

UX Challenges in IoT and Connected Products

@tamberg

Software Engineer / Founder

Access devices from the Web

Yaler provides a **relay infrastructure** for secure, controlled and manageable **access to embedded systems**.

Get Started with Yaler

Why Yaler? (relay spelled backwards)

Connectivity as a service

Get secure Web and SSH access to your embedded systems, no matter if they're located behind a firewall, a NAT or a mobile network router. Pay-per-use, with premium enterprise support.

Works with your hardware of choice

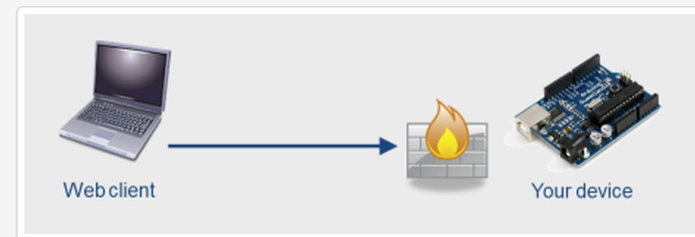
Yaler works with any device that provides a TCP socket. Get started with devices like Arduino, BeagleBone, Netduino and Raspberry Pi, or implement a custom binding for your device, based on our examples in C, C#, Java and Python.

Hassle-free setup, no port forwarding

Once the YalerTunnel command line tool, or a Yaler library, has been installed on the device, and users install it in their device

How it works

Firewall, NAT or mobile router **prevents access**



Relay **provides addressability and accessibility**



Find your people - Meetup

www.meetup.com/find/?allMeetups=true&radius=2&userFreeform=Zürich%2C+Switzerland&mclId=c1005076&mcName=Zü...

meetup

Find
a Meetup Group

Start
a Meetup Group

Organizer

JUN

3

IoT Zurich

IoT and Sensors

Wednesday, June 3 at 6:00 PM | 2 Comments

31

Meetups in your groups

427

Meetups nearby

All Meetups

Q

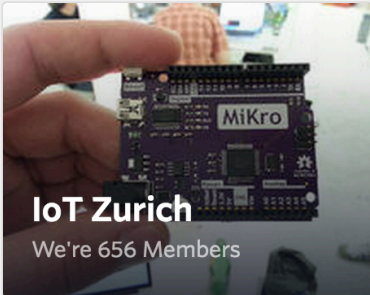
within 2 miles of Zürich, CH

Groups

Calendar


Your Meetups

Sort by Recommended




IoT Zurich

We're 656 Members



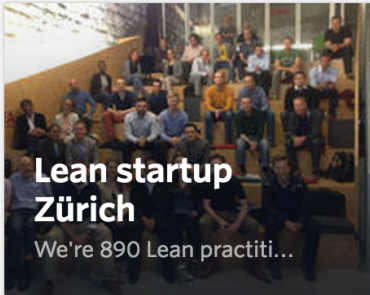
Hardware Startup Zürich Meetup

We're 84 Members



3D Printing Zürich

We're 325 Members



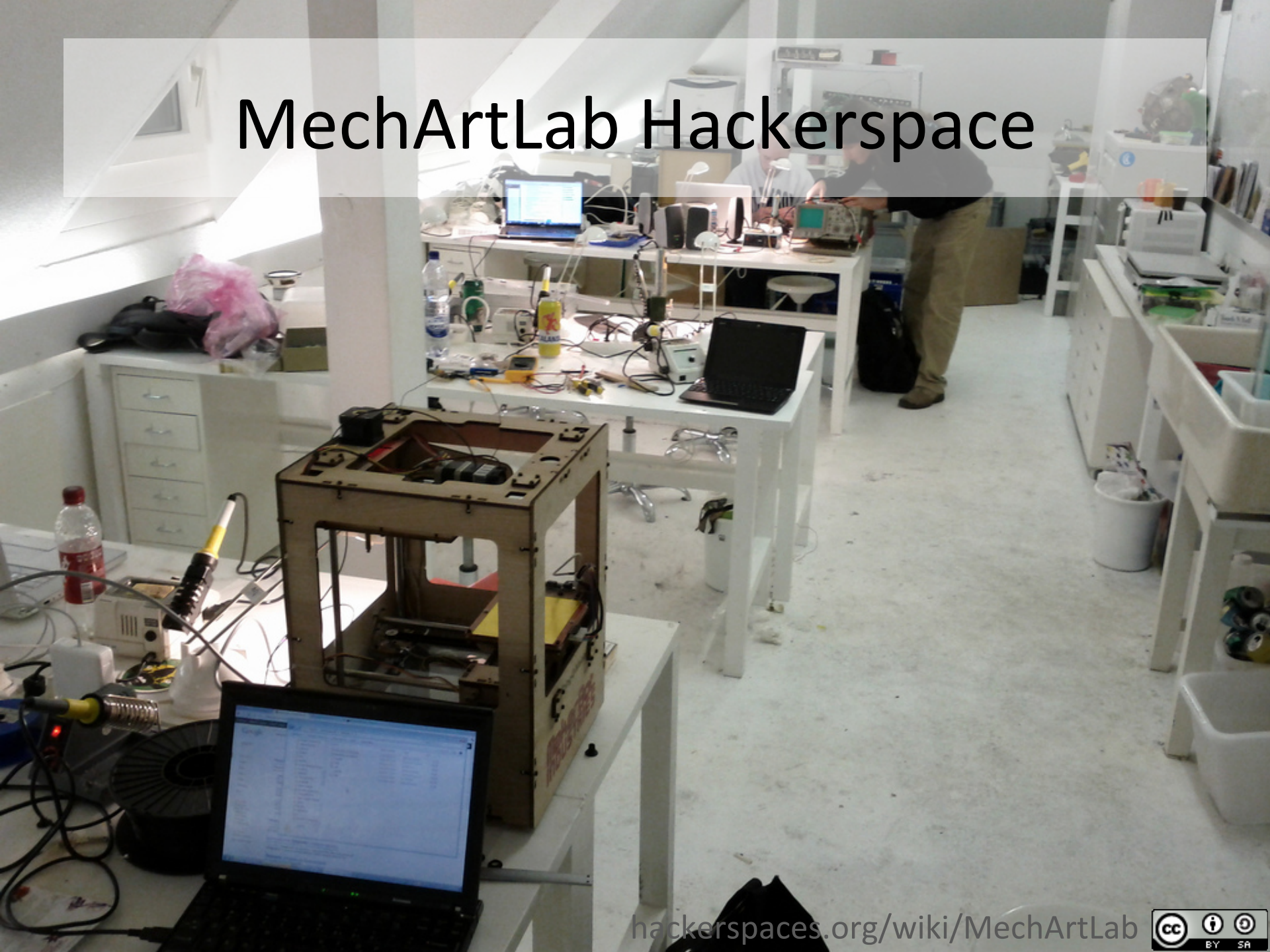
Lean startup Zürich

We're 890 Lean practiti...

FabLab Zürich



MechArtLab Hackerspace



DIY Water Saving Device



#OktoberfestOfThings



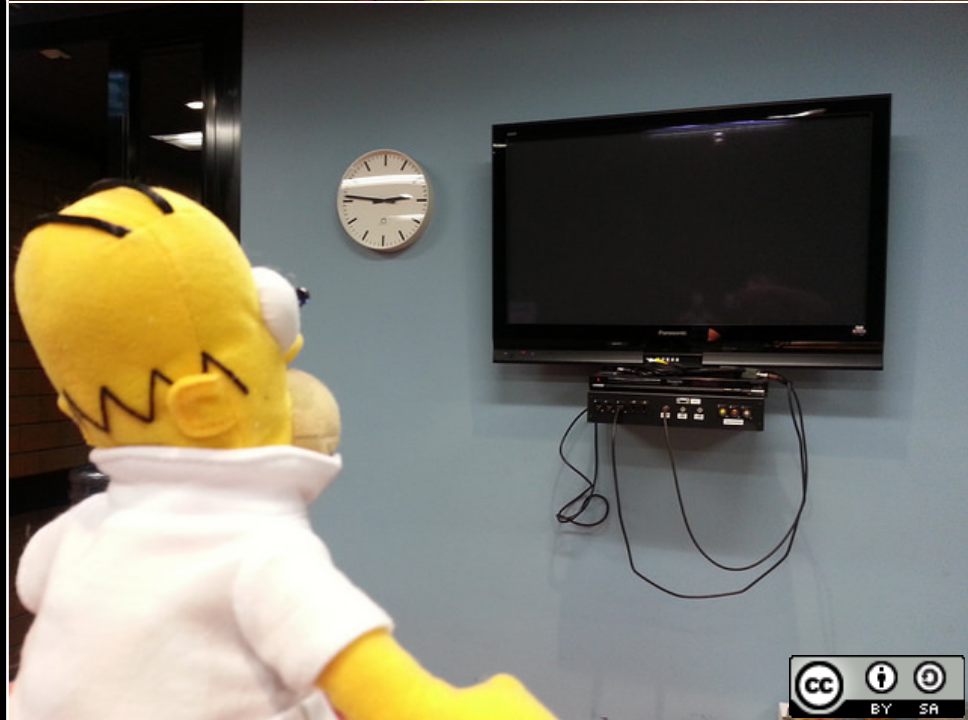
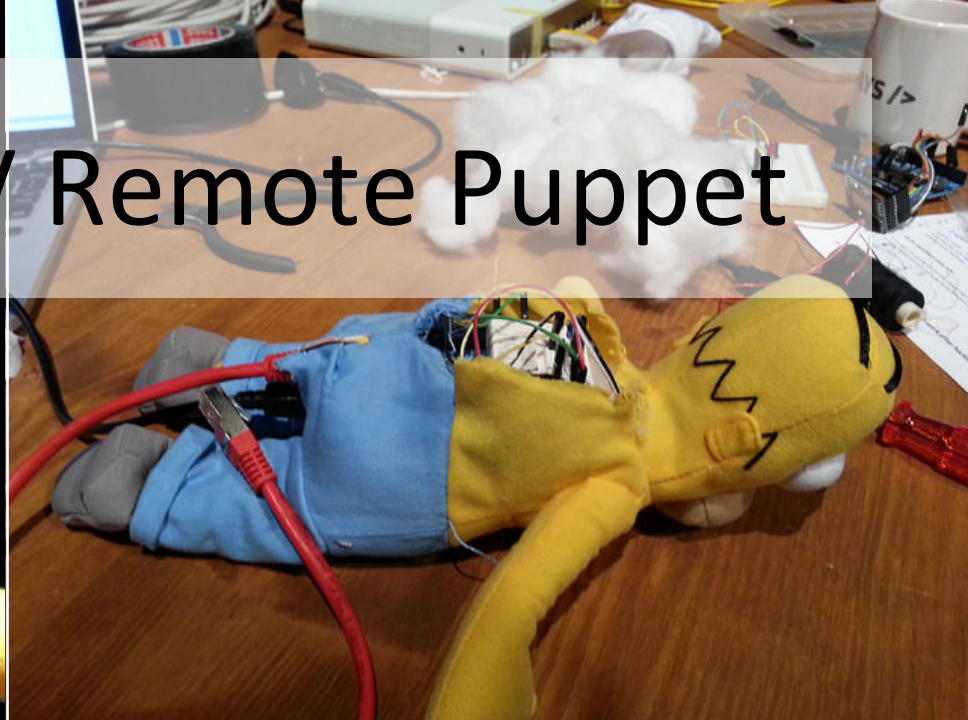
oktoberfestofthings.tumblr.com



www.mkroll.mobi



Smart Homer TV Remote Puppet



Internet of Things (IoT)

"Computers with **sensors and actuators**, connected through Internet-protocols."

=> Measure and manipulate **physical properties**

=> Web apps can reach into the real world

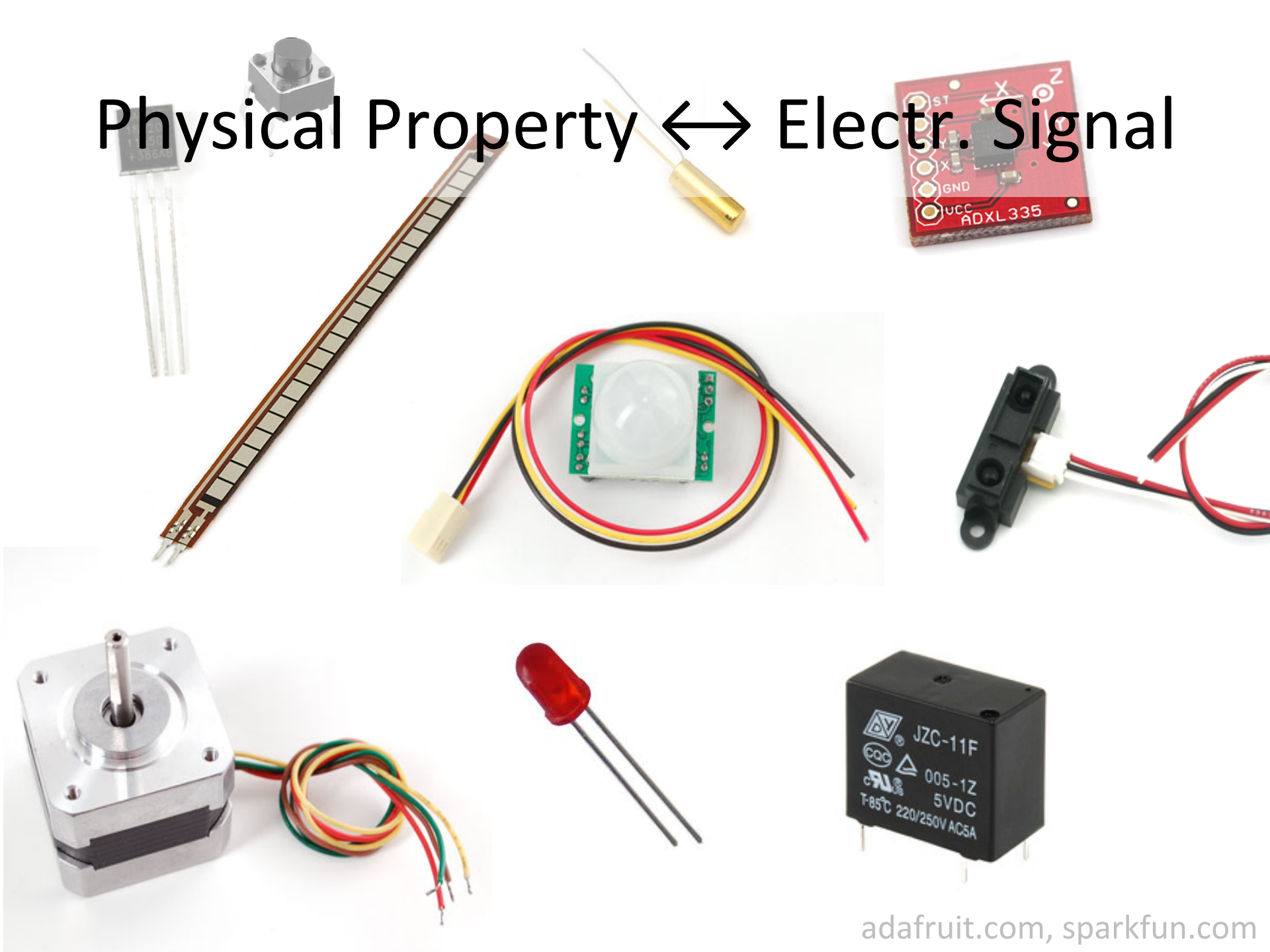
=> Real things become Web services

<http://e-home.com/tamberg/kitchen/light>

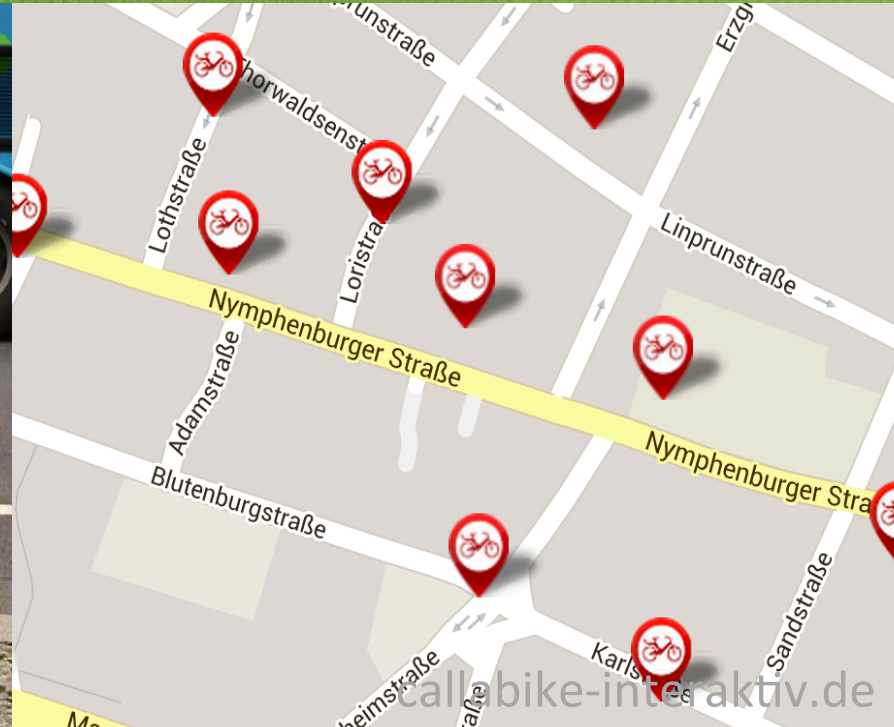
Small + Connected + GPIO Ports



Physical Property \leftrightarrow Electr. Signal



Efficiency, Convenience



Product becomes a Service

Honda Jazz Hybrid



Economy

mobility.ch

"Buy once, read everywhere"



amzn.com/kindle

Mike Kuniavski: Service Avatars



Amazon Dash Button - Offi x


https://www.amazon.com/oc/dash-button/

amazon

PRODUCT OVERVIEWPOPULAR BRANDSHOW IT WORKSMAKERS AND INNOVATORS

Place it. Press it. Get it.

Dash Button comes with a reusable adhesive and a hook so you can hang, stick, or place it right where you need it. Keep Dash Button handy in the kitchen, bath, laundry, or anywhere you store your favorite products. When you're running low, simply press Dash Button, and Amazon quickly delivers household favorites so you can skip the last-minute trip to the store.



Popular brands and products

Choose from favorite household brands. Select your favorite pack sizes. [See selection](#)

NATURAL FOOD FOR DOGS

Information Shadow



withings.com



Visualize Your Progress



Play With Friends



nikeplus.nike.com



My Recipes

Browse

Channels

tamberg ▾

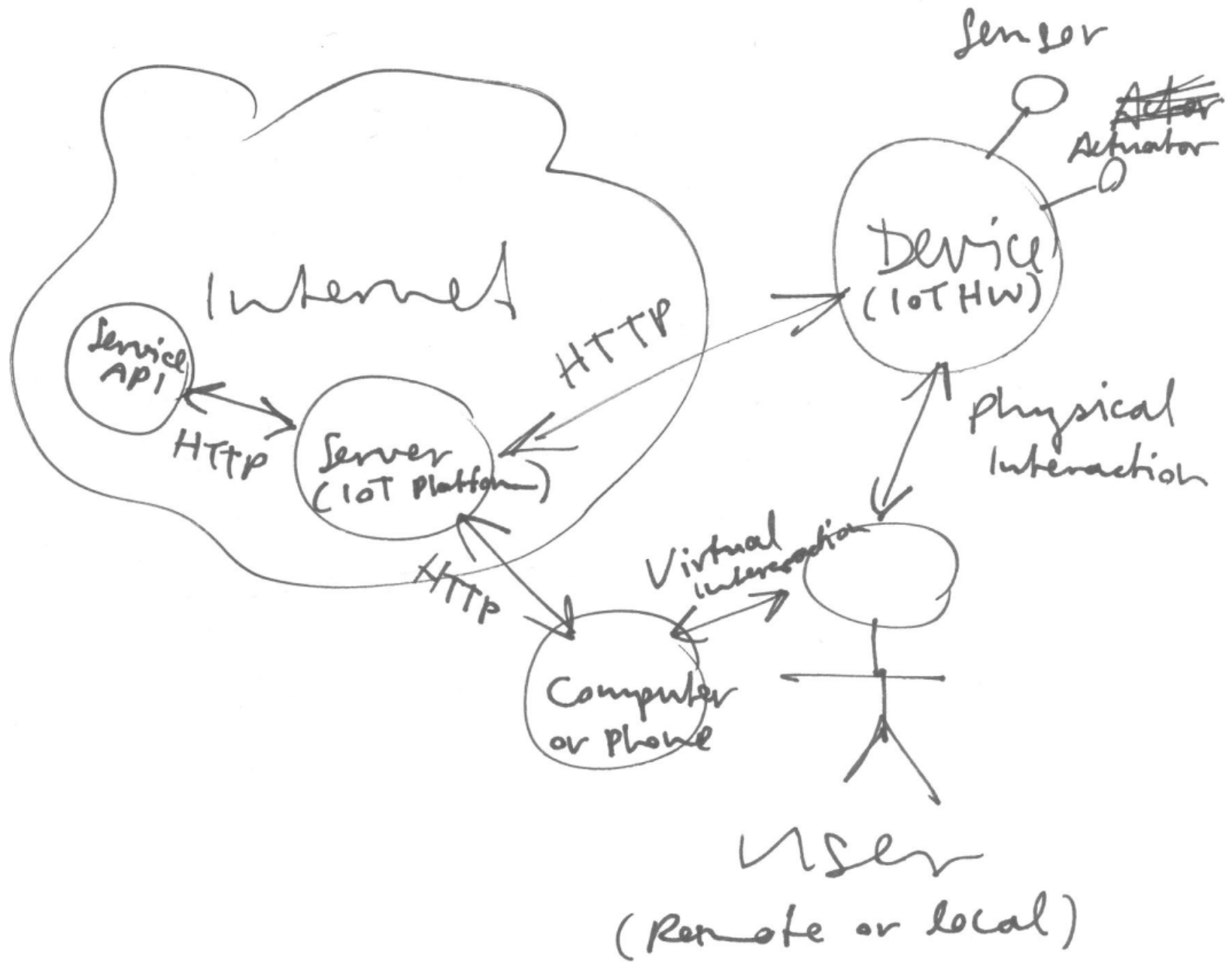
if
UP

then

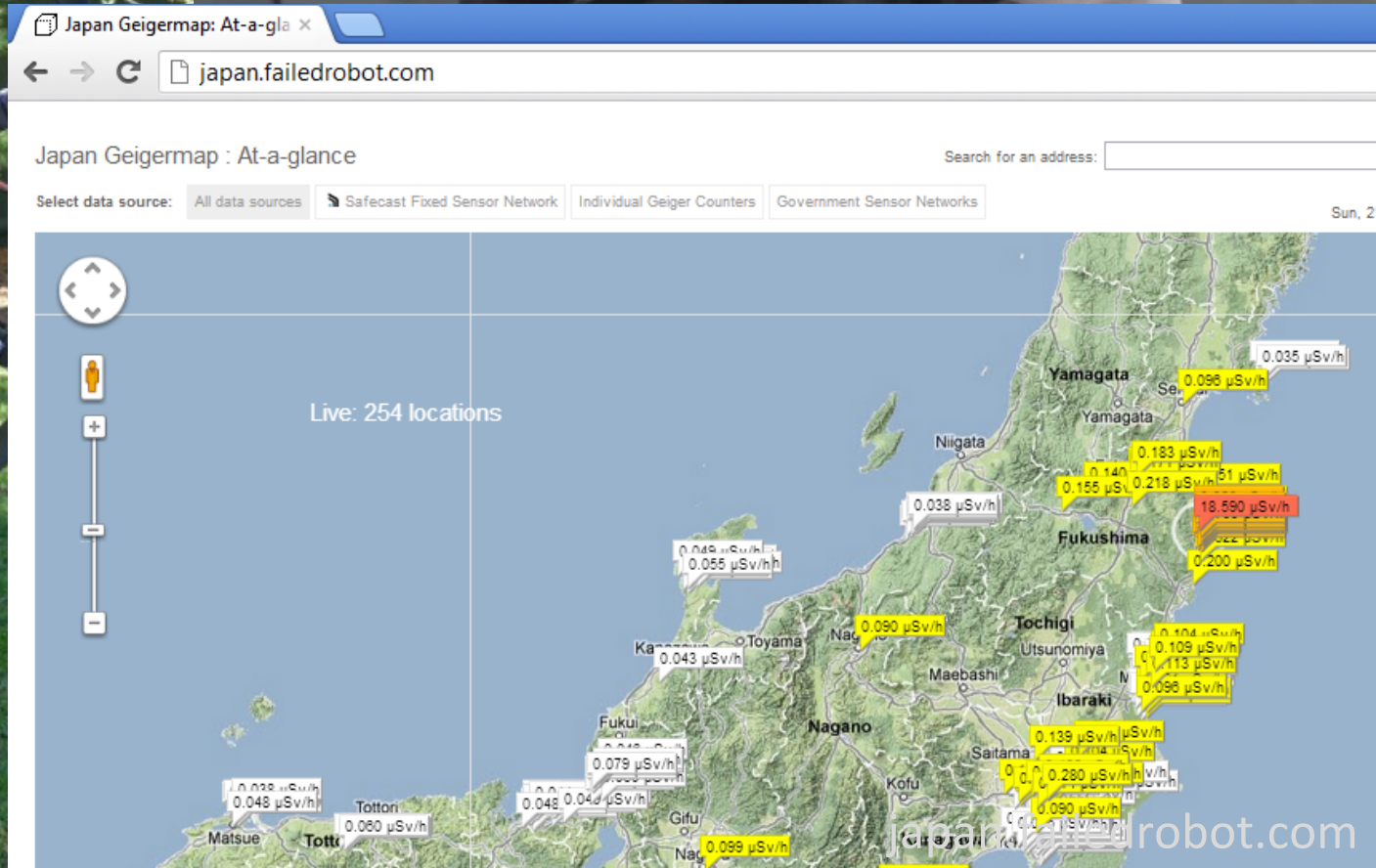


**When I don't get
much sleep, text my
colleague to let her
know I'll be cranky.**





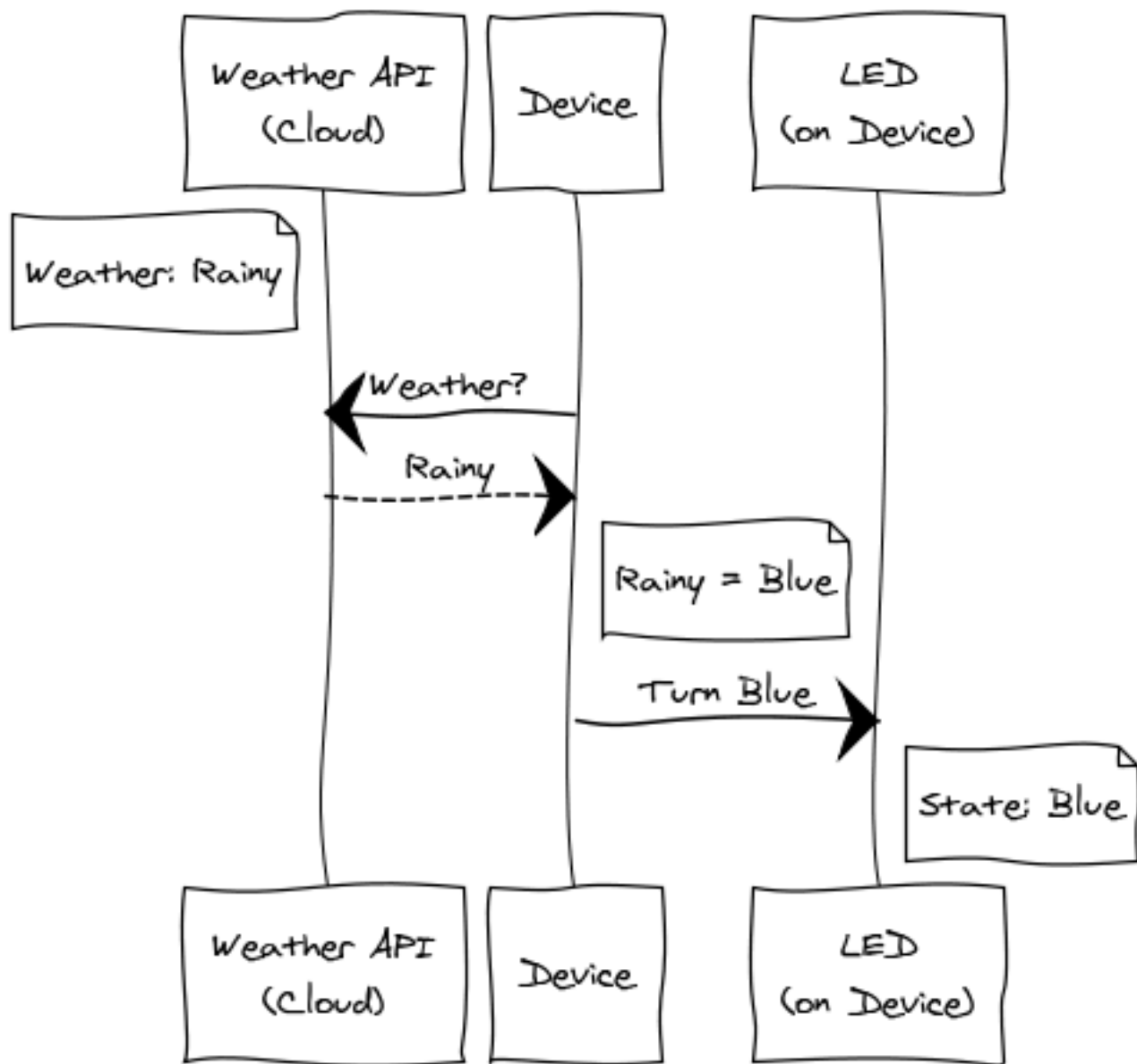
Classic: DIY Radiation Monitoring



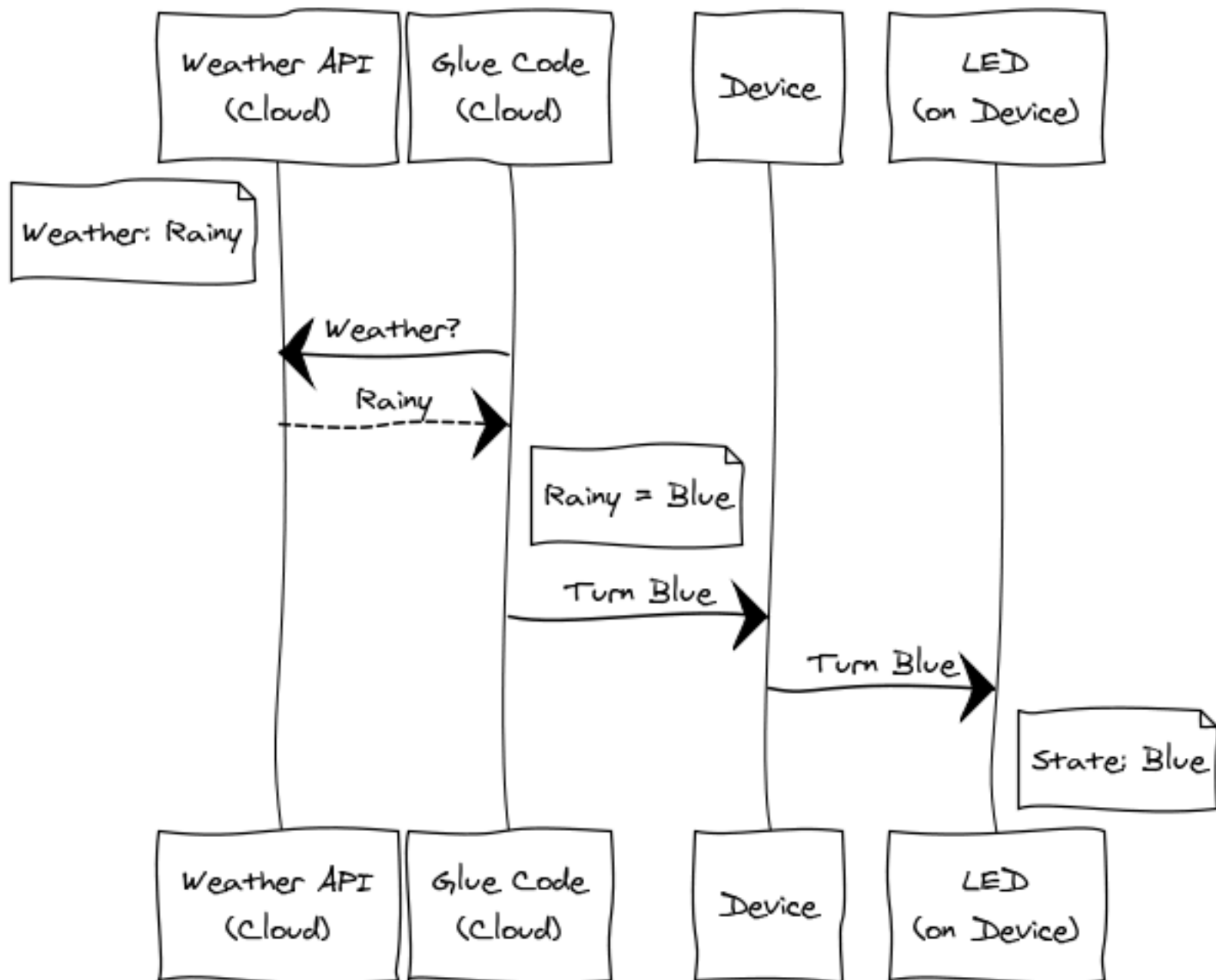
DIY Ambient Weather Orb

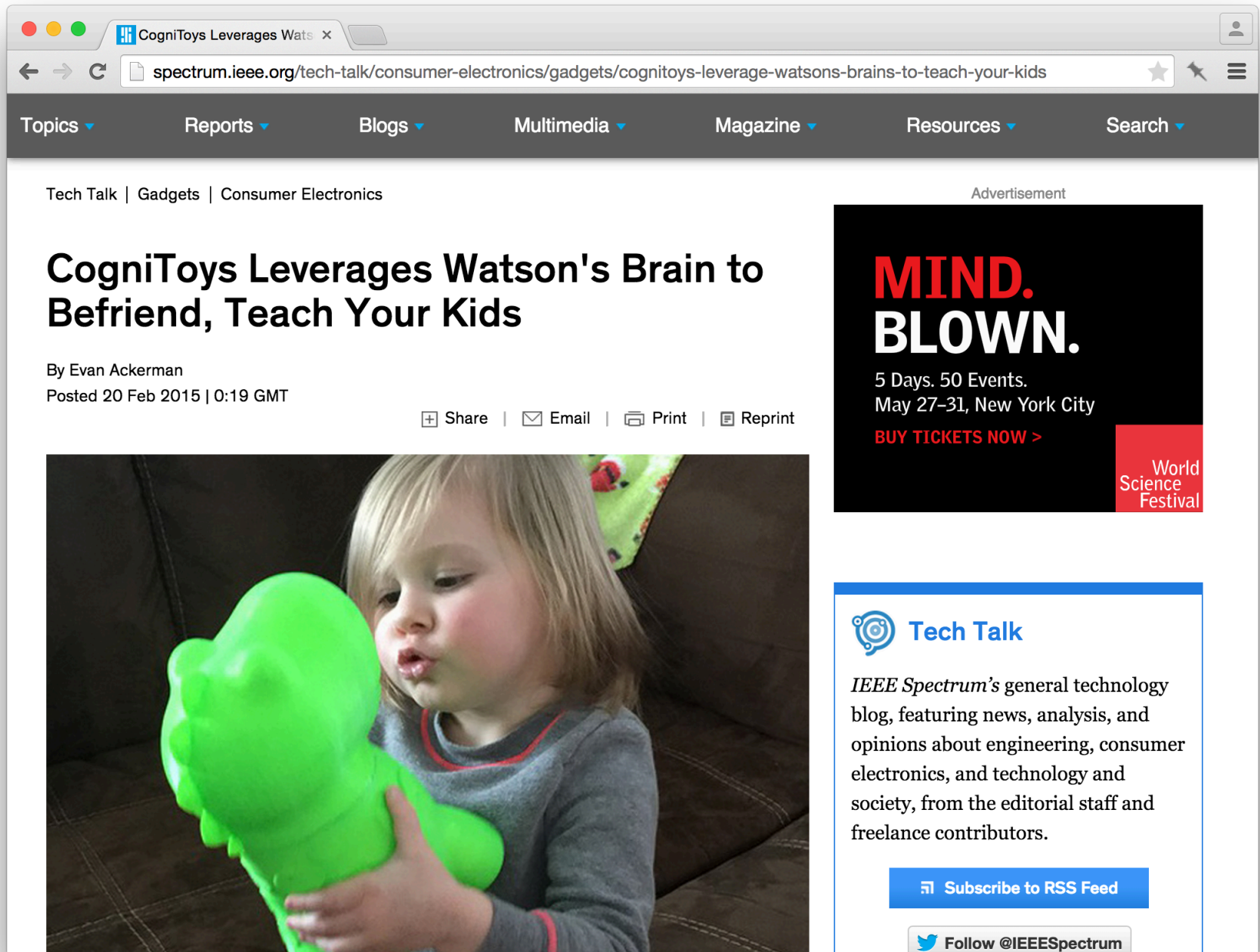


Logic on the Device

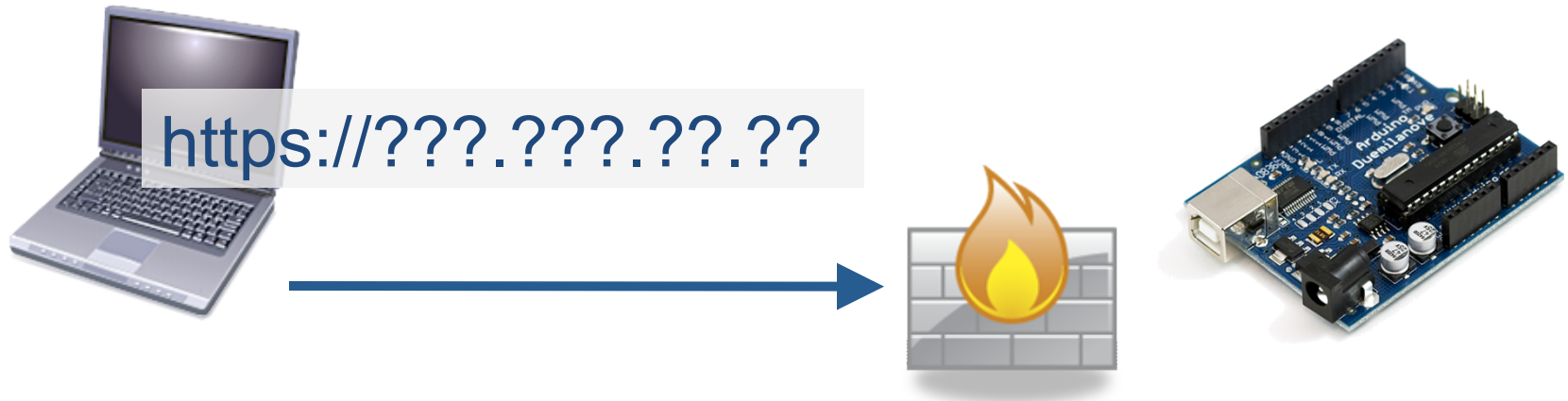


Logic in the Cloud

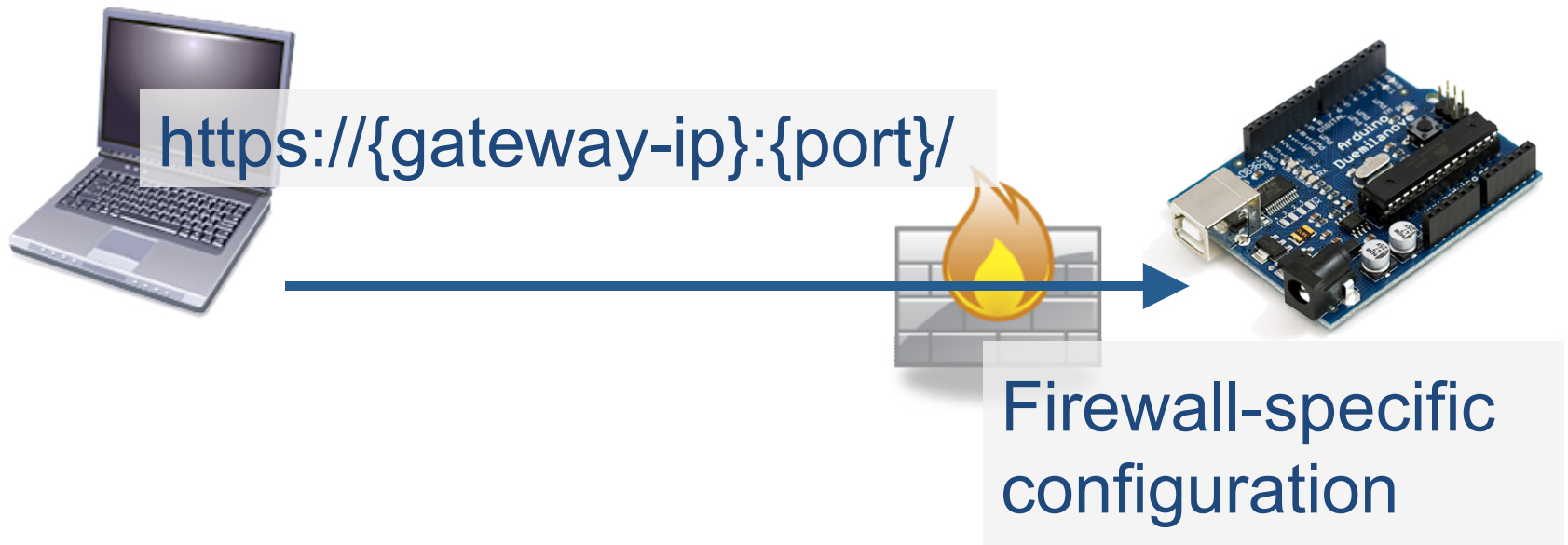




Challenge: Remote Access



Port Forwarding = Hassle

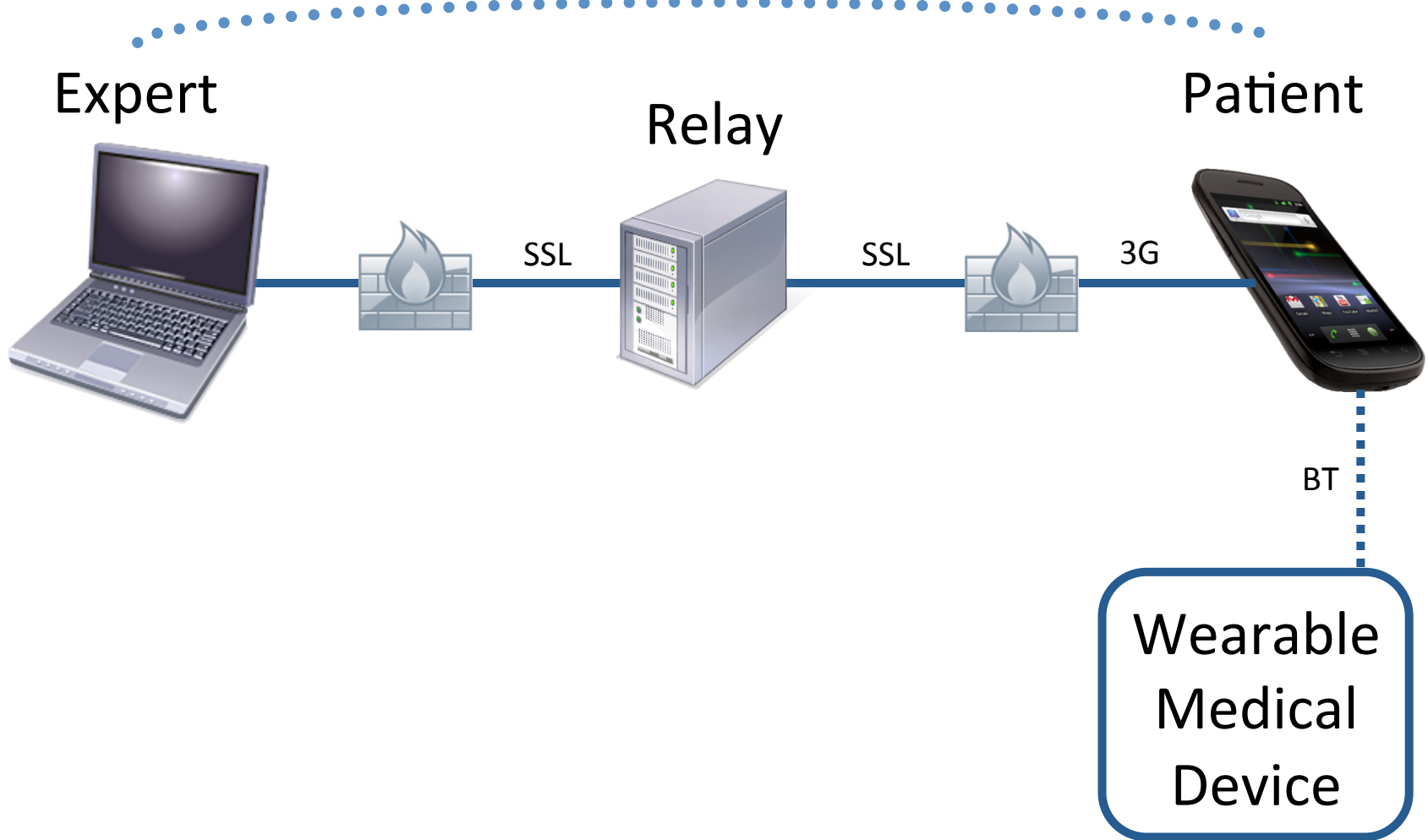


Solution: Relay in the Cloud



Ad-hoc Connectivity

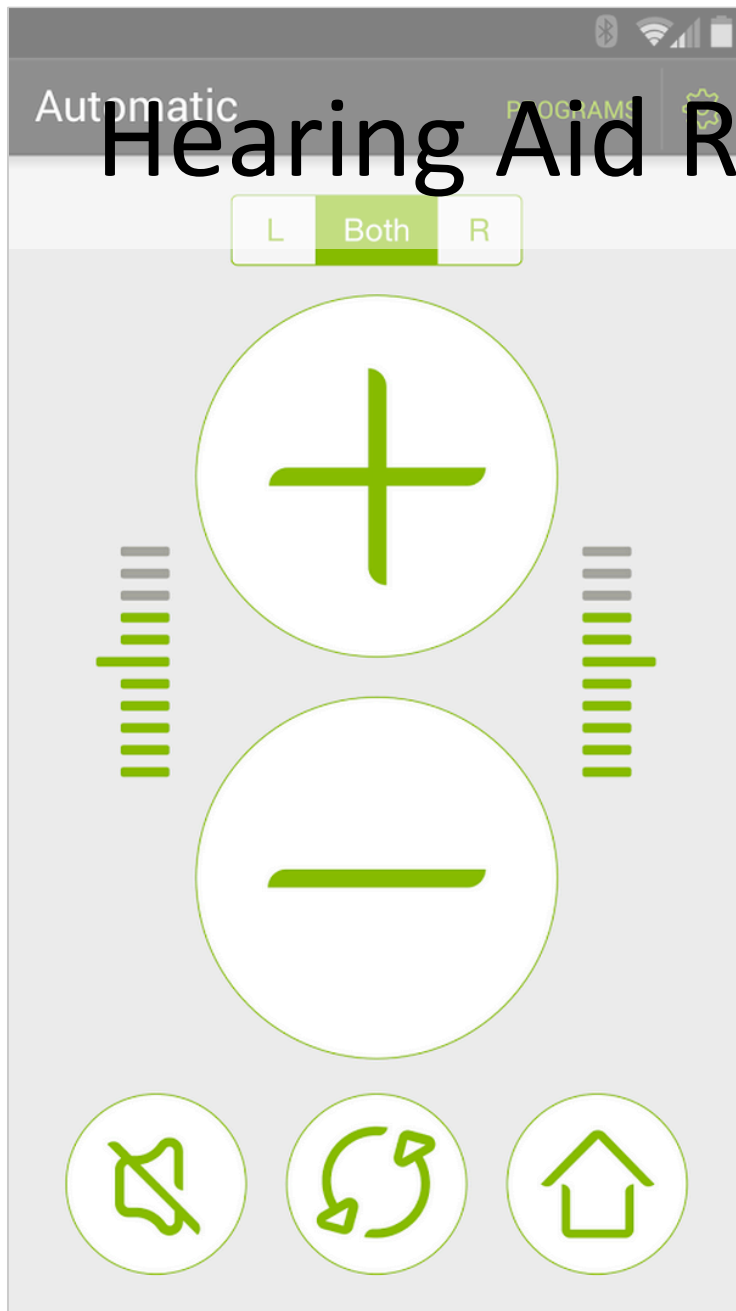
Voice



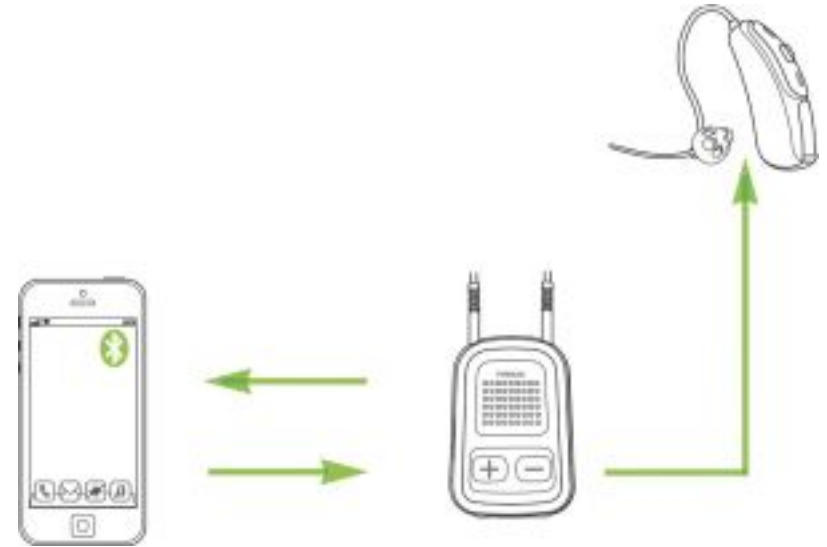
App + accessory



tagg.com, icedot.org,
backyardbrains.com

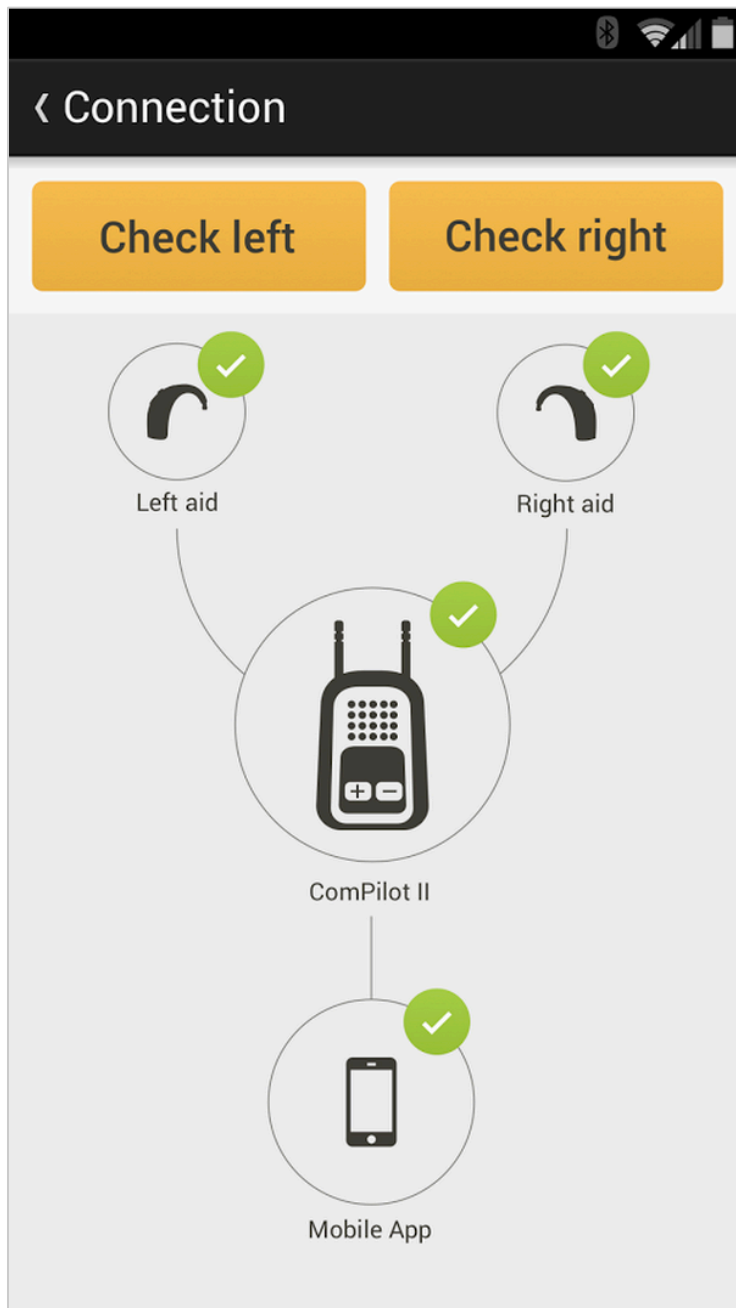


Hearing Aid Remote Control App



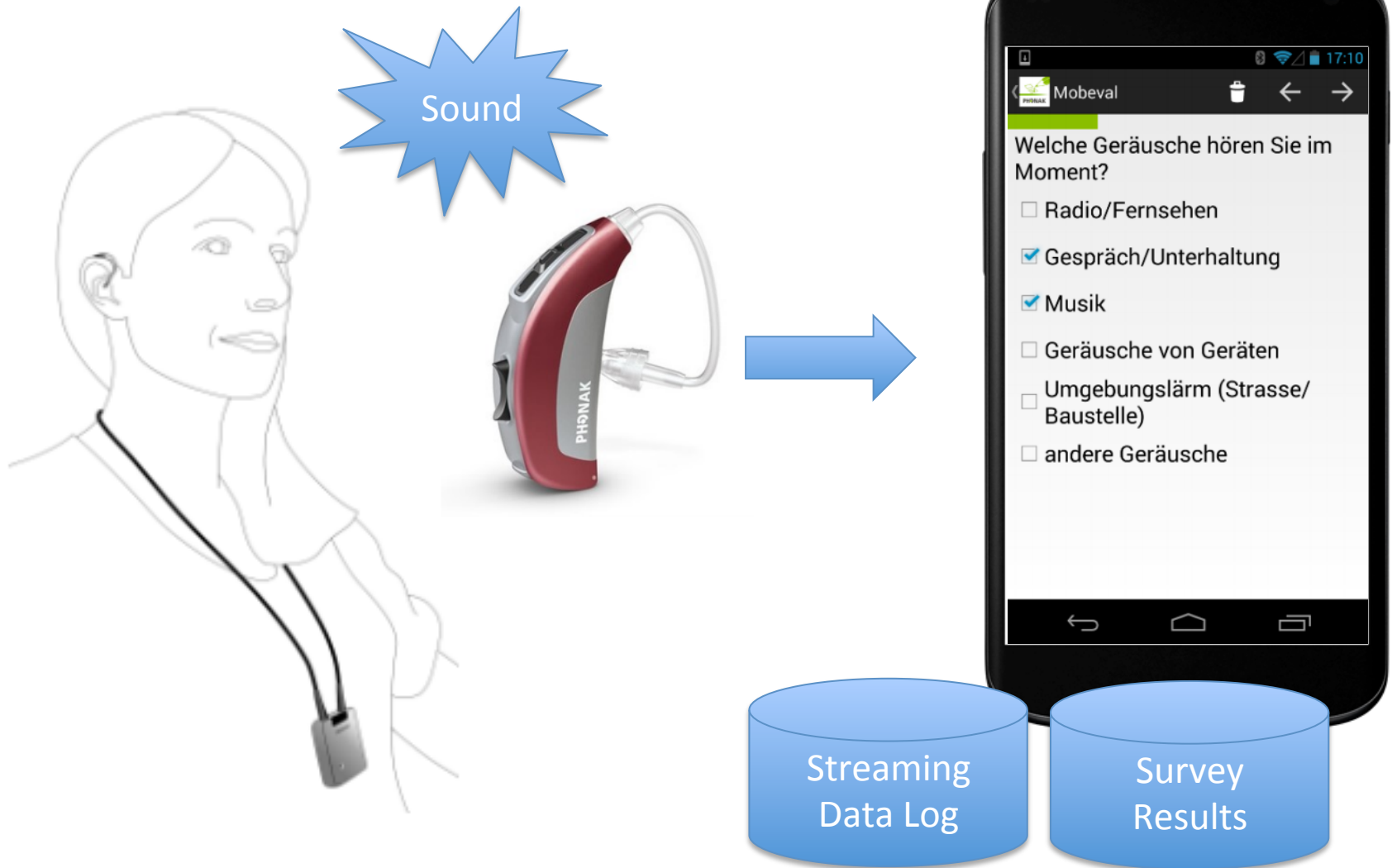
<http://www.phonak.com/com/b2c/en/products/wireless-accessories/products/com pilot/hearing-aid-accessory.html>

<https://play.google.com/store/apps/details?id=com.phonak.mobileapps.rcapp>



<https://play.google.com/store/apps/details?id=com.phonak.mobileapps.rcapp>

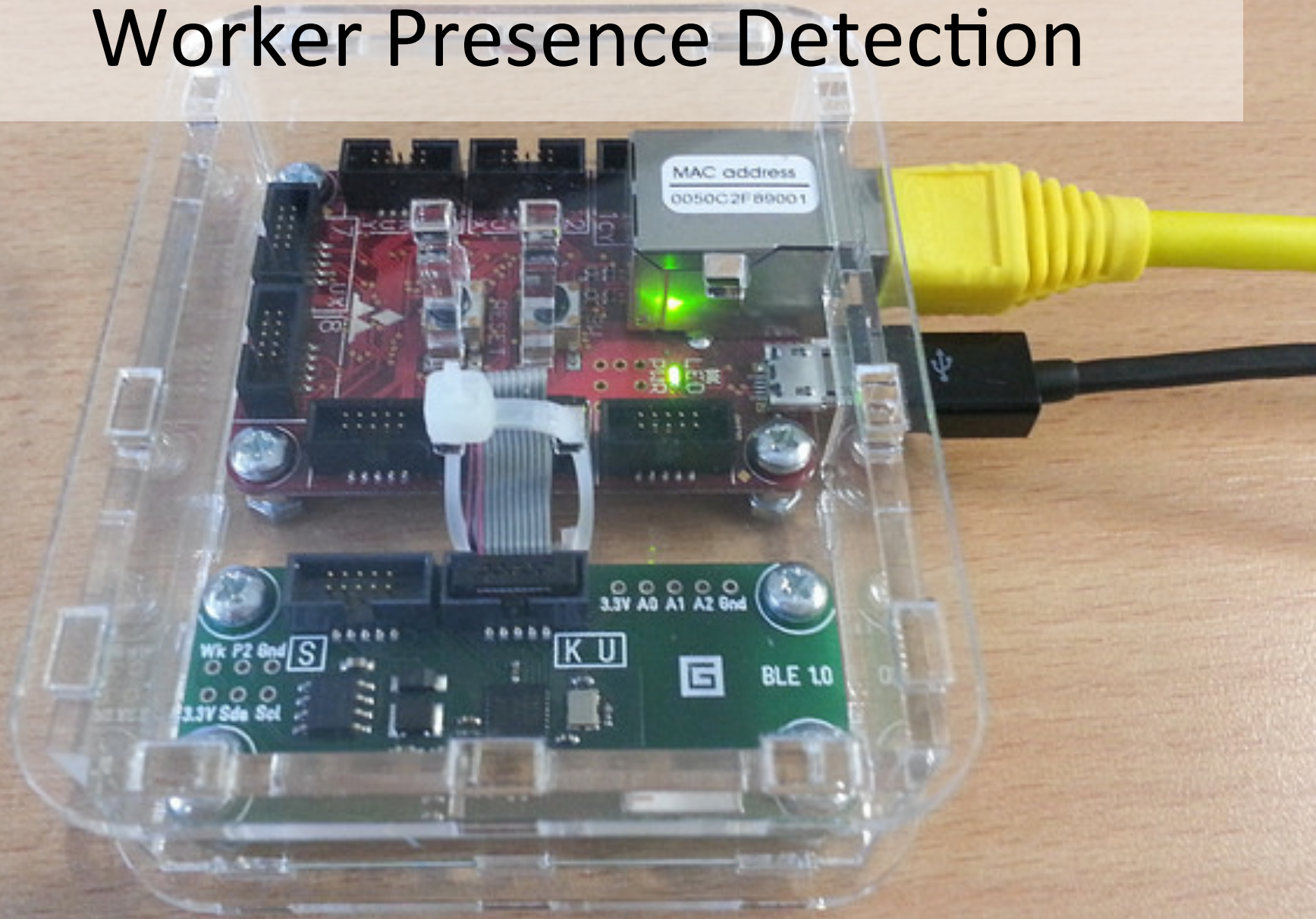
Context Triggered Surveys

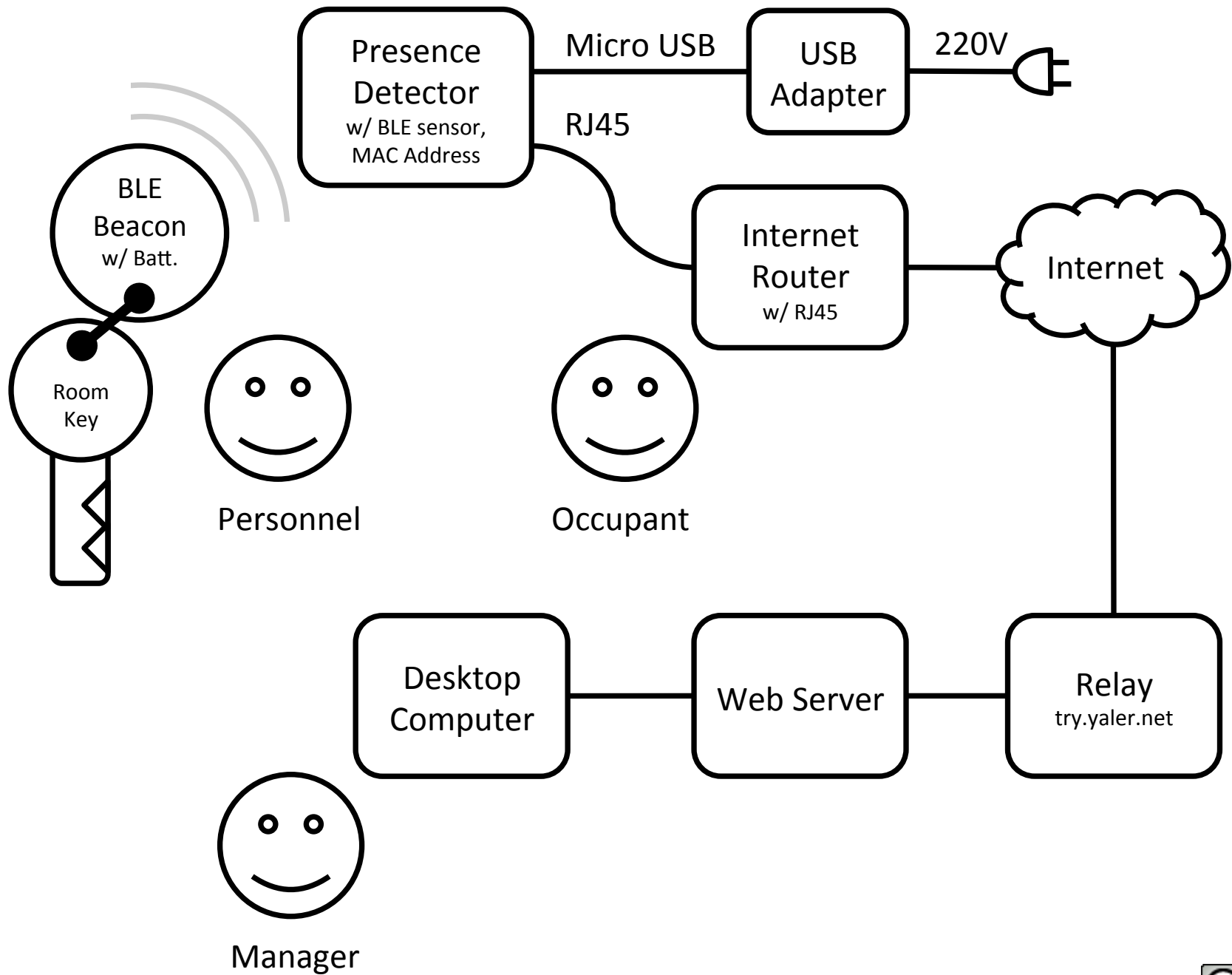


iBeacon (UUID, Major, Minor)



Worker Presence Detection



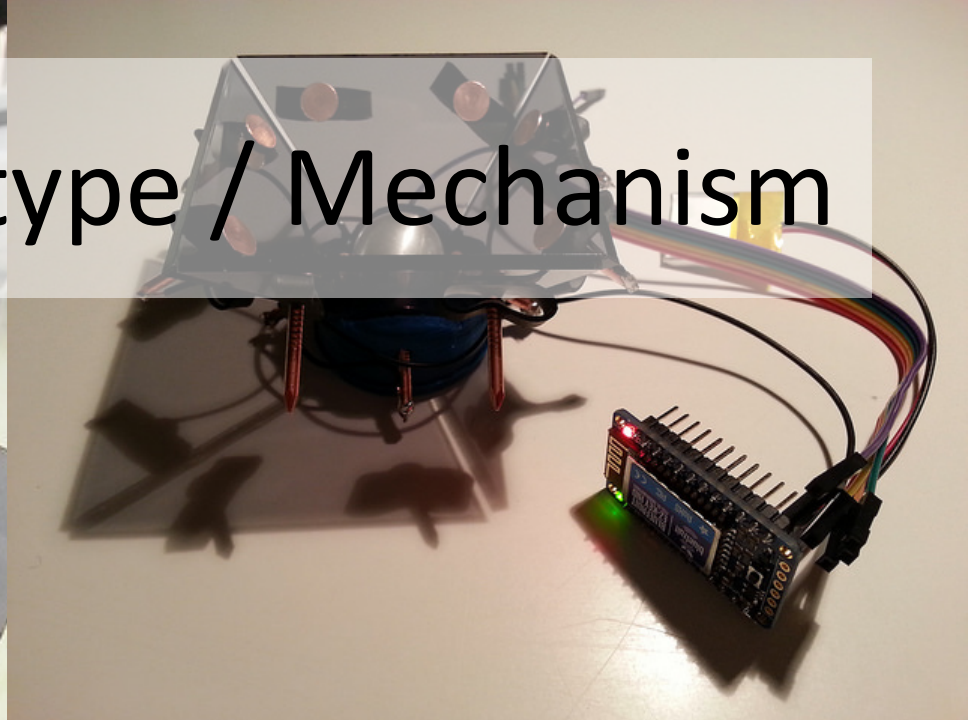
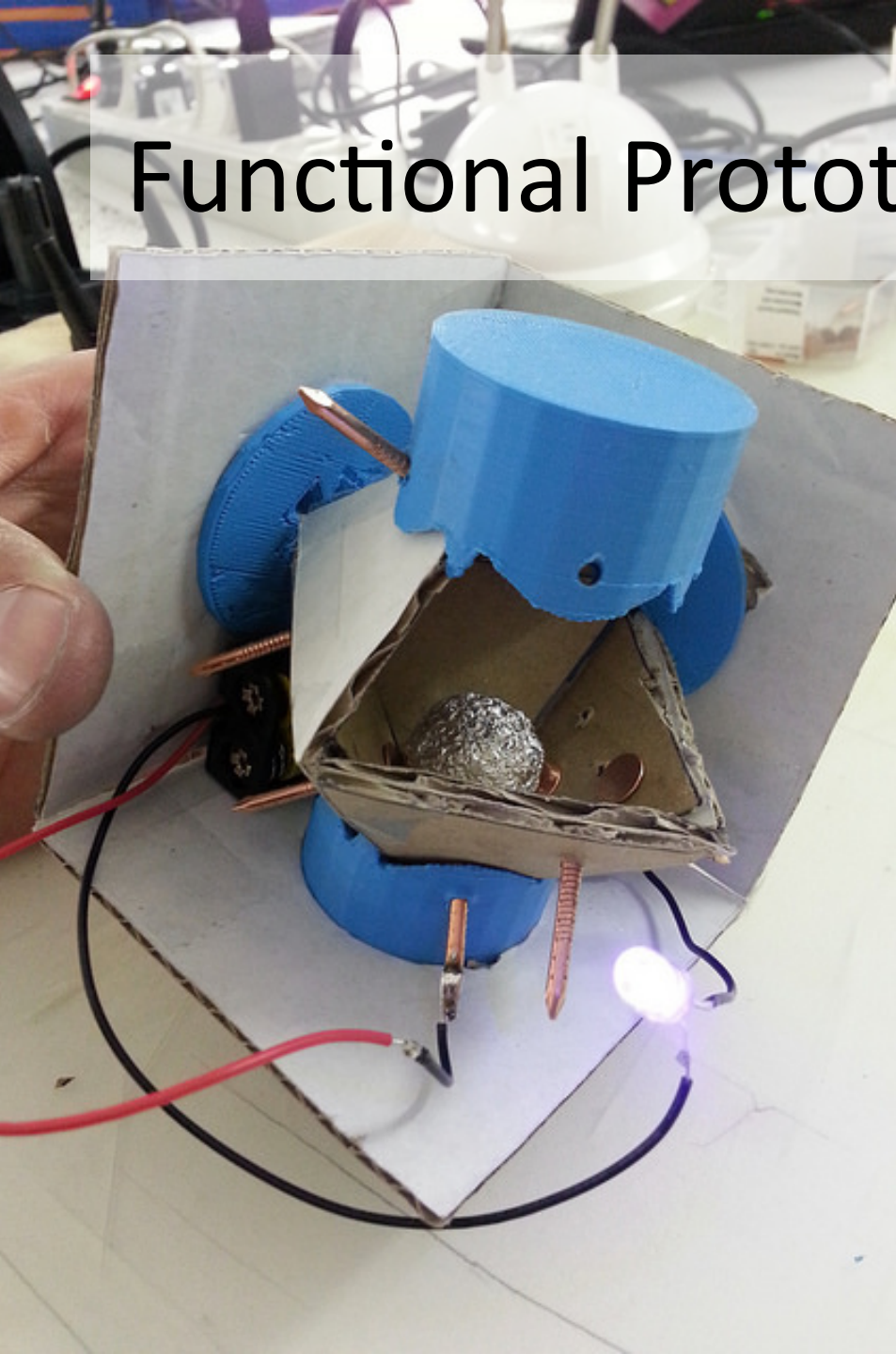


Requirements

- Automatic presence detection, per room key
- Touch-less (no more "forgot to check in")
- Low maintenance, low support
- Integration with existing Web app

Would you install this at your home?

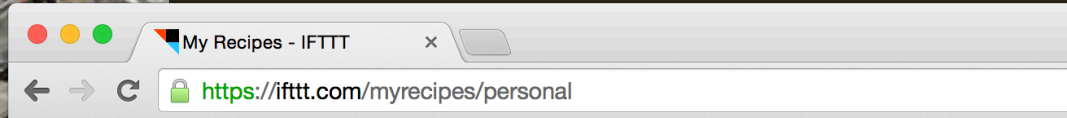
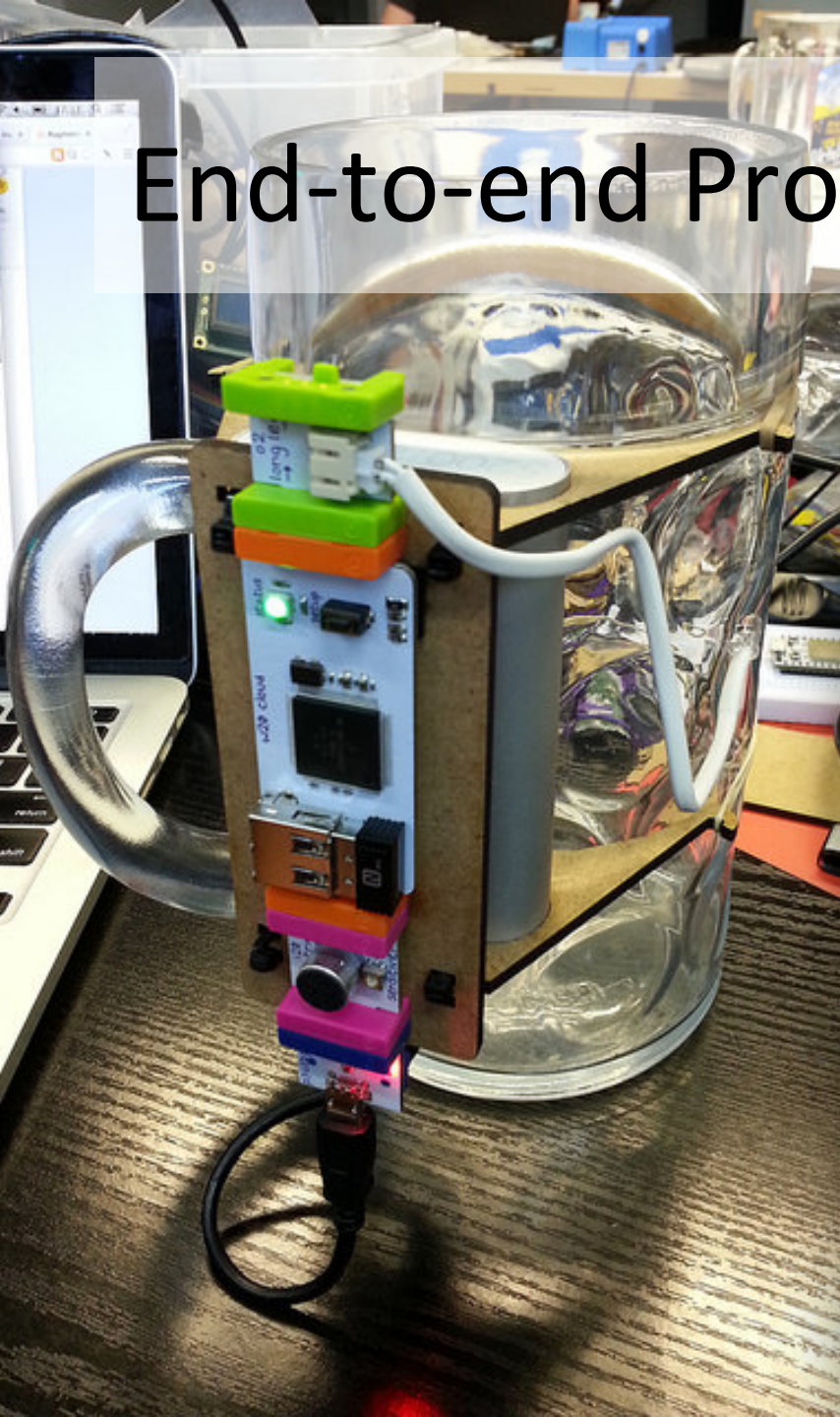
Functional Prototype / Mechanism



Design Prototype / How it Feels



End-to-end Prototype / Interaction



If input received by tamberg-w20, then post a tweet to @fabtronics

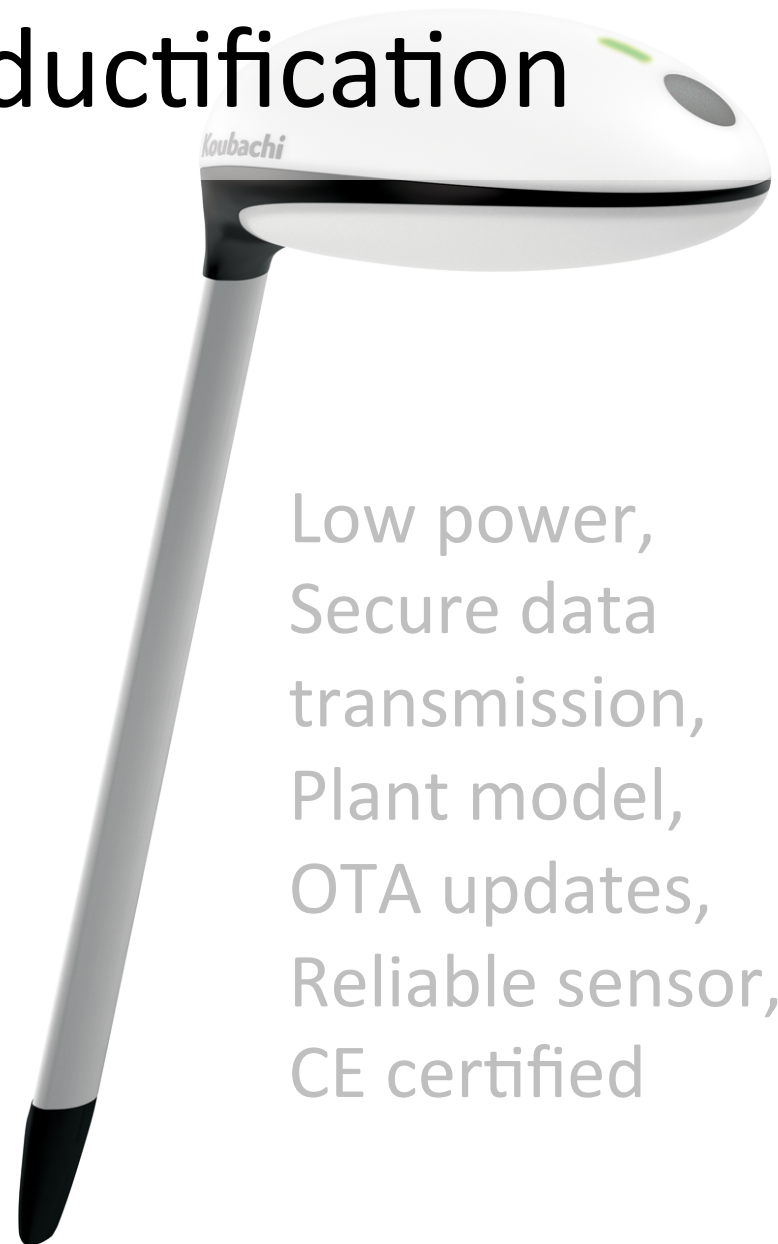


If input received by tamberg-w20, then set tamberg-w20's output for

Challenge: Productification



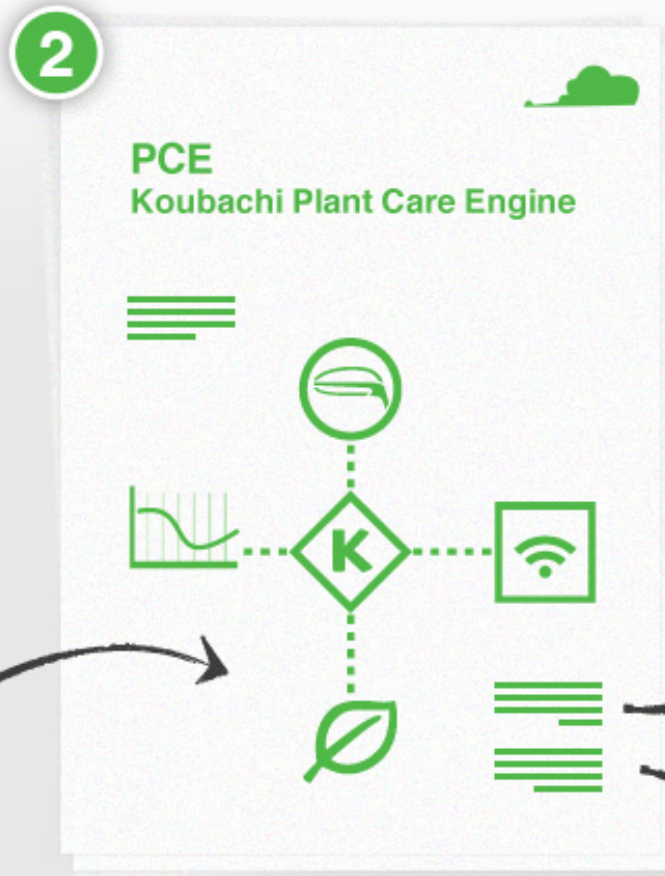
botanicalls.com,
CC BY-NC-SA sparkfun.com



Low power,
Secure data
transmission,
Plant model,
OTA updates,
Reliable sensor,
CE certified

koubachi.com

Koubachi analyzes your data
and gives you detailed care instructions
when and how to care for your plants.



Wi-Fi Plant Sensor

Quick start guide

This Quick start guide provides additional instructions for startup. **Before starting, we recommend to read the instructions on <http://www.koubachi.com/support>**

Package content

Wi-Fi Plant Sensor
2x AA-Batteries
Quick start guide

System requirements

- Internet connection through Wi-Fi (802.11 b/g)
- Wi-Fi reception at the location of the plant
- For configuration: A computer or an iOS device with Wi-Fi receiver

The following systems are supported for configuration

- Microsoft: Windows XP, Windows Vista, Windows 7
- Apple: Mac OS X 10.6.8 or later, iOS 4 or later
- Linux: The Wi-Fi adapter must support ad-hoc.

Perfect efficiency with non specified systems cannot be guaranteed.

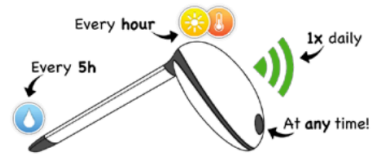
Configuration over Wi-Fi

To start the configuration make sure all mentioned system requirements are fulfilled.

- 1) Go to <http://go.koubachi.com> and follow the instructions.
- 2) Insert batteries.
- 3) After completing the configuration, insert the sensor into the soil near your plant.

How it works

The Wi-Fi plant sensor measures soil moisture, light intensity, and the ambient temperature. Measurements are transmitted wirelessly to the Koubachi server for further processing. These are the measurement ranges and values:



Measurement range of soil moisture : 1-6000 mBar
Resolution of soil moisture : 5 mBar
Measurement range of light intensity : 0-200 klux
Resolution of light intensity : 5 Lux
Measurement range of ambient temperature : -20°-50° C / 0°-120° F
Resolution of ambient temperature : 1.8° C / 3.2° F

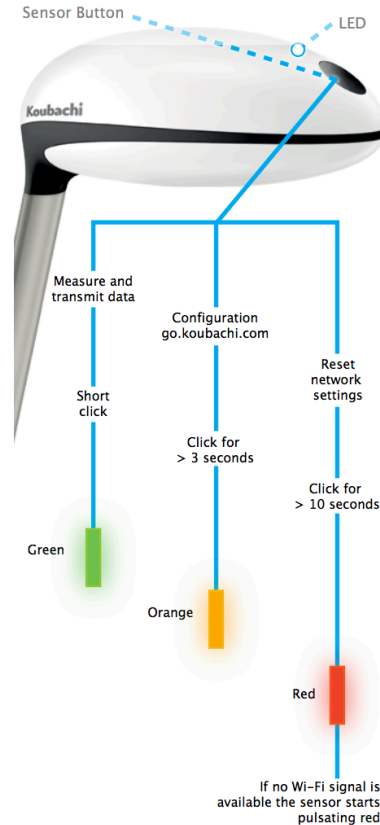
Care instructions

The Koubachi Wi-Fi Plant Sensor is generally maintenance free. With little care, it will be the best companion for your plant care.

Cleaning: The sensor tip can be cleaned with a moist cloth, e.g. when you relocate the sensor to another plant. **Do not use detergents or oil containing substances for cleaning. The sensor tip must only be cleaned with pure water.**

Battery replacement: Normally, the lifespan of the batteries is approximately 1.5 years. When you replace the batteries, take care that you close the battery compartment firmly, before tightening the battery screw. That way, the compartment remains watertight. Always use two fresh disposable batteries. **Use high quality disposable AA batteries. We recommend Duracell PLUS or Panasonic Pro Power batteries.**

Use of the Sensor button



For further information go to:
<http://www.koubachi.com/features/sensor>

Safety instructions

- Use the Koubachi Wi-Fi Plant Sensor only indoors.
- Avoid plugging the Koubachi Wi-Fi Plant Sensor into hard ground, and if necessary loosen the soil with a spade.
- Do not immerge the sensor in water.
- Do not drop the sensor on hard surfaces, such as tables or concrete floors.
- Use the product only according to its intended use and within the range of the denoted technical parameters. Do not use force.
- Never use the device on or near conducting current components.
- Only perform maintenance and repair work on this device as instructed in the operation manual. Adhere strictly to the described action steps. Use only original Koubachi spare parts.
- Dispose used batteries according to legal regulations.
- At the end of its lifespan, dispose the product according to the separated refusal collection regulations for electric and electronic devices (according to local regulations) or return the product to Koubachi.

Warranty

When used according to the intended use, you have 24 months warranty from the date of purchase on material and manufacturing defects. A detailed warranty description can be found on <http://www.koubachi.com/warranty>

Tested with the following systems



The product fulfills according to the conformity declaration the guidelines 2004/108/EU, ES 60950 and ES 301489-1.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1) This device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

Koubachi

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The Koubachi logo is a registered trademark of Koubachi AG.

Home - HAXLR8R x

haxlr8r.com

HAXLR8R ⚙️ ⚙️ ⚙️


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HAXLR8R is a new kind of accelerator program.

For people who hack hardware and make things.

Join us next July for 111 days in Shenzhen and San Francisco.
We're currently **accepting applications**, deadline is May 31st!
Now up to 50K funding!


APPLY NOW



Highway1 x

highway1.io

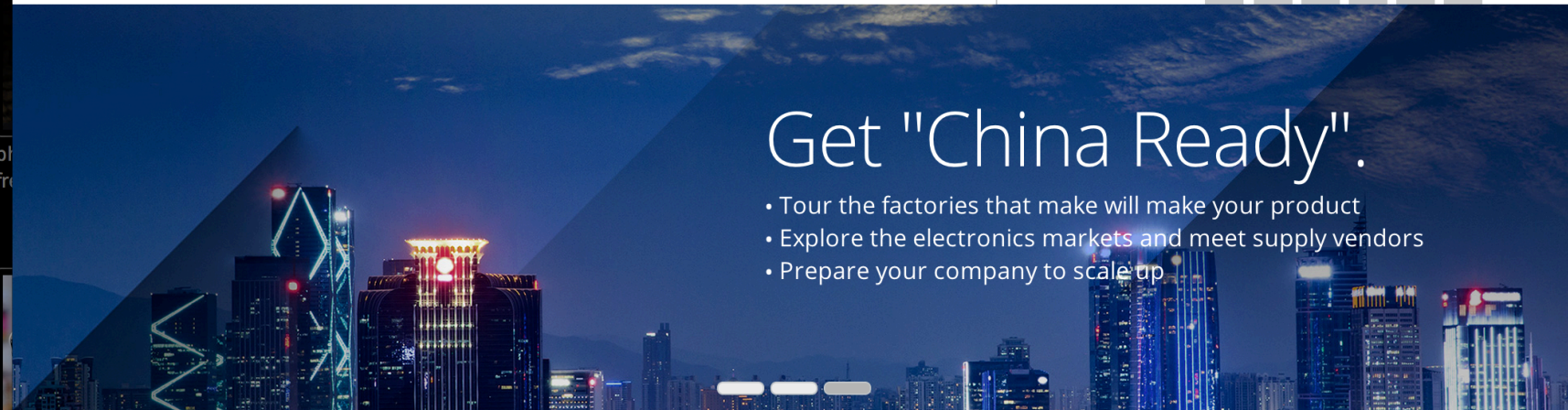
Learn | Incubate | Graduate | Portfolio | Team | Blog | Apply



Get updates

Get "China Ready".

- Tour the factories that make will make your product
- Explore the electronics markets and meet supply vendors
- Prepare your company to scale up

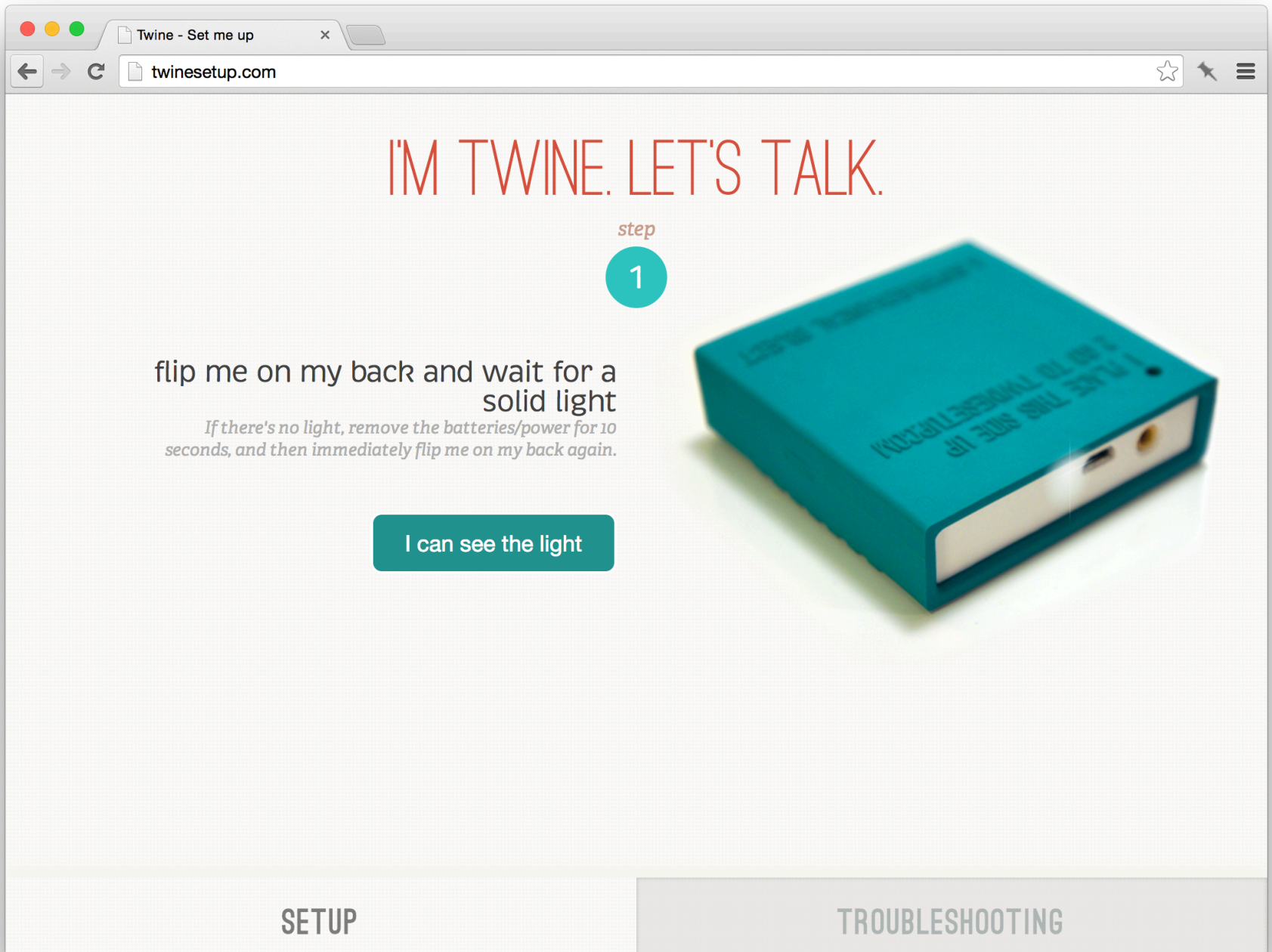


You've got a prototype. We've got a roadmap.

Anyone can build a prototype, but manufacturing at scale is a bigger, tougher problem.

Challenge: Setup





I'M TWINE. LET'S TALK.

step

1

flip me on my back and wait for a
solid light

*If there's no light, remove the batteries/power for 10
seconds, and then immediately flip me on my back again.*

I can see the light



SETUP

TROUBLESHOOTING

INSTRUCTIONS

Download the Ubooly app:
ubooly.com/app

Tap the alarm clock to wake
Ubooly up. Your code is:

4F

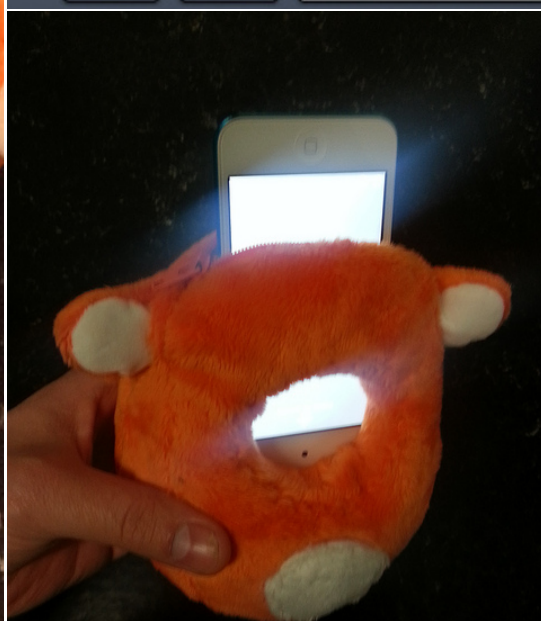
TRY SAYING:

"Tell me a joke"
"Play a game"
"Tell a story"

- * Double tap the face to skip to a new activity.
- * Tap and hold the face to put Ubooly to sleep.

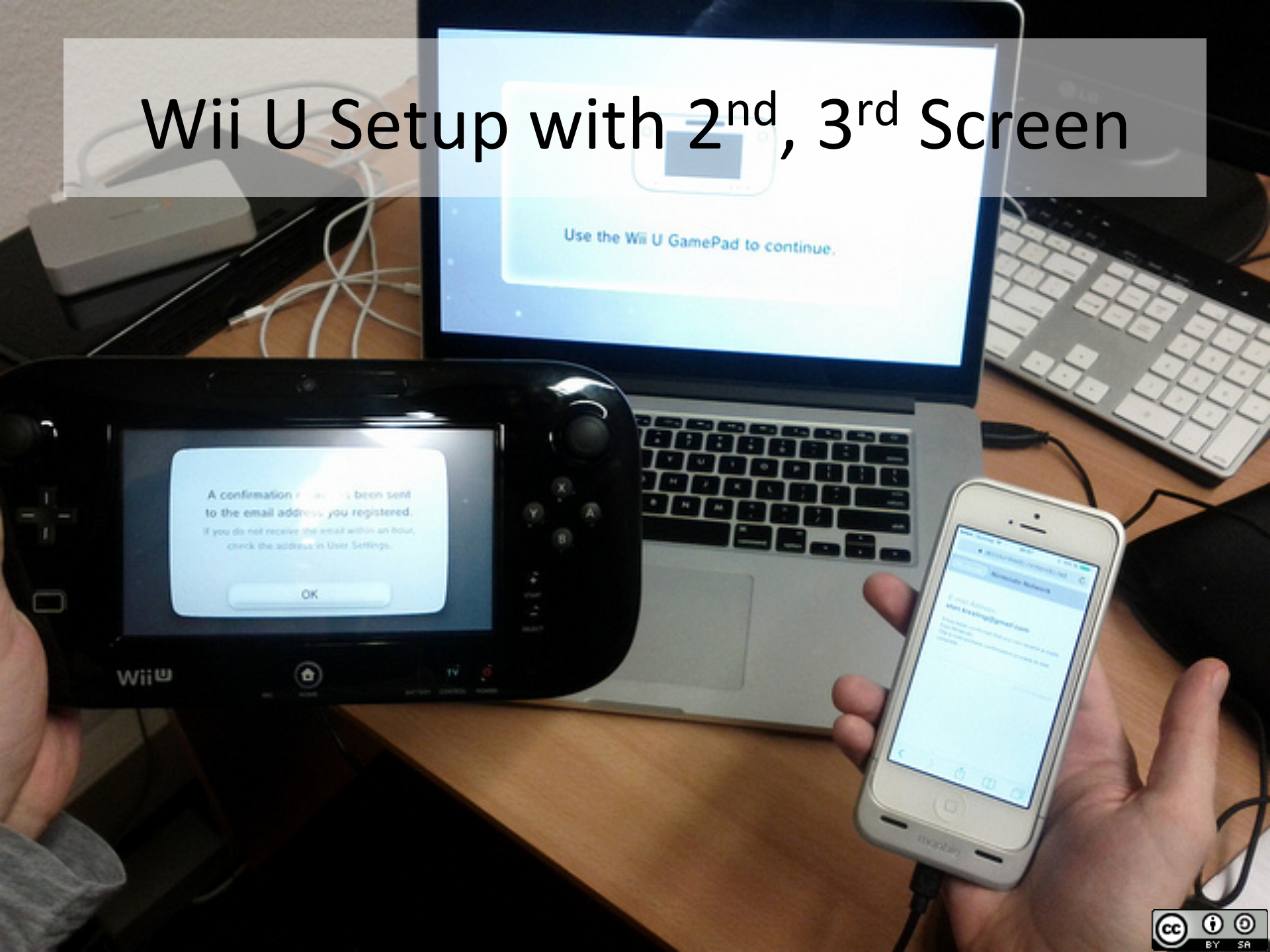
QUESTIONS?

support@ubooly.com

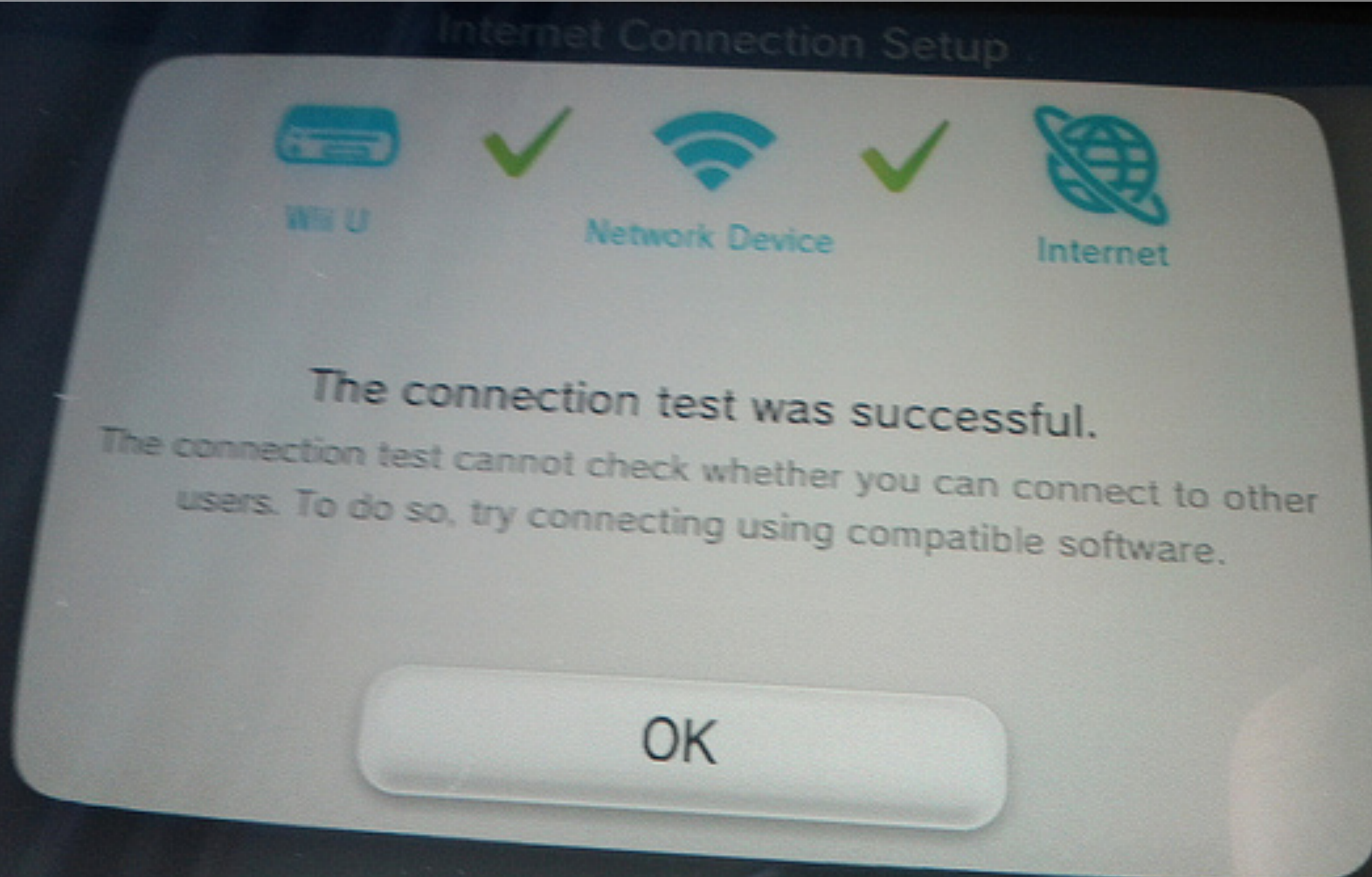




Wii U Setup with 2nd, 3rd Screen



Wii U Connection Test





The connection with the Wii U console
has been lost.

Please check that the Wii U GamePad and
Wii U console are not too far apart and that there
is no interference between them.

Wii U

MIC



HOME

TV

BATTERY

CONTROL



Home

Features

Downloads

Community

Github

Wiki

my.openHAB

Welcome to **openHAB** - a vendor and technology agnostic open source automation software for your home.
Build your smart home in no time!

Apple Developer

Technologies

Resources

Programs

Support

Member Center



HomeKit

HomeKit is a new framework for communicating with and controlling connected devices in a user's home. Apps can enable users to discover devices in their home and configure them, or you can create actions to control those

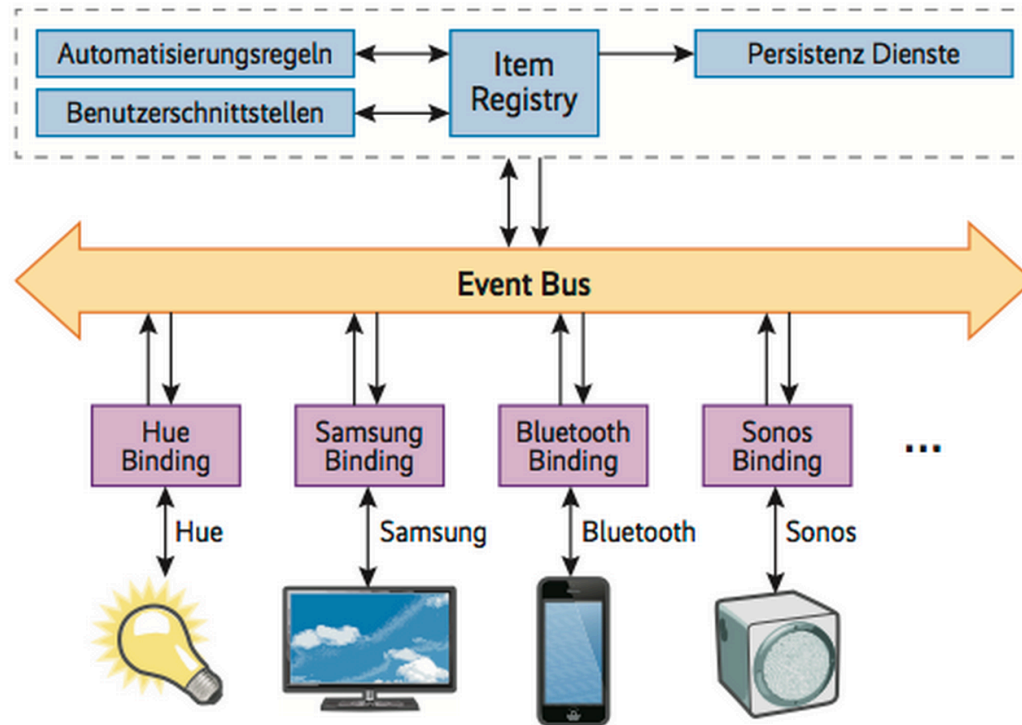


Abb.2: openHAB ermöglicht die Integration verschiedenster Technologien über Bindings

Derzeit unterstützt openHAB bereits mehr als 50 verschiedene Technologien, die neben stark verbreiteten Technologien wie KNX, Z-Wave, EnOcean, Insteon, HomeMatic, digitalSTROM, HTTP, MQTT, Philips Hue, SONOS auch

smarthome/discovery.md






← → ↺

GitHub, Inc. [US] https://github.com/eclipse/smarthome/blob/master/docs/sources/architecture/discovery.md

☆ ⚡ ☰

12 lines (7 sloc) | 1.585 kb

Raw Blame History



Thing Discovery and Inbox

Many technologies and systems can be automatically discovered on the network or browsed through some API. It therefore makes a lot of sense to use these features for a smart home solution.

In Eclipse SmartHome bindings can therefore implement discovery services for things. As a solution might not want to make everything that is found on the network immediately available to the user and his applications, all discovery results are regarded as suggestions that are first put into an "inbox".

Inbox entries can then be either ignored or approved, which means that a thing is created for them and they become available in the application.

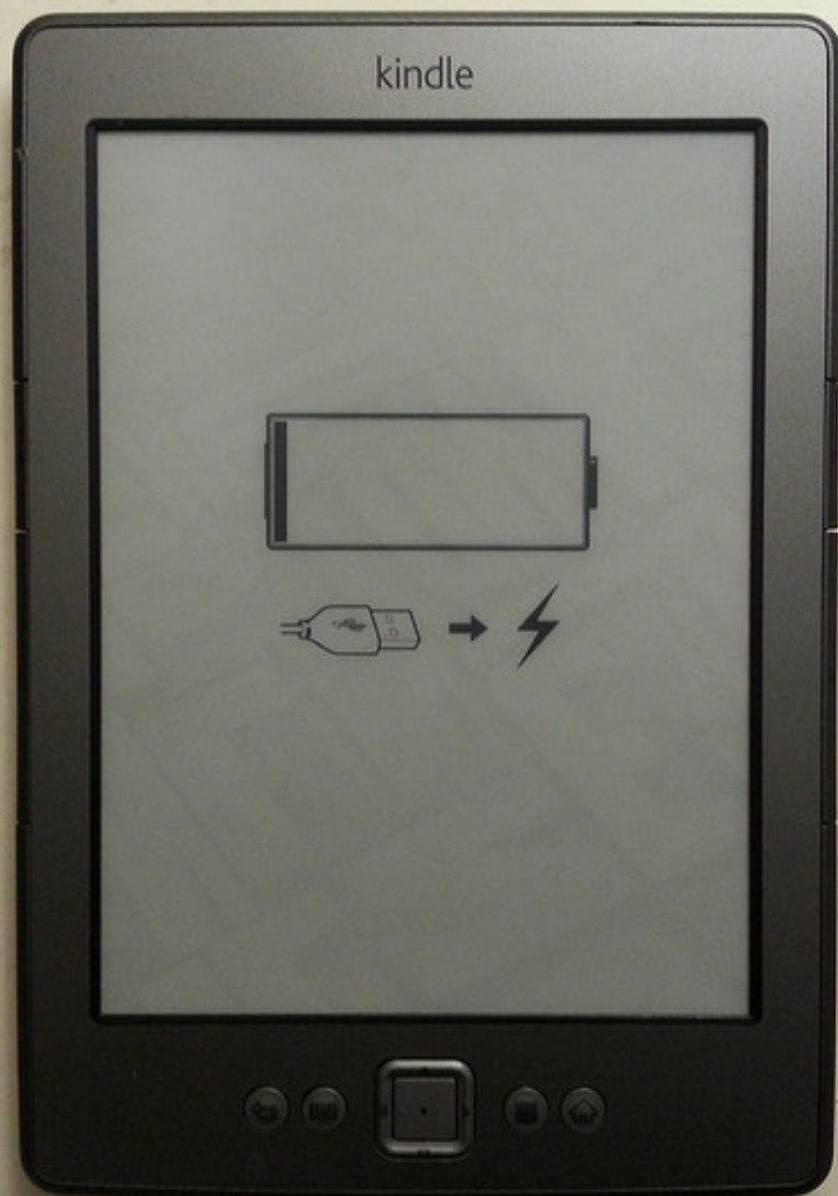
There are different ways how a thing discovery can be performed:

- In protocols like UPnP or Bonjour/mDNS devices send announcements on the network that can be listened to. In Eclipse SmartHome we refer to such mechanisms as "background discovery", i.e. passive mechanisms where events come in and can be processed. Things can be therefore found any time and put into the inbox.
- There might be an API, which can be accessed to actively query all available things. In Eclipse SmartHome, this is called an "active scan" and thus configuration UIs must provide a way to trigger such a scan for a certain thing type. In general, it is not recommended to do any active discovery by the binding in the background as it can negatively impact the system performance. The only exception is that a scan can be triggered once at startup and if a bridge has been added, so that its attached things are directly discovered.

Challenge: Power

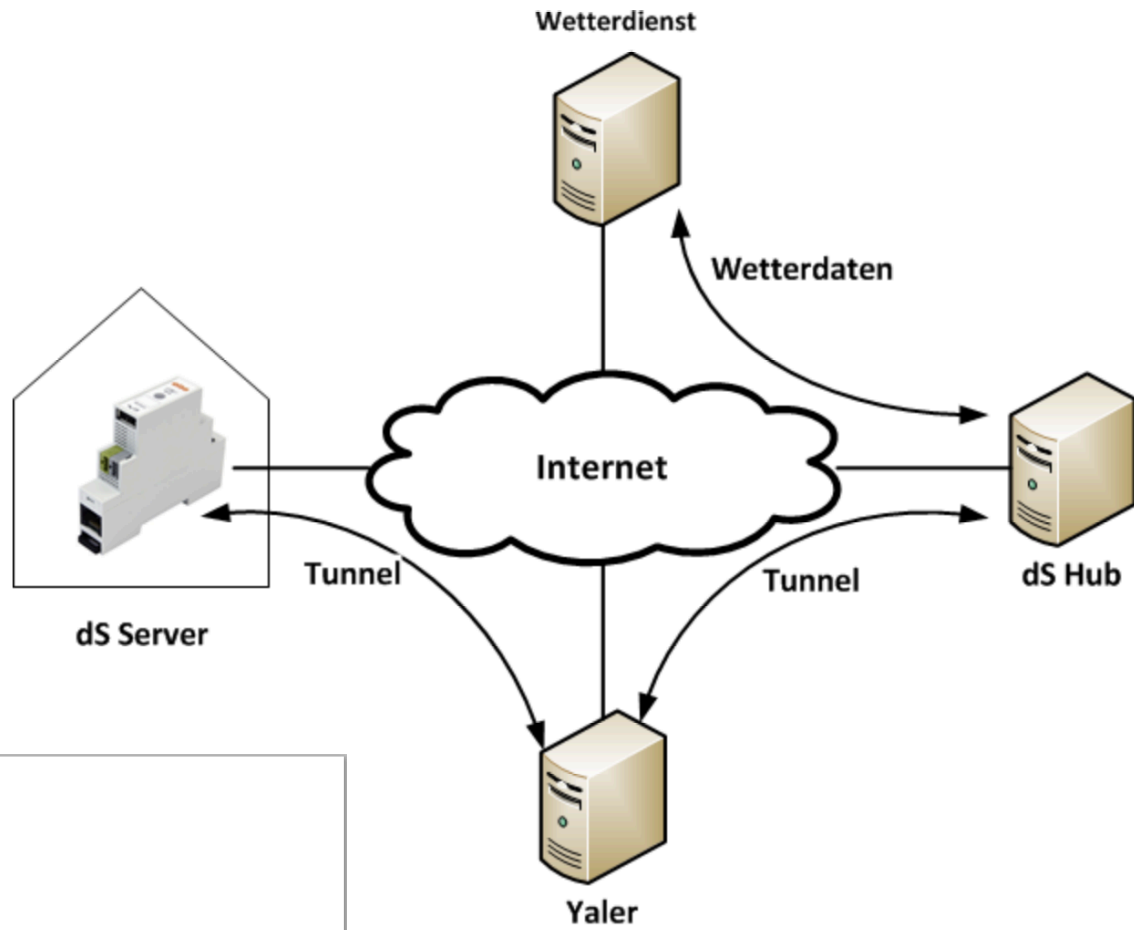






Challenge: Security and Safety





Keeping Car Keys in the Freezer

Style

SUBSCRIBE | LOG IN

Keeping Your Car Safe From Electronic Thieves



GARY HALLGREN

APRIL 15, 2015

Disruptions

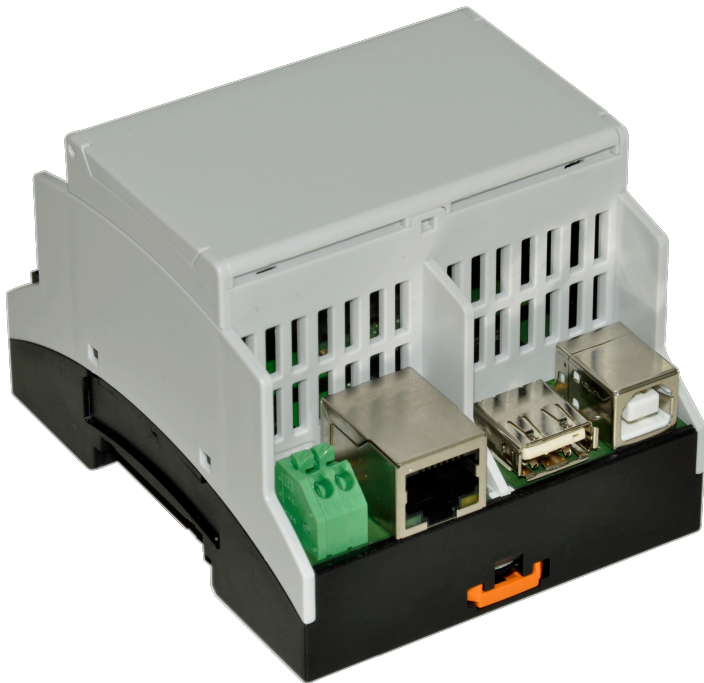
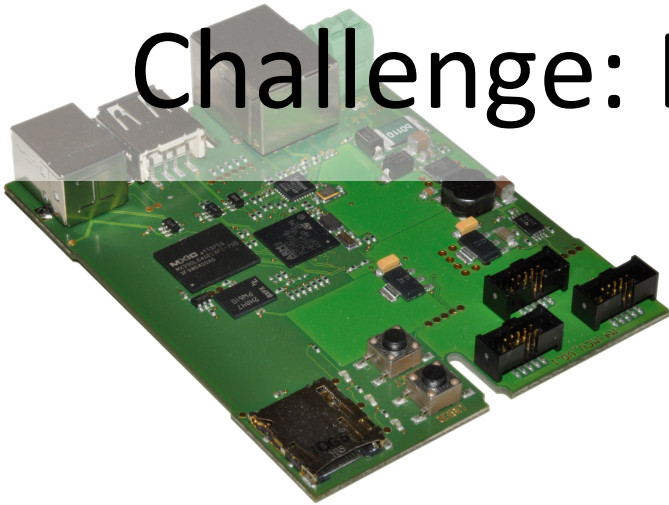
By NICK BILTON

Last week, I started keeping my car keys in the freezer, and I may be at the forefront of a new digital safety trend.

Let me explain: In recent months, there has been a slew of mysterious car break

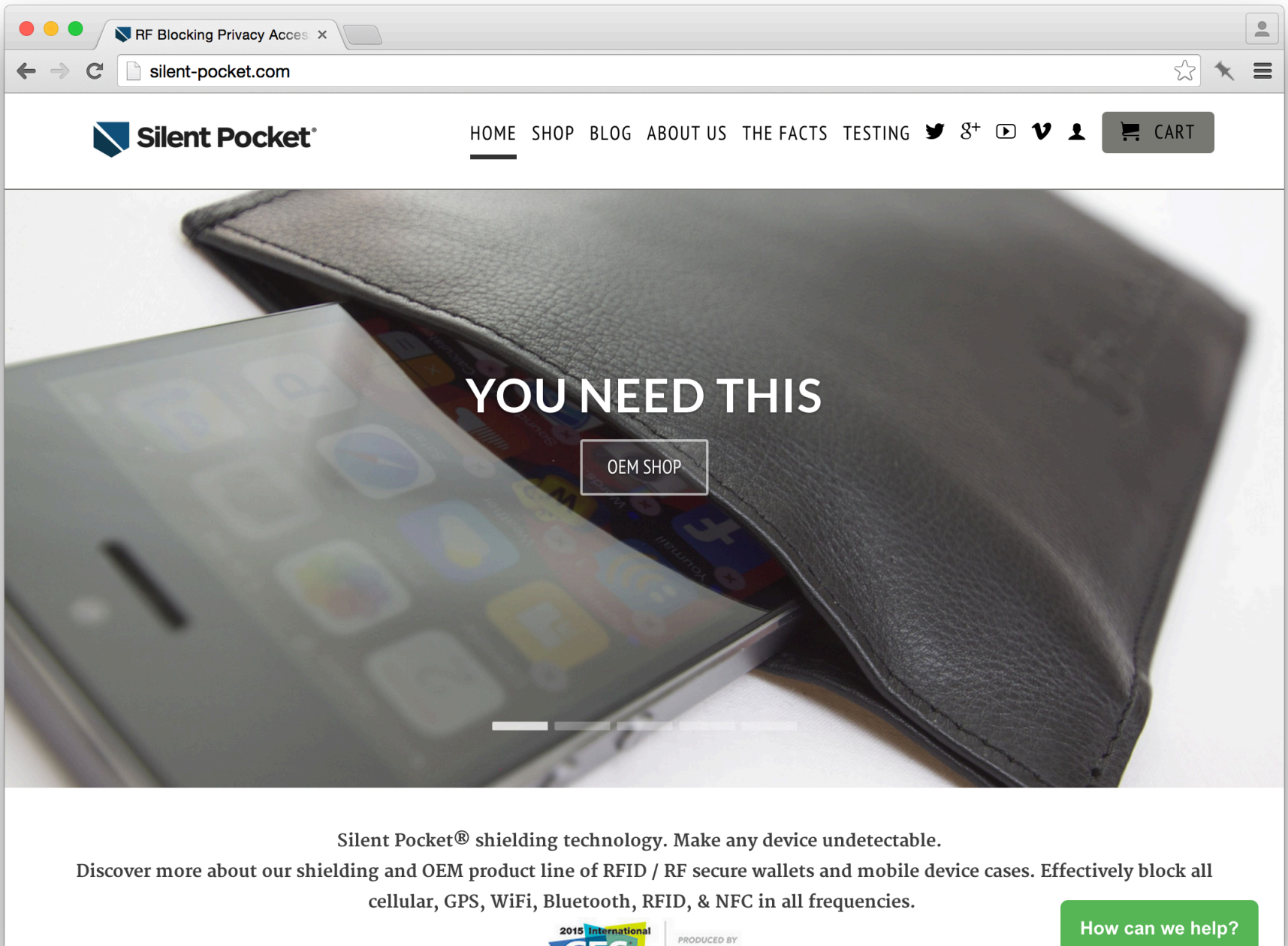
60

Challenge: Different Life-spans



Challenge: Public vs. Private





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YOU NEED THIS

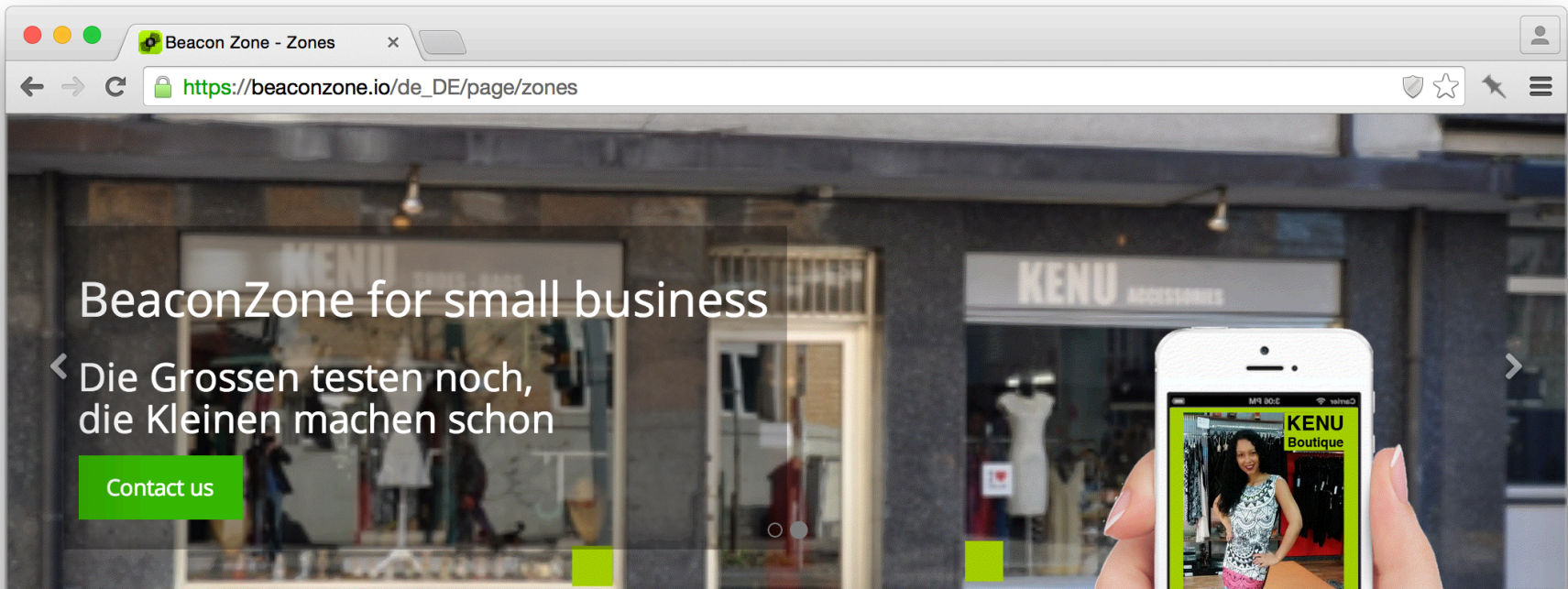
OEM SHOP

Silent Pocket® shielding technology. Make any device undetectable.

Discover more about our shielding and OEM product line of RFID / RF secure wallets and mobile device cases. Effectively block all cellular, GPS, WiFi, Bluetooth, RFID, & NFC in all frequencies.



How can we help?



Das Pilotprojekt

Fakten | Zahlen | Ziele



#WiedikonValley

Sprung in die Gegenwart

Wiedikon ist im Wandel und voll von scheinbaren Widersprüchen. Höchste Zeit, den Schmelztiegel von Tradition und Moderne im Herzen von Zürich zu entdecken: **#Start-up #KMU #Smart**



Digito ergo sum

Smartphones erreichen Menschen

4.3 Millionen Menschen in der Schweiz verlassen sich auf ihre Smartphones als ständige Begleiter. **Projektthese:** wenn etwas auf dem Smartphone stattfindet, wird es in der "Realität" oft erst



BeaconZone

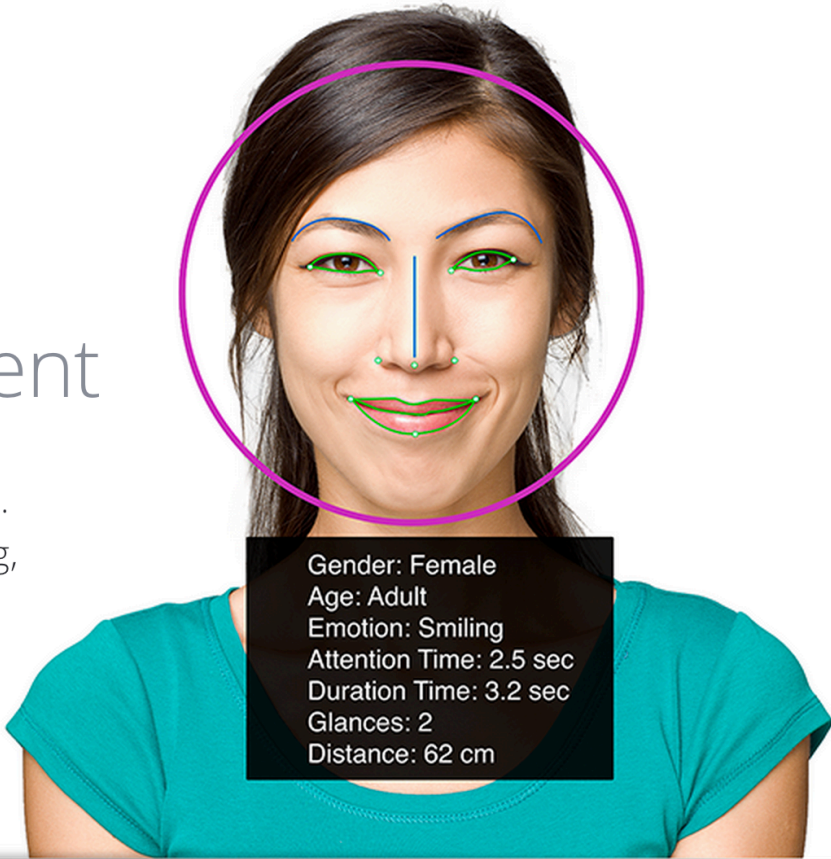
20 Pioniere gestalten den Wandel

iBeacons sind die Vorboten des Internets der Dinge oder eine Brücke vom physischen in den digitalen Raum. 20 Geschäfte in Wiedikon verbinden sich mit Bluetooth-Sendern und einer

CARA[®]

Emotion Measurement

Measure human emotions using any webcam.
Easily analyze facial expressions to advertising,
brands and media content.



Gender: Female
Age: Adult
Emotion: Smiling
Attention Time: 2.5 sec
Duration Time: 3.2 sec
Glances: 2
Distance: 62 cm

Try Demo

[Learn More](#) →

SceneTap | View Age, Crow

scenetap.com

SceneTap

Augusta, ME

Map

Places

Pictures

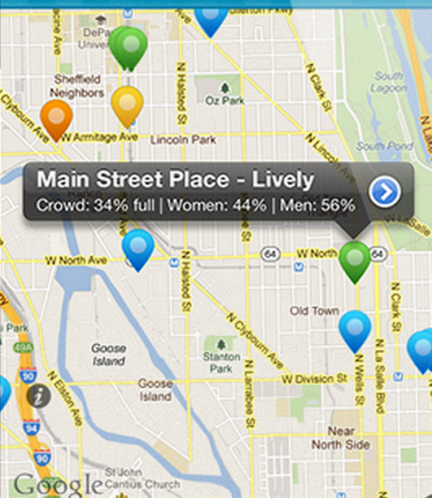
Login

Sign Up

SceneTap lets you check out the scene in real-time.

VIRGIN 3G 4:17 PM

SceneTap



Main Street Place - Lively



Crowd: 34% full | Women: 44% | Men: 56%

Main Street Place

64% Full

Hoppin'

68% 32%



 

29yrs Avg Age 26yrs

What is SceneTap?

With the tap of a button, view information on how many people are at a place, the male to female ratio, and the average age of everyone inside.

Start using desktop app

Download mobile app  

Learn more about SceneTap [here](#)





v1.0 · May 2015

IOT DESIGN MANIFESTO

The world is becoming increasingly connected. This offers opportunities for designers, engineers and entrepreneurs to create unprecedented products and services. Yet, a connected world also brings new questions and challenges to the table.

This manifesto serves as a code of conduct for everyone involved in developing the Internet of Things, outlining 10 principles to help create balanced and honest products in a burgeoning field with many unknowns.

First drafted by a number of design professionals, this manifesto is intended to be a living document that the larger community of peers working within the IoT field can contribute to and improve upon.

This manifesto is a living document, we seek your input to help it grow. Please discuss, contribute, remix, and test the boundaries of these principles.

www.iotmanifesto.org

WE DON'T BELIEVE THE HYPE



We pledge to be skeptical of the cult of the new — just slapping the Internet onto a product isn't the answer. Monetizing only through connectivity rarely guarantees sustainable commercial success.

WE DESIGN USEFUL THINGS



Value comes from products that are purposeful. Our commitment is to design products that have a meaningful impact on people's lives; IoT technologies are merely tools to enable that.

WE AIM FOR THE WIN-WIN-WIN



A complex web of stakeholders is forming around IoT products: from users, to businesses, and everyone in between. We design so that there is a win for everybody in this elaborate exchange.

WE KEEP EVERYONE AND EVERY THING SECURE



With connectivity comes the potential for external security threats executed through the product itself, which comes with serious consequences. We are committed to protecting our users from these dangers, whatever they may be.



WE BUILD AND PROMOTE A CULTURE OF PRIVACY

V

Equally severe threats can also come from within. Trust is violated when personal information gathered by the product is handled carelessly. We build and promote a culture of integrity where the norm is to handle data with care.

WE ARE DELIBERATE ABOUT WHAT DATA WE COLLECT

VI

This is not the business of hoarding data; we only collect data that serves the utility of the product and service. Therefore, identifying what those data points are must be conscientious and deliberate.

WE MAKE THE PARTIES ASSOCIATED WITH AN IOT PRODUCT EXPLICIT

VII

IoT products are uniquely connected, making the flow of information among stakeholders open and fluid. This results in a complex, ambiguous, and invisible network. Our responsibility is to make the dynamics among those parties more visible and understandable to everyone.

WE EMPOWER USERS TO BE THE MASTERS OF THEIR OWN DOMAIN

VIII

Users often do not have control over their role within the network of stakeholders surrounding an IoT product. We believe that users should be empowered to set the boundaries of how their data is accessed and how they are engaged with via the product.

WE DESIGN THINGS FOR THEIR LIFETIME

IX

Currently physical products and digital services tend to be built to have different lifespans. In an IoT product features are codependent, so lifespans need to be aligned. We design products and their services to be bound as a single, durable entity.

IN THE END, WE ARE HUMAN BEINGS

X

Design is an impactful act. With our work, we have the power to effect relationships between people and technology, as well as among people. We don't use this influence to only make profits or create robot overlords; instead, it is our responsibility to use design to help people, communities, and societies thrive.

Great Books



Thanks.

thomas.amberg@yaler.net

twitter.com/tamberg

yaler.net

Slides online at goo.gl/NEeA1A →

