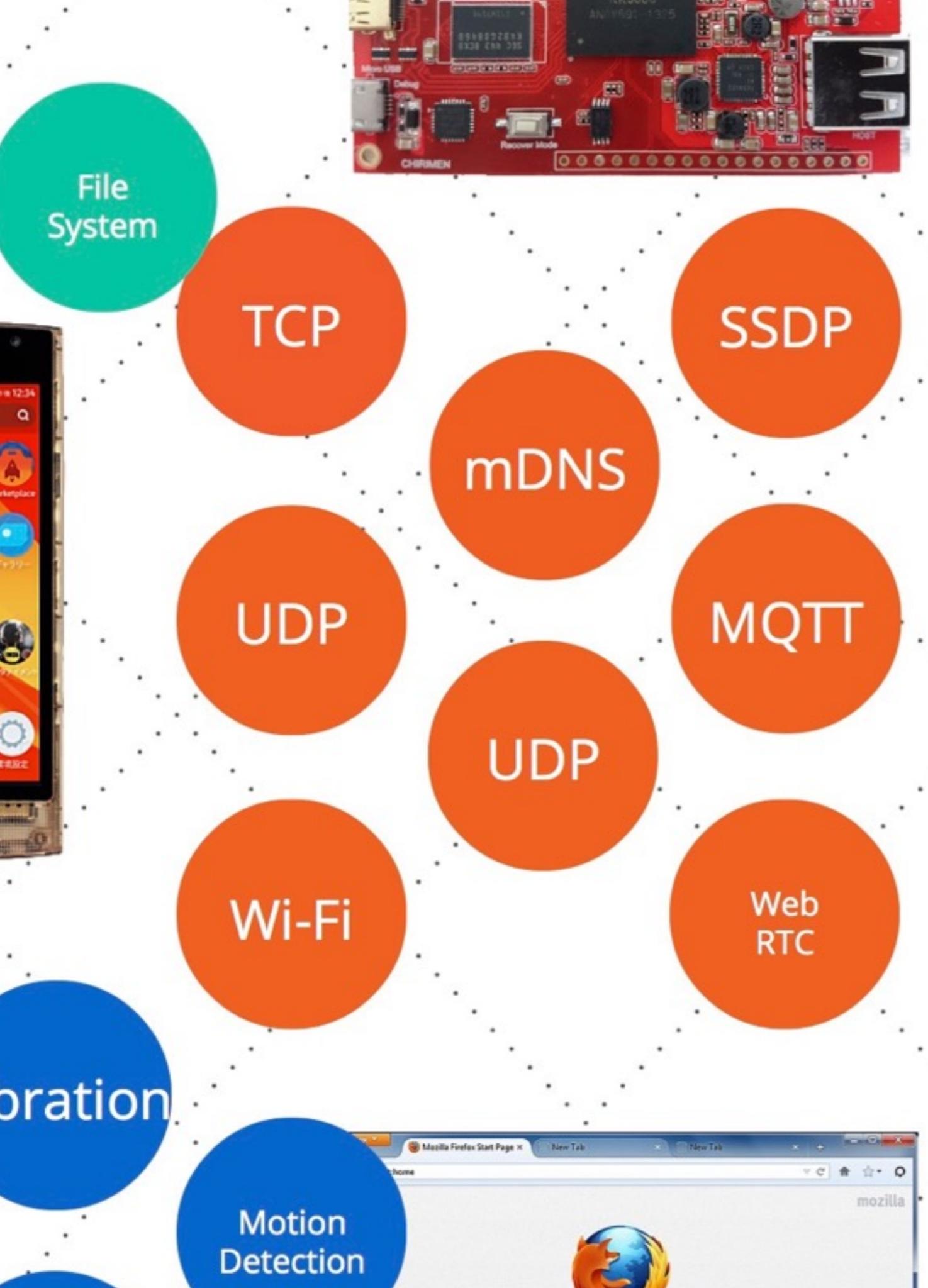
TCP

mD

UDP



# NETWORK APIs



XHR

TCP & UDP SOCKETS

MDNS / BONJOUR

SSDP

DLNA

**WHAT YOU NEED TO PLAY.**

AN OLD SMARTPHONE.

JAVASCRIPT.

WEB APIs.

NOW LOOK AROUND.

# **DEVICES AND PLATFORMS**

I'M USING A FIREFOX OS PHONE  
BECAUSE I CAN ACCESS LOW-LEVEL  
DEVICE APIs FROM JAVASCRIPT.

WEB PAGES ON ANDROID AND IOS  
CAN DO INTERESTING THINGS TOO!

# **APIS -> TRIGGERS**

BATTERY API .....	POWER OUTAGE
ACCELEROMETER.....	EARTHQUAKES/ THEFT
BLUETOOTH .....	PRESENCE / ABSENCE
WI-FI .....	NEIGHBORHOOD
MICROPHONE .....	PRESENCE / ABSENCE
CAMERA .....	PRESENCE OF CATS

# **INTERACTIONS**

WEB PUSH NOTIFICATIONS

SMS

SLACK BOT

IFTTT'S MAKER CHANNEL

**YOU CAN TRY THIS AT HOME.**

[HTTPS://GITHUB.COM/AUTONOME/CONTEXT](https://github.com/autonome/context)

FIREFOX OS (CYANOGEN)

PHONEGAP

ANDROID

IOS



**THANK YOU.**

**@RABIMBA**

**@DIETRICH**