

# Mobile Computing Internet of Things & Connected Products

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Slides: [tmb.gr/mc-iot](http://tmb.gr/mc-iot)

# Overview

These slides introduce *IoT and connected products.*

Definitions, main use cases and how it works.

What becomes possible, good and bad.

# Internet of Things (IoT)

Small, connected computers with sensors, actuators.

"Physical objects with a Web API." – [@hansamann](#)

IoT: "Global network of computers, sensors and actuators, connected through Internet protocols."

*Web* of Things: "RESTful Web services that measure or manipulate physical properties." – [@gsiot](#)

# Ubiquitous computing

"The idea of integrating computers seamlessly into the world at large [...] *Ubiquitous computing*"

"How do technologies disappear into the background? The vanishing of electric motors may serve as an instructive example" e.g. in escalators or in a car.

- Mark Weiser in [The Computer for the 21st Century](#)

# Connectivity

Transmit data at room, building or city scale.

Personal area network, e.g. BLE, Zigbee, ~30 m.

Local area networks, e.g. Ethernet, Wi-Fi, ~100 m.

Wide area networks, e.g. 5G, LoRaWAN, 2 to 20 km.

# Use Cases

Efficiency, e.g. trash bins let you know they are full.

Convenience, e.g. remotely preheat a holiday home.

New insights, e.g. a crowdsourced air quality map.

Sectors include connected consumer products,  
citizen sensing, industrial IoT and many more.

# Connected products

Internet-connected consumer products.

[Philips Hue](#), connected lights with a Web API.

[Withings Scale](#), logs your weight to a dashboard.

[Good Night Lamp](#), linked lamps to share presence.

Meethue.com | Welcome to the [+ New tab](#)

https://www2.meethue.com/en-us

Star Print 3 More

# Smart lights Smarter controls

Philips Hue is not just a smart bulb, it's a smart lighting system. The smart lights, Hue Bridge, and smart controls will forever change the way you experience light.



## Hue lights

These smart and energy-efficient LED lights come in a wide variety of shapes, sizes, and models to suit your space.



## Hue Bridge

The heart of your Philips Hue system, the Bridge acts as a smart hub, connecting your devices to your smart lights. You can add up to 50 Philips Hue lights and accessories to one Bridge.



## Hue app

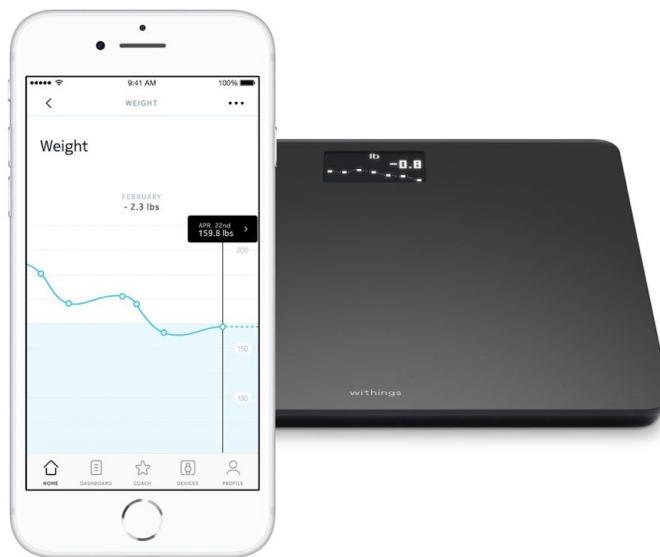
Control your smart lights quickly and conveniently with the Philips Hue app.

Weight & BMI Wi-Fi Scale - Body

https://www.withings.com/us/en/body

## Meet your new accountability partner

Body offers a complete weight tracking experience tailored to individuals seeking easy, effective weight management. Weighing in is just the first step. Each session also provides instant feedback via weight trend and BMI screens, plus automatic sync to a free app on your smartphone, so you can track progress any time, anywhere.

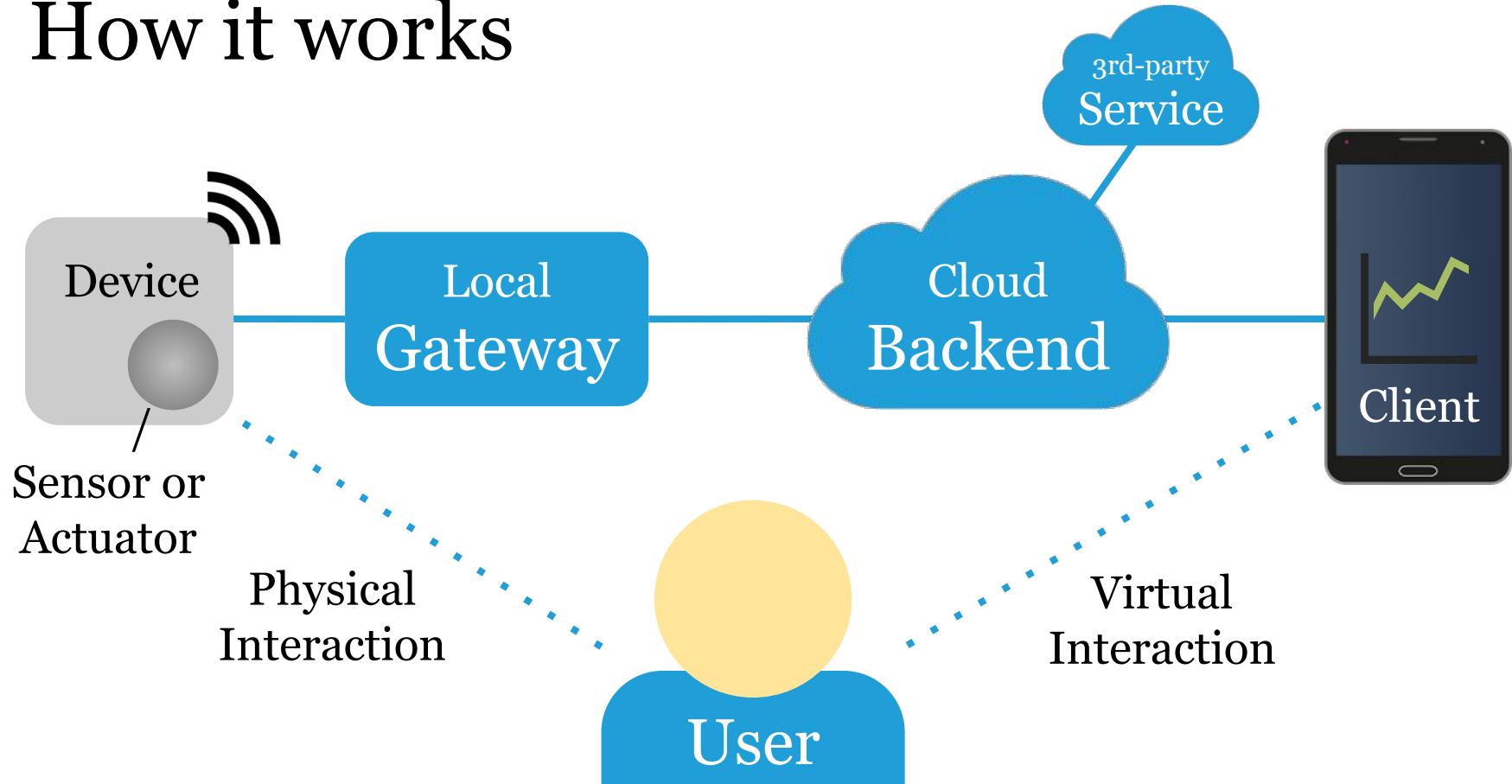


Turn a Big Lamp on and Little Lamps which you've given away turn on too. Anywhere in the world.

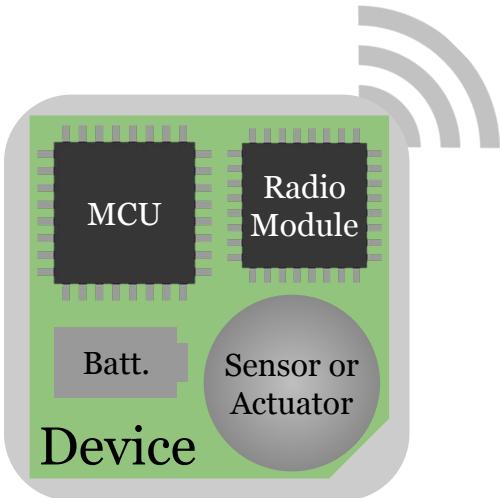
Use the Good Night Lamp to tell a loved one 'now's a good time for a chat', 'I'm thinking of you' or 'call me when you get home'. You decide. As your family grows or moves away, you can add as many Little Lamps as you want.



# How it works



# What's inside

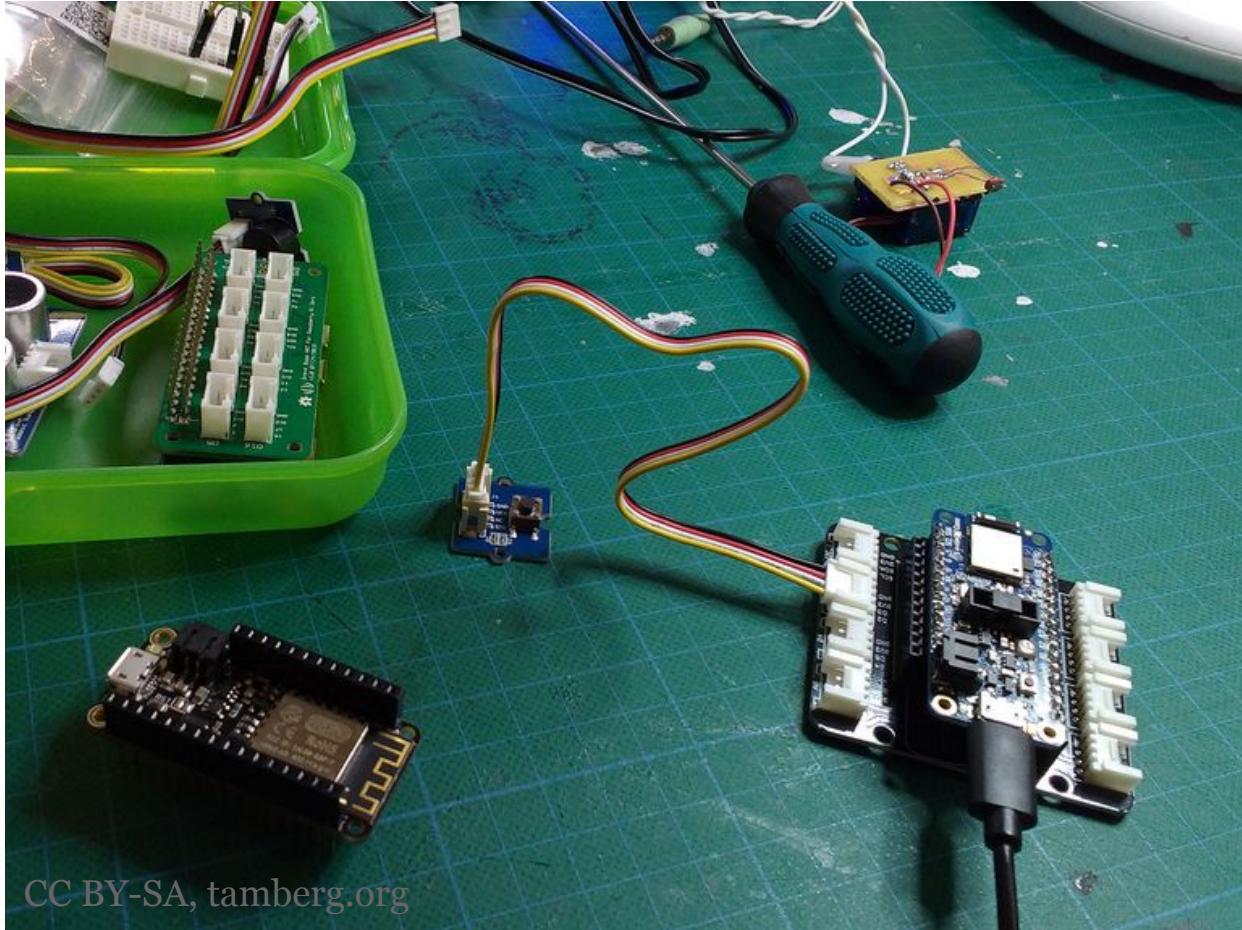


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# Proto-typing

Use modular,  
open source  
hardware.

E.g. Feather  
and Grove.



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# From prototype to product

Hardware prototypes are easy, products are hard.

**Engineering**, to make electronics smaller, low power.

**Design for manufacturing**, to reduce cost per piece.

**Scale up from 100 to 1000 to 10k** per batch, learn.

# From product to service

Each connected product represents a service.

Philips Hue lights for "smart lighting".

Kindle reader to "never be without a book".

Withings smart scale as "accountability partner".

# mobility

Solutions

Vehicles & stations

How it works

Opening a new station



Good value

Unlike your own car, you only pay when you use our car sharing vehicles.



Transparent

Mobility is all inclusive: fuel, servicing and insurance.



Flexible

Rent for as little as one hour with round-the-clock self-service.



Convenient

Without a worry in the world: whether you are after somewhere to park, a



# caru

Produkt  
Über uns

**Firmenkunden**  
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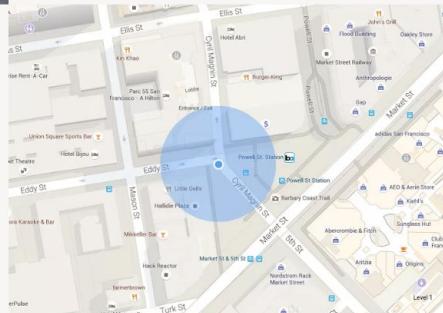
Receive a notification when your home alarm system goes off.

[Click for full guide](#)



Send a text message or email to a caregiver when the hearing aid battery is low.

[Click for full guide](#)



Have your hearing aids go into a special listening program when you make a voice command.

[Click for full guide](#)



Have your hearing aids switch to a preferred listening program based on your GPS location.

[Click for full guide](#)

# Better IoT

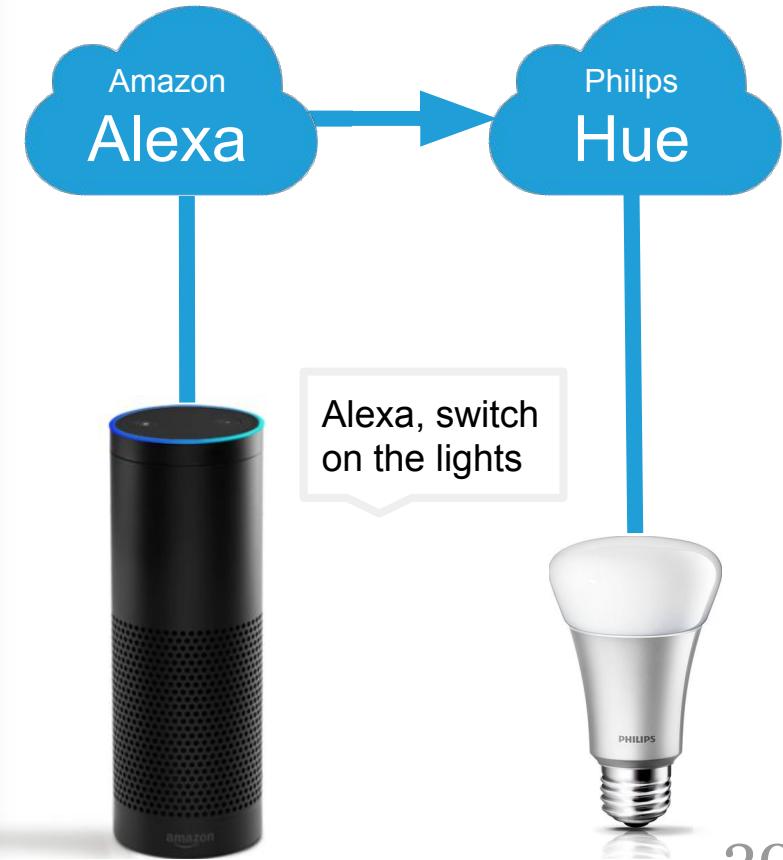
Security, to keep devices, network & backend secure.

Privacy, to keep people in control of their own data.

Interoperability, to become part of an ecosystem.

Openness, standards & open source build trust.

See, e.g. [betteriot.org](https://betteriot.org) principles and [wiki](https://betteriot.org/wiki).





All Products

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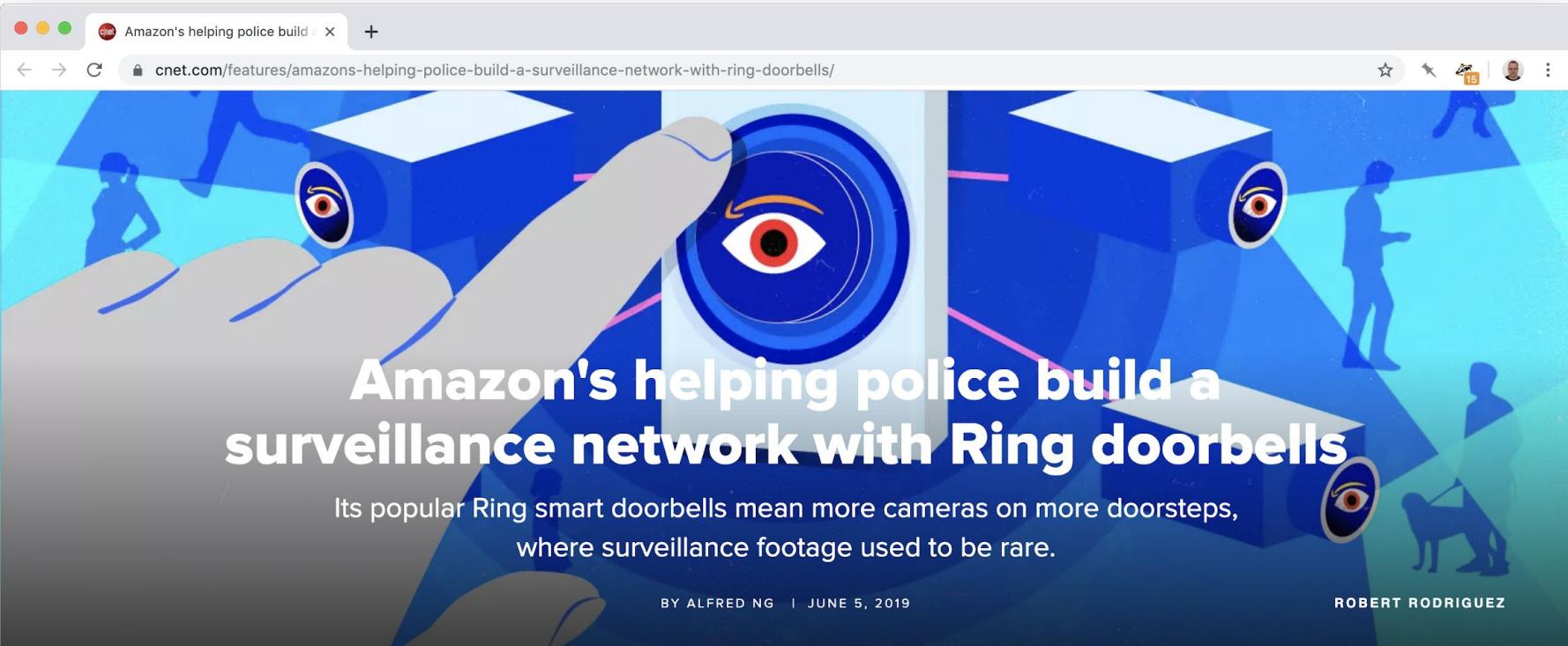
New

Goes everywhere.  
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Introducing the new Stick Up Cams.

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Amazon's helping police build a surveillance network with Ring doorbells

Its popular Ring smart doorbells mean more cameras on more doorsteps, where surveillance footage used to be rare.

BY ALFRED NG | JUNE 5, 2019

ROBERT RODRIGUEZ

If you're walking in Bloomfield, New Jersey, there's a good chance you're being recorded. But it's not a corporate office or warehouse security camera capturing the footage -- it's likely a [Ring doorbell](#) made by [Amazon](#).

While residential neighborhoods aren't usually lined with [security cameras](#), the smart doorbell's popularity has essentially created private surveillance networks powered by Amazon and promoted by police departments.

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# OrCam MyEye.

**Wearable technology for people who are blind or visually impaired.**

Voice-activated device that provides increased independence by communicating visual information, audibly.

With OrCam MyEye, you can read text, recognize faces, identify products & more\*.

\*New: The Smart Reading feature is now available

# Feedback or questions?

Join us on MSE TSM MobCom in MS Teams

Or email [thomas.amberg@fhnw.ch](mailto:thomas.amberg@fhnw.ch)

Thanks for your time.