

# Securing the Internet of Things

Elmer Lastdrager

*28 May 2020*

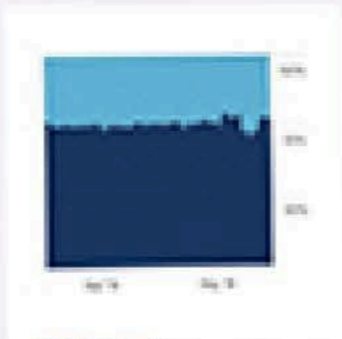




# .nl stats and data

We are providing latest statistics and insights about the use of the .nl domain, which is managed by SIDN. With over 4 million registered domain names, it's the most popular TLD in the world.

Learn More



# Stichting Internet Domeinregistratie Nederland (SIDN)

## Critical Internet services

- ▶ Lookup IP address of a domain name (almost every interaction)
- ▶ Domain name registration
- ▶ Manage fault-tolerant and distributed infrastructure

## “Catalyst” of the Internet in the Netherlands

- ▶ Enable safe and novel use of the Internet
- ▶ Improve the security and resilience of the Internet itself

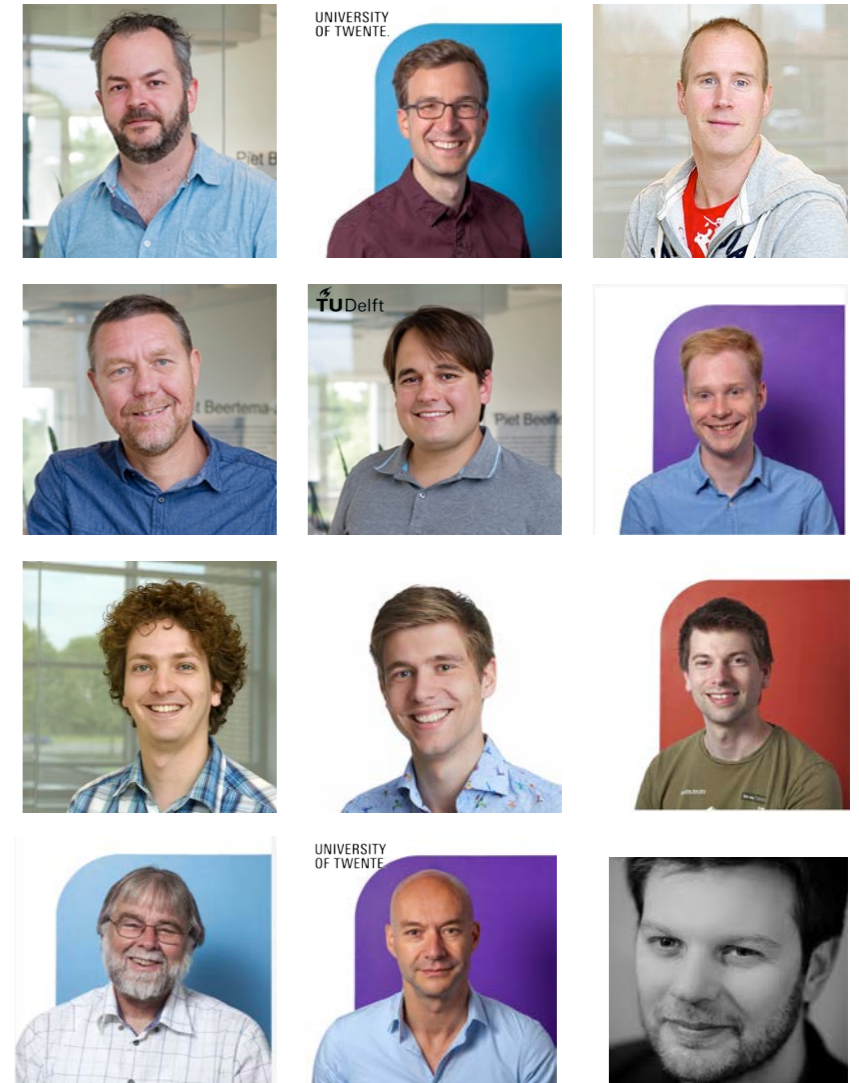


**.nl = the Netherlands**  
17M inhabitants  
5.9M domain names  
3.2M DNSSEC-signed  
1.5B DNS queries/day



# SIDN Labs

- Help operational teams
- Write open source software
- Analyze vast amounts of data
- Run experiments
- Write academic papers and tech reports
- Work with universities



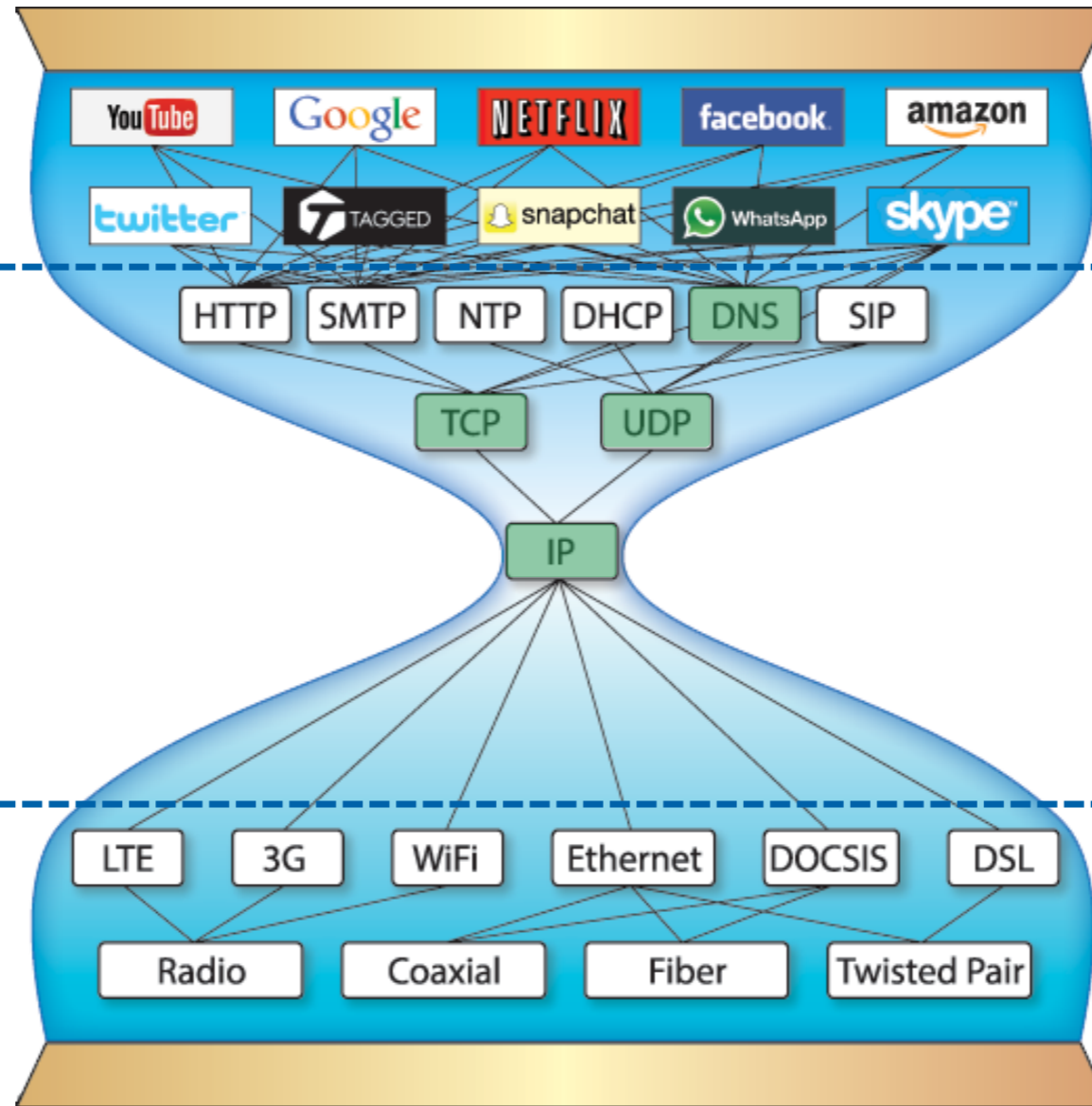


Most people

Services

Us

Transmission







**Internet of Things**



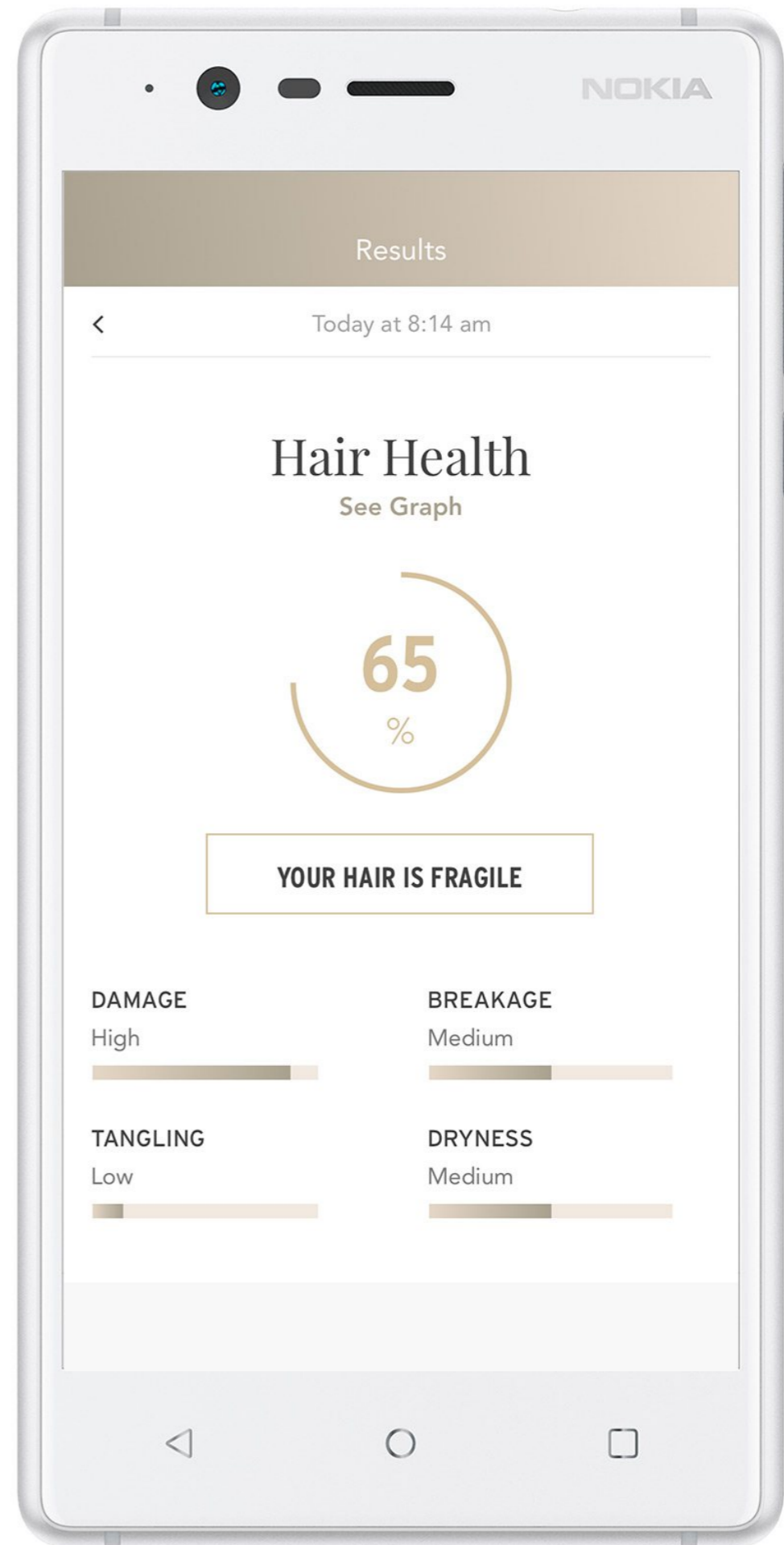


# Smart Devices

**“A smart device is an electronic device, [snip], that can operate to some extent interactively and autonomously.”**

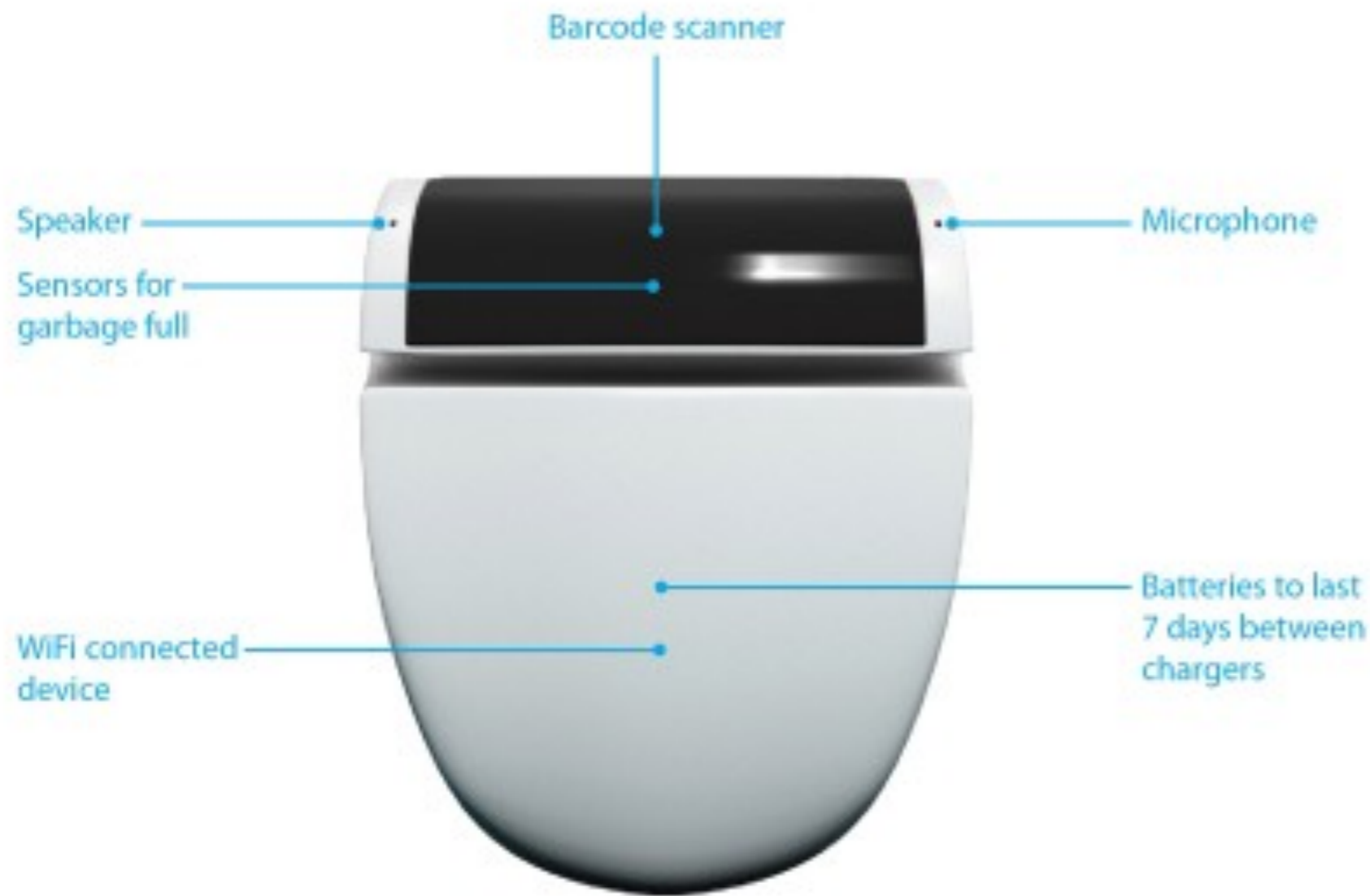
*According to Wikipedia*











This is GeniCan.







# Como Huggies TweetPee funciona

## Design ergonômico

O design busca o conforto e segurança do bebê. Fácil de instalar e retirar para utilizar na próxima fralda.



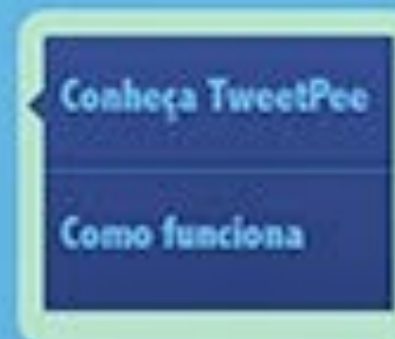
O sensor da fralda monitora a umidade e envia um sinal quando o bebê faz xixi



Todos que têm a permissão para acompanhar a atividade do bebê são notificados



Através do APP mães e papais conseguem comprar fraldas sem sair de casa.



Pelo histórico de troca de fraldas do bebê, você acompanha a quantidade usada por dia

Jan	
28	6 trocas
29	9 trocas
30	4 trocas
31	6 trocas
Fev	





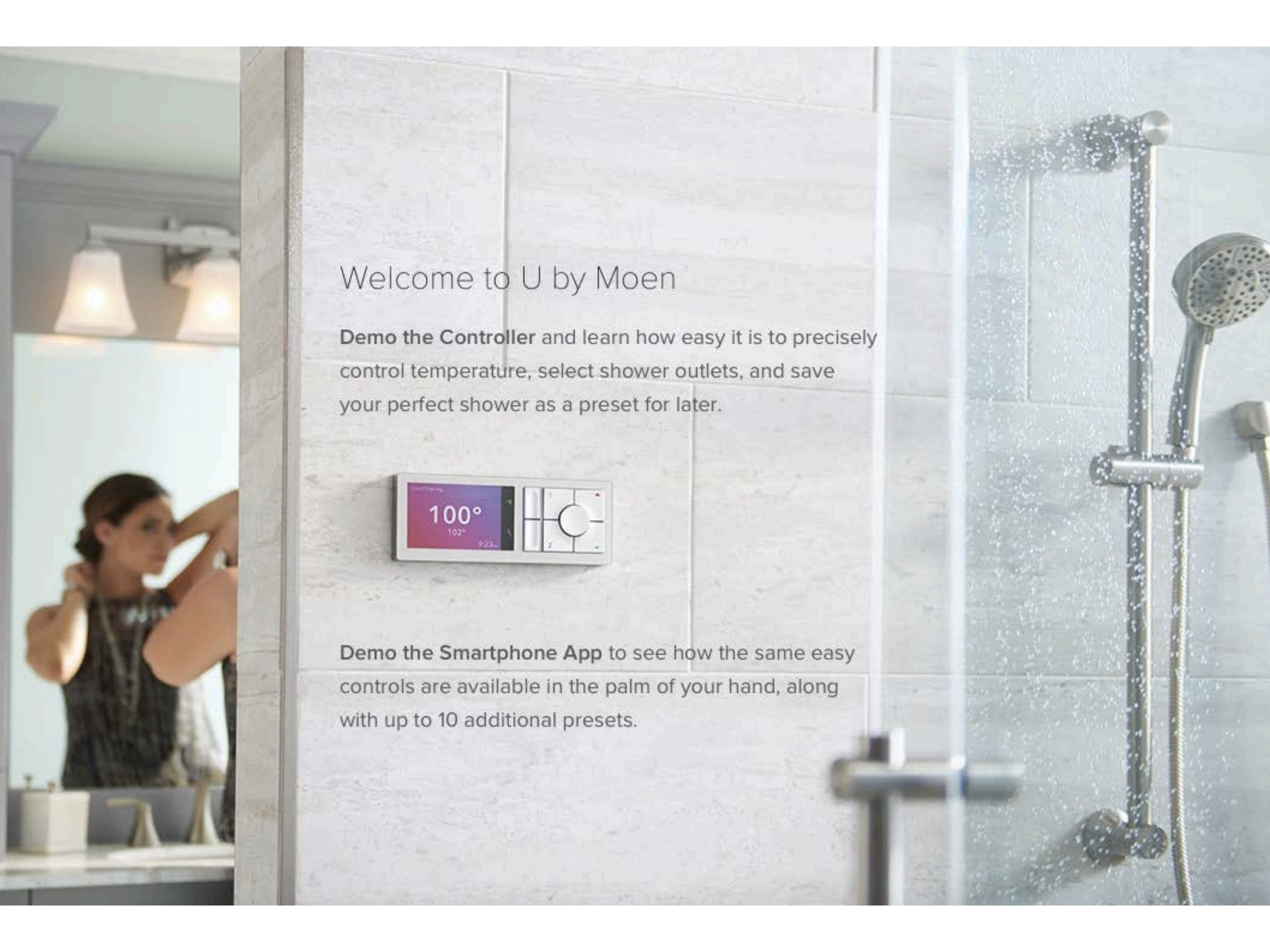




## What does i.Con do with its data? Can I use it anonymously?

“Absolutely! All data will be kept anonymous but users will have the option to share their recent data with friends, or, indeed the world. You will be able to anonymously access stats that you can compare with i.Con users worldwide.”



A woman in a dark tank top is looking into a mirror in a bathroom. The mirror reflects her adjusting her hair. In the foreground, a Moen shower controller is mounted on a light-colored tiled wall. The controller has a digital display showing '100°' and '102°' and several physical buttons. To the right, a shower head is visible, spraying water. The background shows a bathroom vanity with a sink and a light fixture with two warm-toned lights.

Welcome to U by Moen

**Demo the Controller** and learn how easy it is to precisely control temperature, select shower outlets, and save your perfect shower as a preset for later.

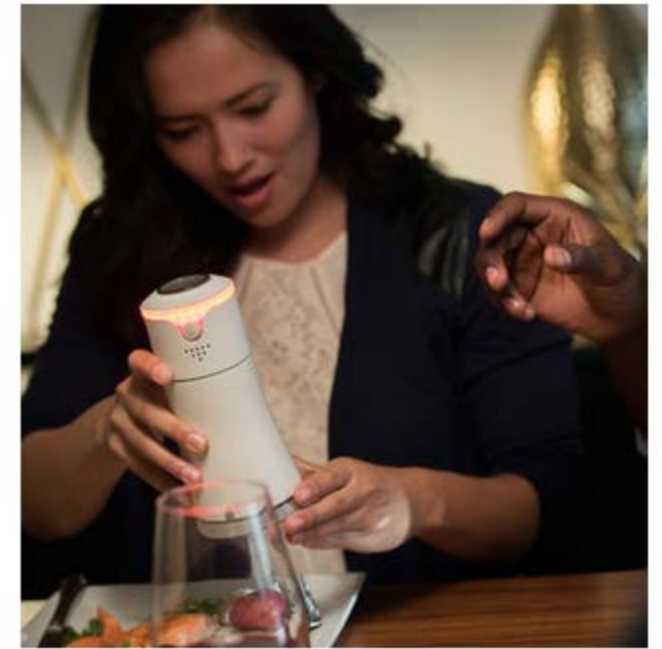
**Demo the Smartphone App** to see how the same easy controls are available in the palm of your hand, along with up to 10 additional presets.





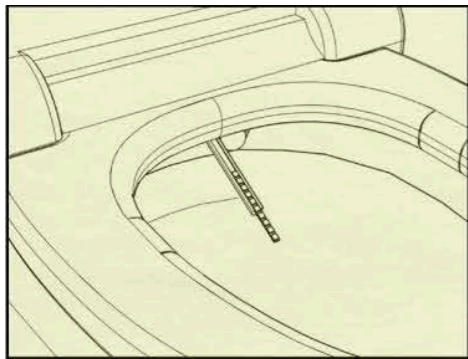
## SMALT with voice

Connect SMALT with Amazon Echo and simply say "Alexa, dispense half a teaspoon of salt".

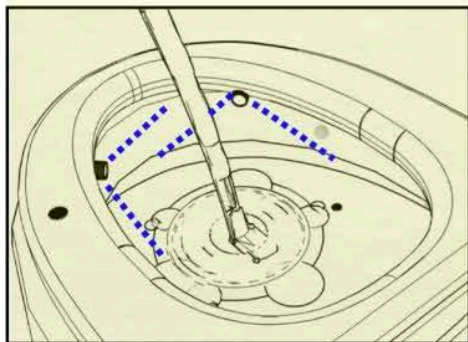


## Bring the flavor

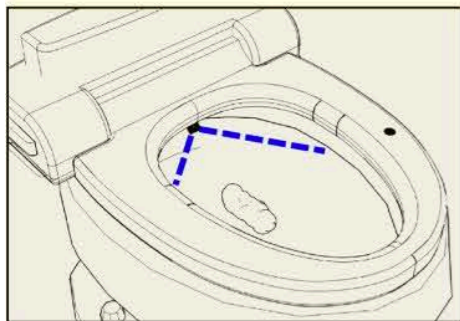
SMALT dispenses salt with a shake/pinch of your smartphone screen or simply turning the dial manually.



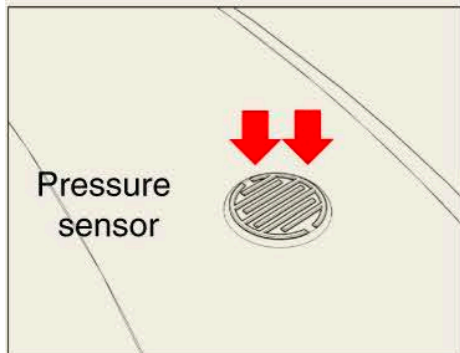
Urinalysis



Uroflowmetry



Bristol stool form scale

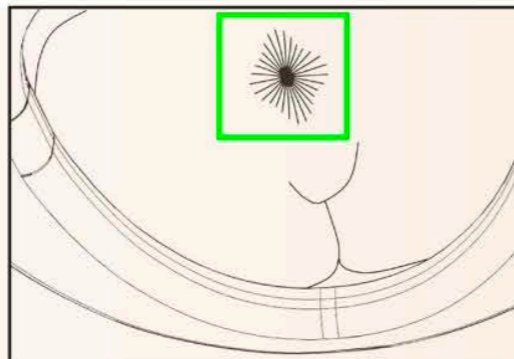
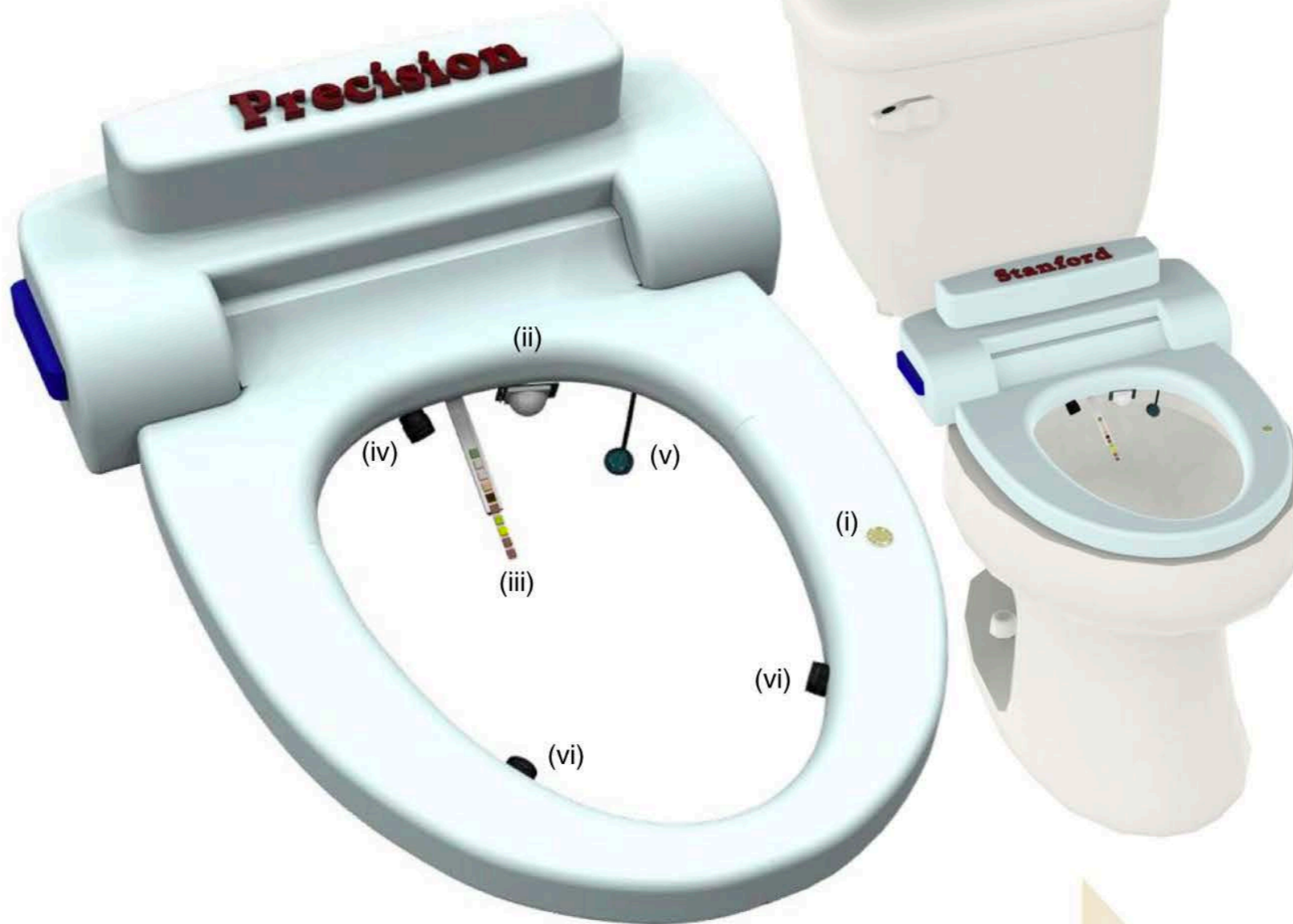


Pressure sensor

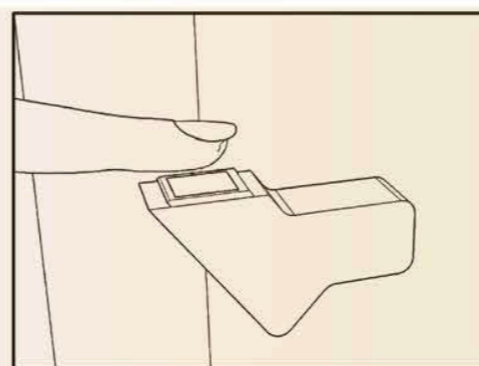
Seating time  
defecation time

- (i) Pressure sensor
- (ii) Motion sensor (PIR)
- (iii) Urinalysis strip

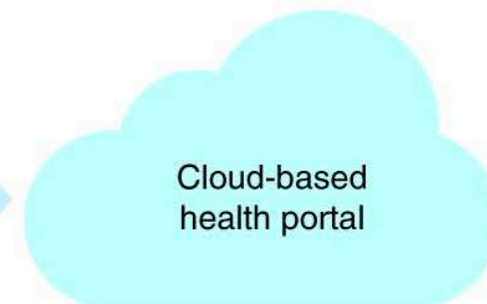
- (iv) Stool camera
- (v) Anus camera
- (vi) Uroflow camera



Analprint scan



Fingerprint scan



Cloud-based  
health portal



**YOU GET CONNECTED!**

**AND YOU GET CONNECTED!**

**EVERYTHING GETS CONNECTED!**





# What is the IoT?

Wikipedia definition:

*“The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as “connected devices” and “smart devices”), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.”*

Global Standards Initiative definition:

*“a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies” [3] and for these purposes a “thing” is “an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks” .”*





## **Towards a definition of the Internet of Things (IoT)**

Revision 1 – Published 27 MAY 2015

A simpler definition:

“Stuff that did not use to be networked”

[Home](#) > [Data Protection](#) > [Internet of Things](#)

SLIDESHOW

# The internet of insecure things: Thousands of internet-connected devices are a security disaster in the making



By [Josh Fruhlinger](#), CSO | Oct 12, 2016 4:00 AM PT





The "S" in IoT  
stands for  
**SECURITY**

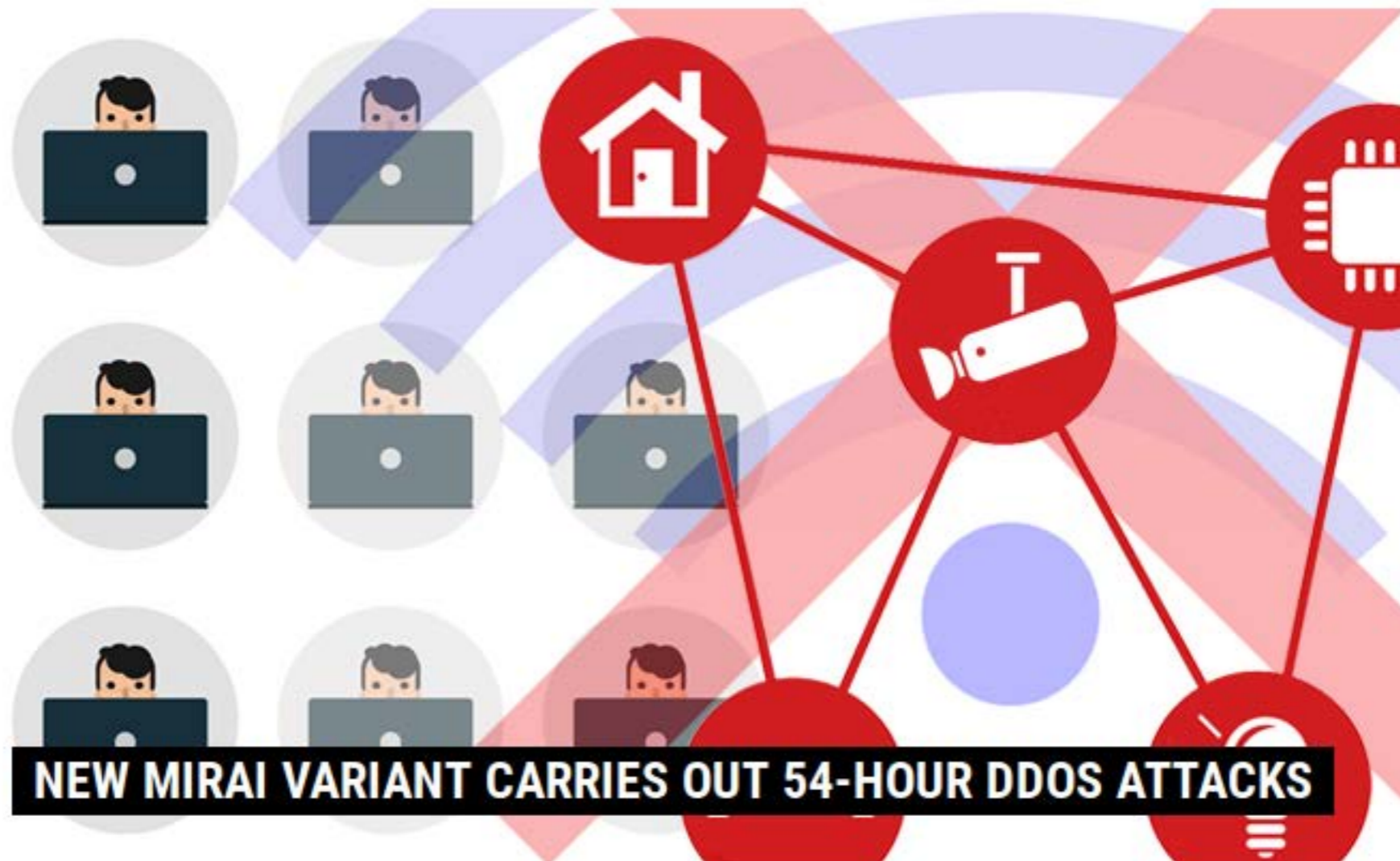


# Why?

- ▶ Security is hard
- ▶ Security is expensive
- ▶ In some cases: security is not ‘user-friendly’
- ▶ Security is not a feature that sells devices
  - ▶ But time to market and price are
- ▶ Security is invisible



[Welcome](#) > [Blog Home](#) > [Hacks](#) > [New Mirai Variant Carries Out 54-Hour DDoS Attacks](#)



by [Tom Spring](#)

March 30, 2017 , 2:50 pm

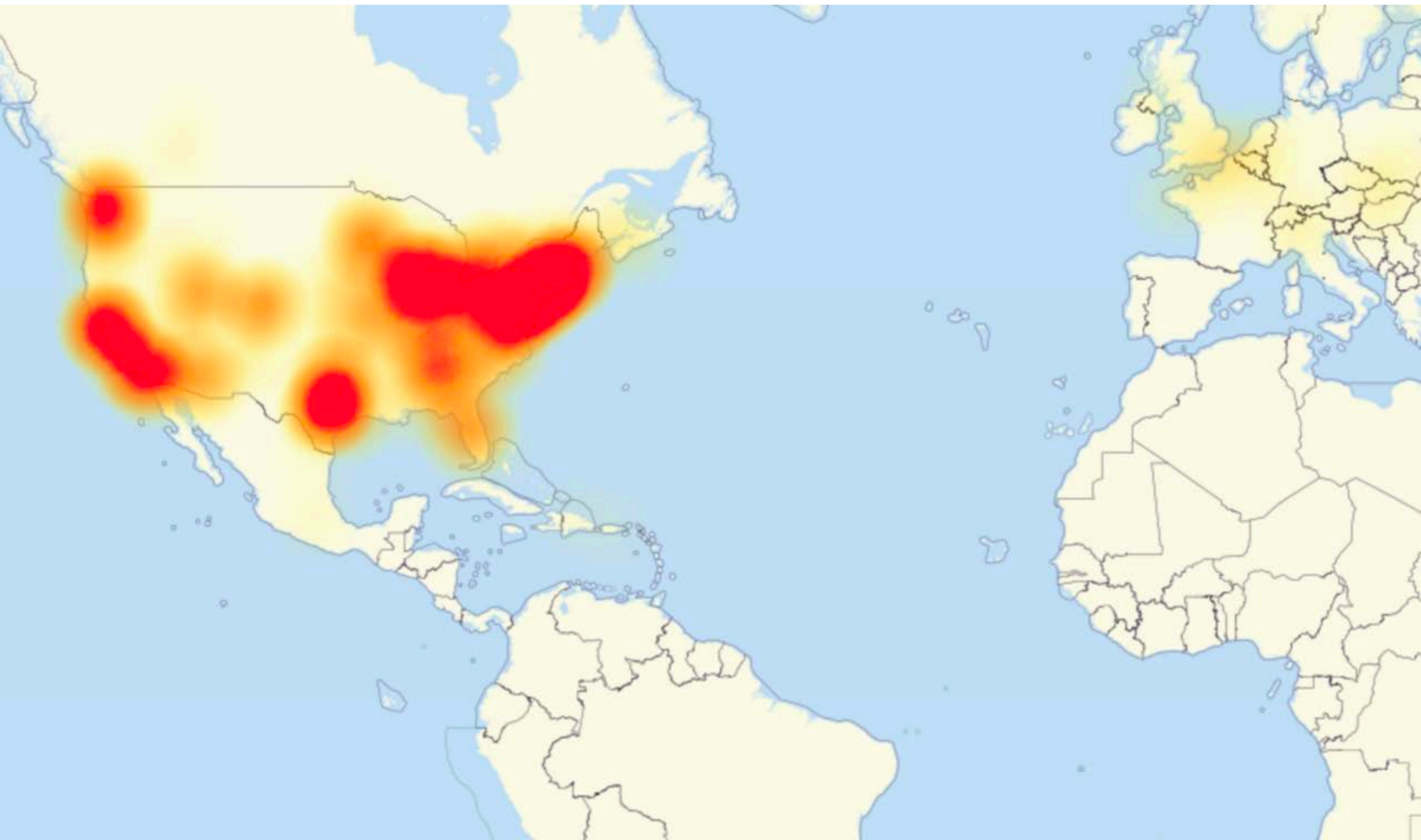
A variant of the Mirai malware pummeled a U.S. college last month with a marathon 54-hour long attack. Researchers say this latest Mirai variant is a more potent version of the notorious Mirai malware that made headlines in [October](#), targeting DNS provider [Dyn](#) and the [Krebs on Security](#) website.



**Mirai vs**  **Dyn**<sup>SM</sup>

1.2 Tbps

From 'only' 100.000 devices



**The  
Economist**

1000 8700 1000 1000

The Pearl river delta: a special report

Hospitals of the future

Jacob Zuma must go

Parking, wrong on so many levels

# Why computers will never be safe



Computers will never be secure. To manage the risks, look to economics rather than technology





# This guy's light bulb performed a DoS attack on his entire smart house



Kashmir Hill

3/03/15 9:41am · Filed to: REAL FUTURE ▾



182





RISK ASSESSMENT —

# BrickerBot, the permanent denial-of-service botnet, is back with a vengeance

New botnet squadrons wage fiercer, more intense attacks on unsecured IoT devices.

DAN GOODIN - 4/24/2017, 10:43 PM





Home > Security > Cybercrime & Hacking



### SECURITY IS SEXY

By Darlene Storm, Computerworld | FEB 2, 2015 12:09 PM PT

#### About

Most security news is about insecurity, hacking and cyber threats, bordering on scary. But when security is done right, it's a beautiful thing...sexy even. Security IS sexy.

NEWS ANALYSIS

# Hacker hijacks wireless Foscam baby monitor, talks and freaks out nanny

This is the third time news has circulated about some jerk hijacking a wireless Foscam camera/baby monitor and made his virtual intrusion known by talking. Please change the default password!



#### MORE LIKE THIS

Hacker strikes again: Creep hijacks baby monitor to scream at infant and...



2 more wireless baby monitors hacked: Hackers remotely spied on babies and...

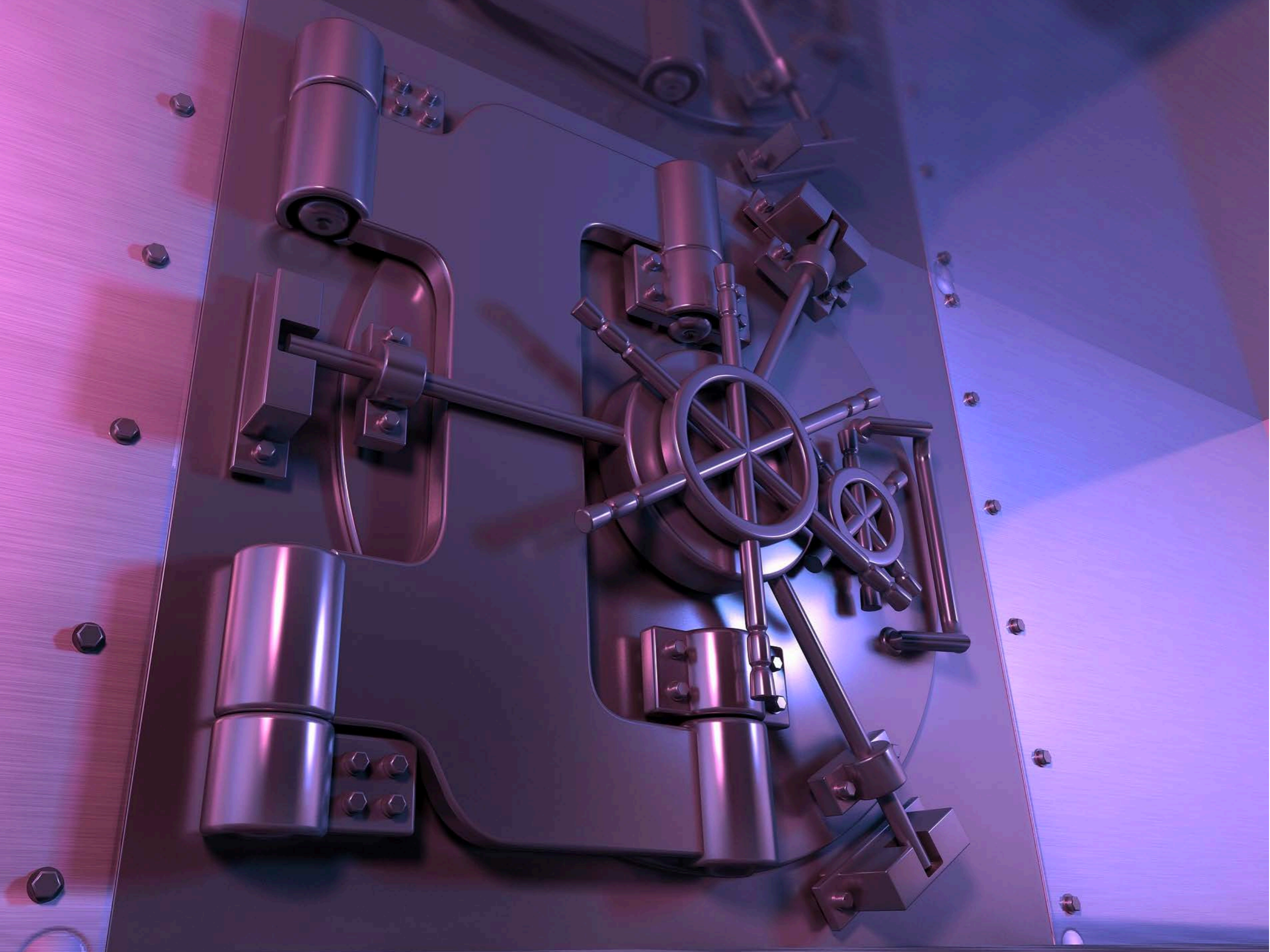


Eerie music coming from wireless baby cam; is it a













**DETECT SMOKE AND CO**



**CONTROL SWITCHES AND OUTLETS**



**CONTROL LIGHTING**



**CONTROL SHADES AND BLINDS**



**ADJUST CLIMATE**



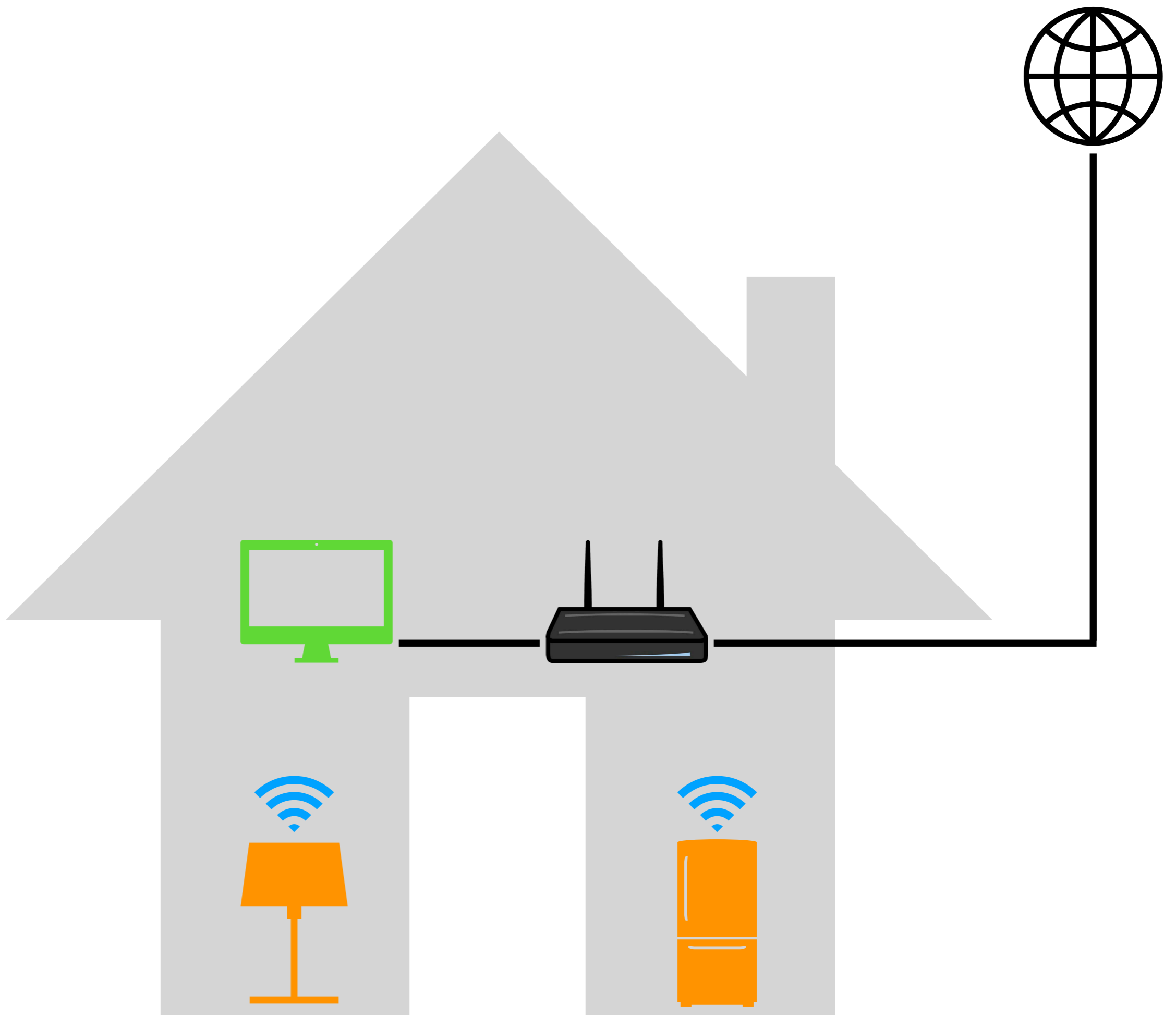
**UNLOCK AND LOCK DOORS**

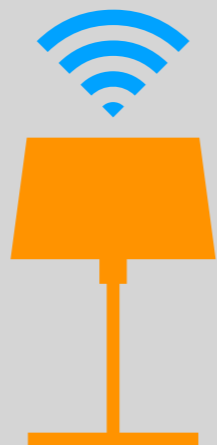
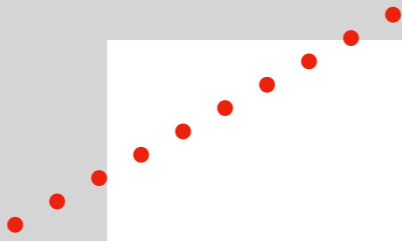
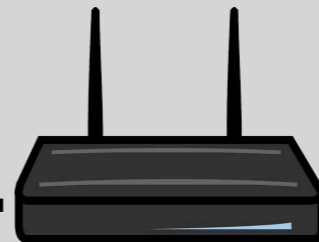
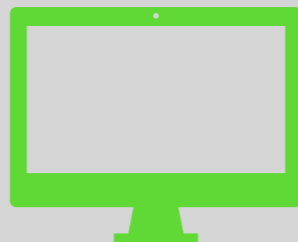
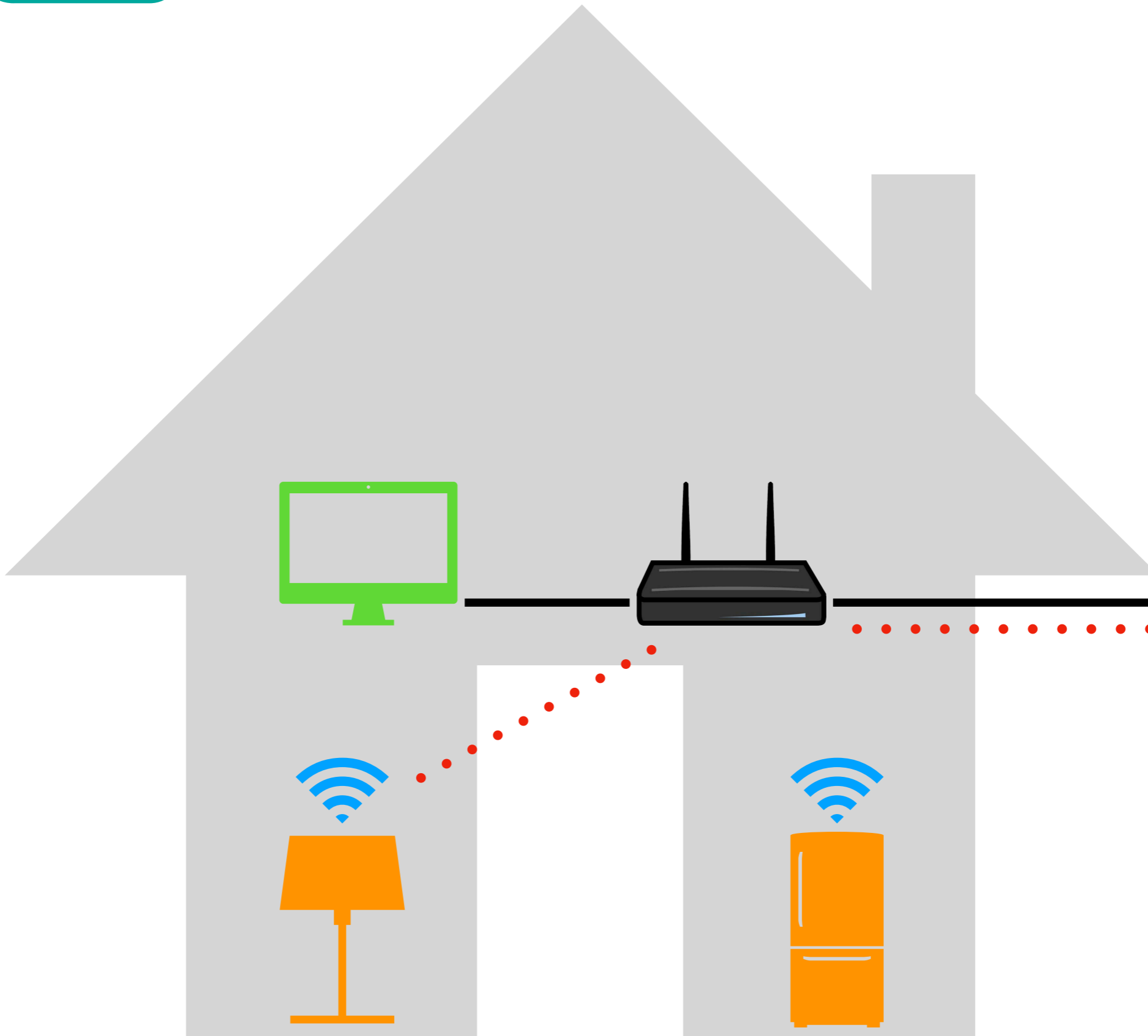
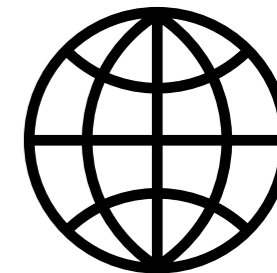


**MONITOR YOUR HOME**

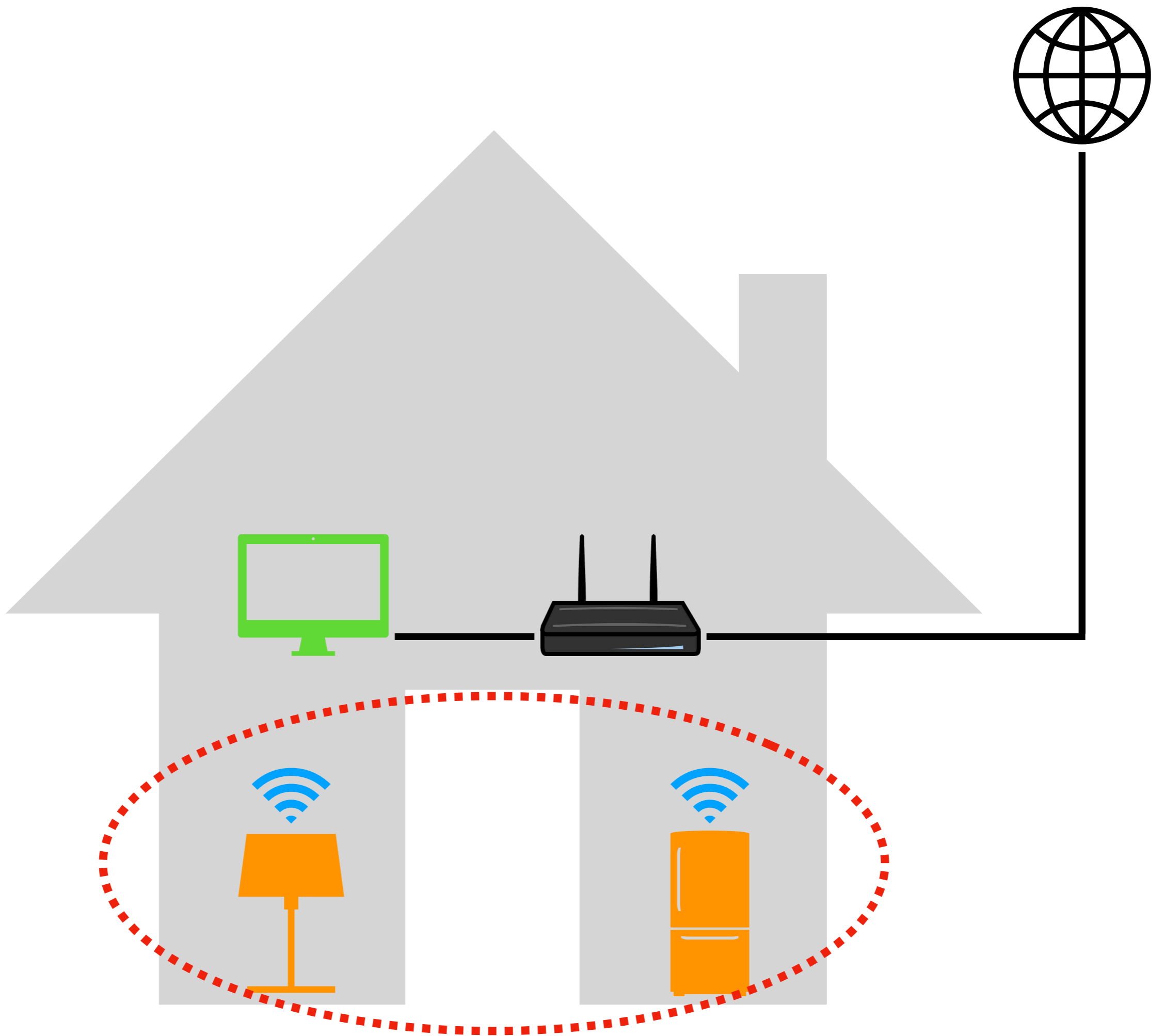


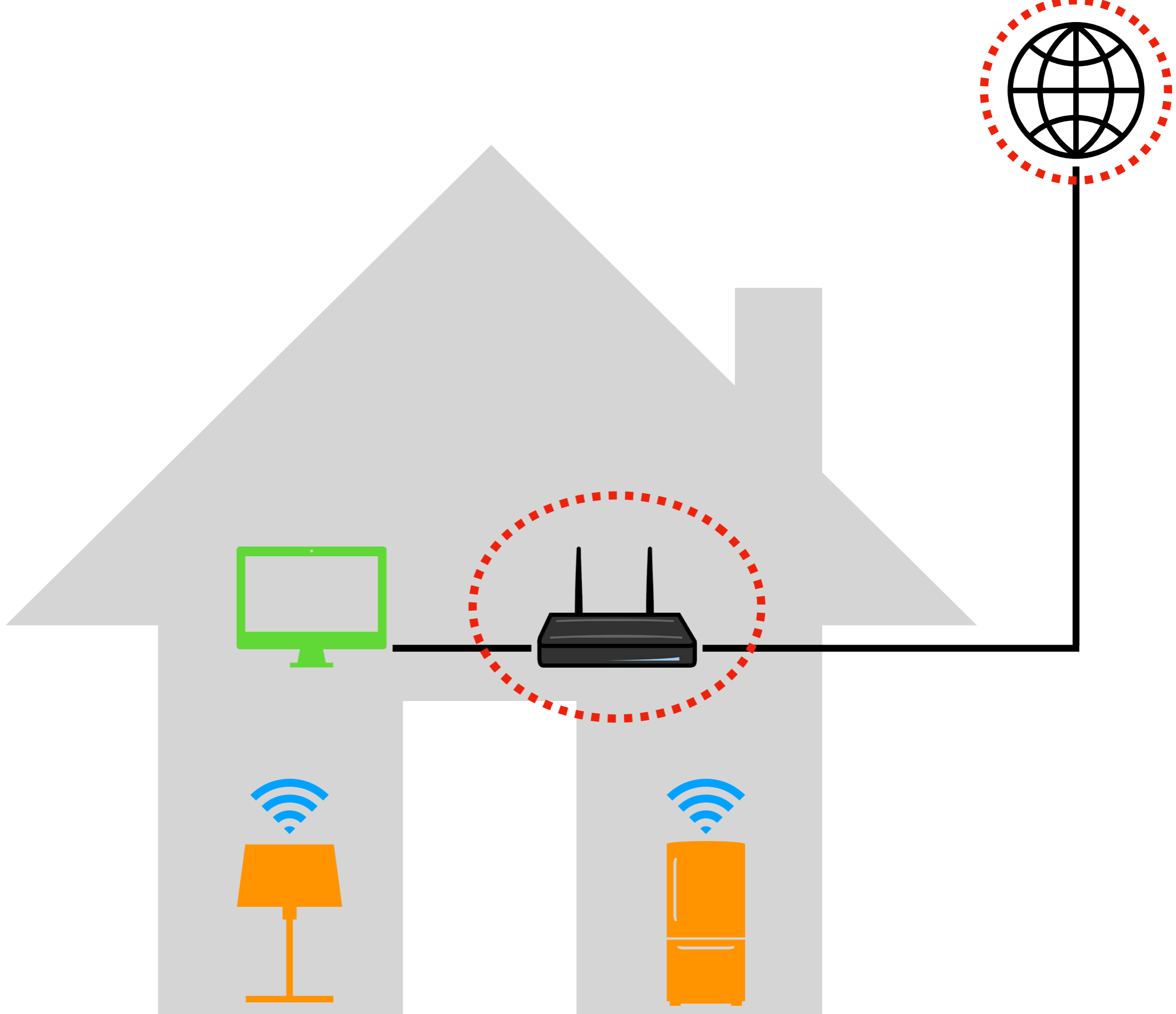
**OPEN AND CLOSE GARAGE DOORS**

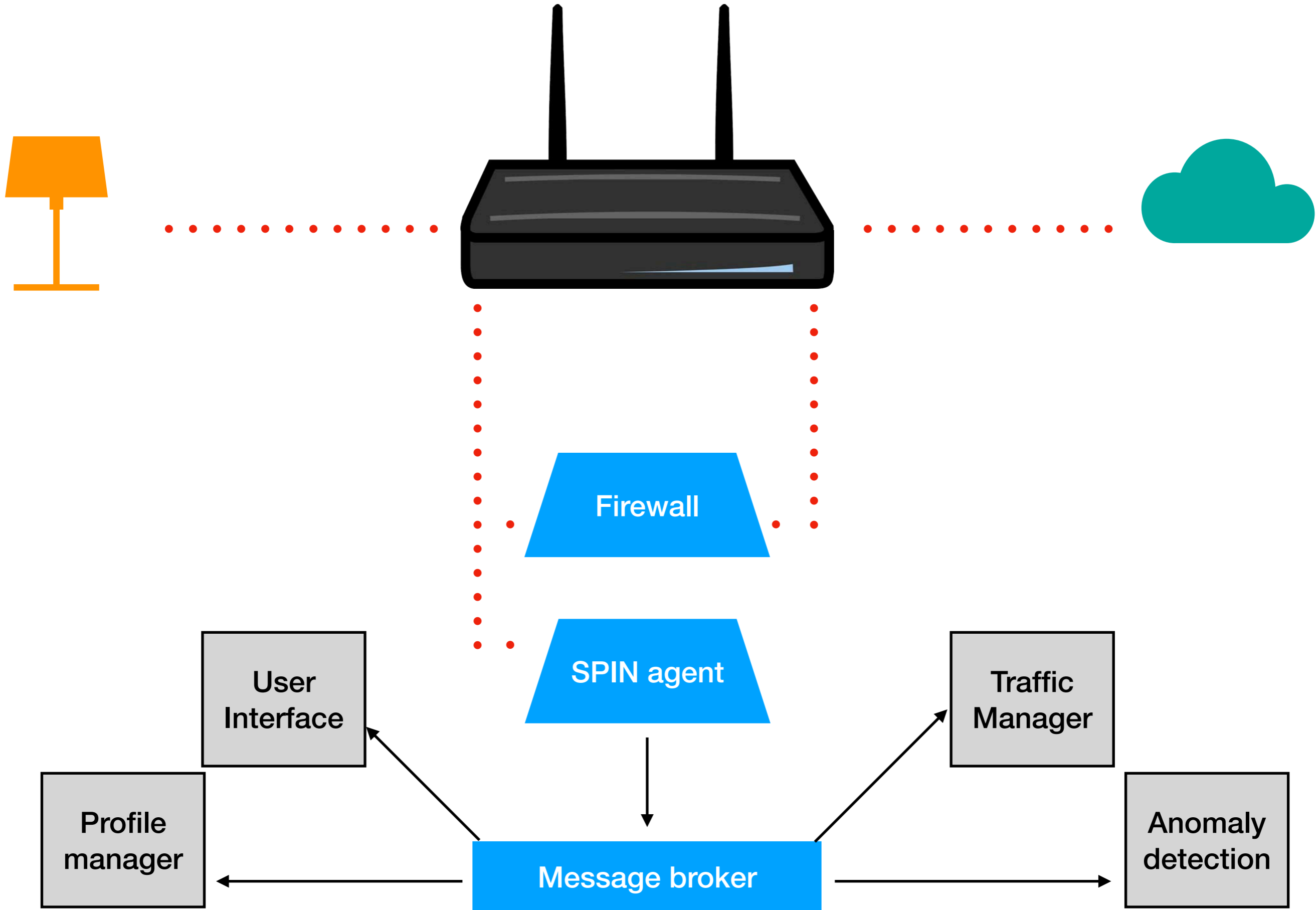




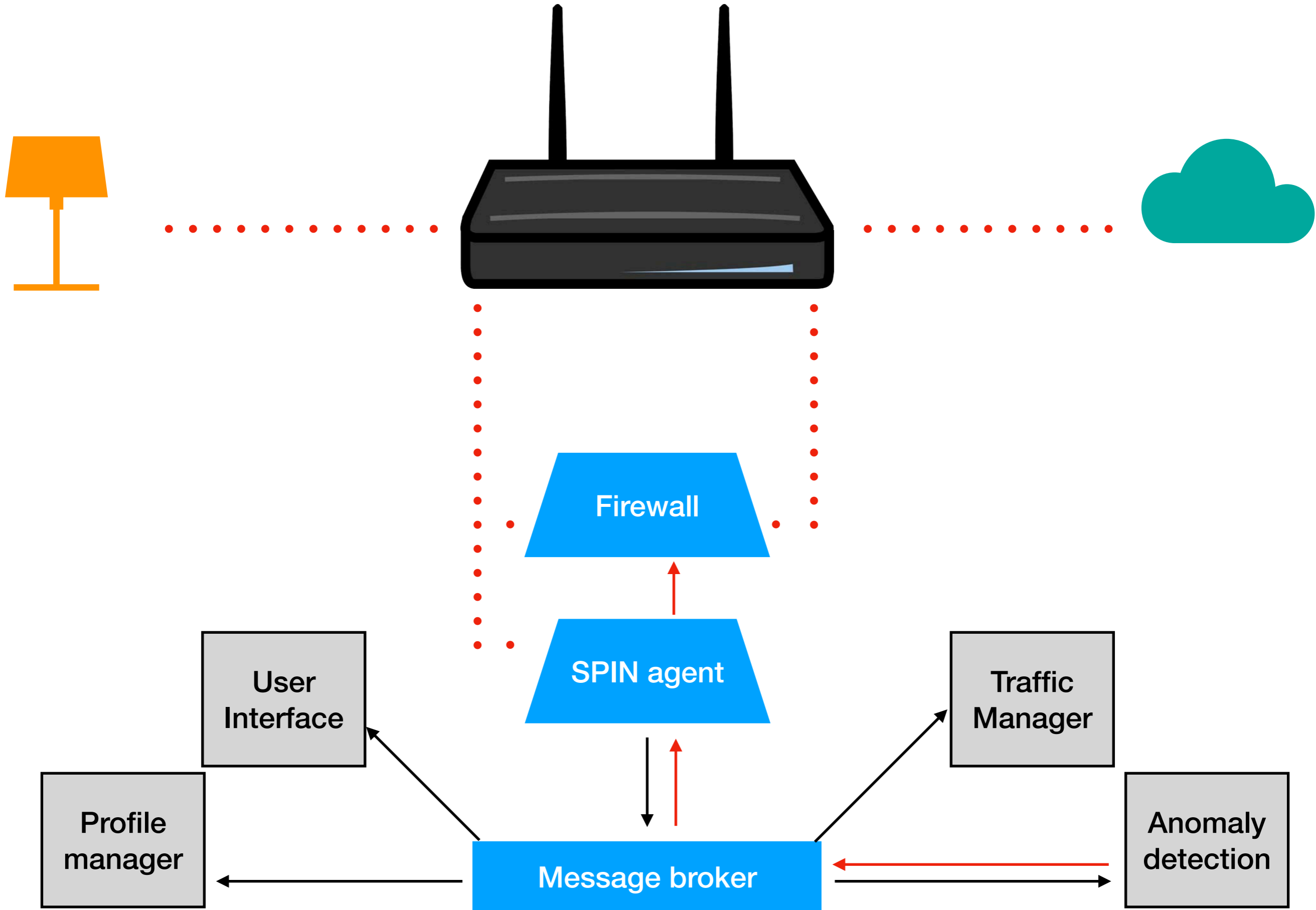


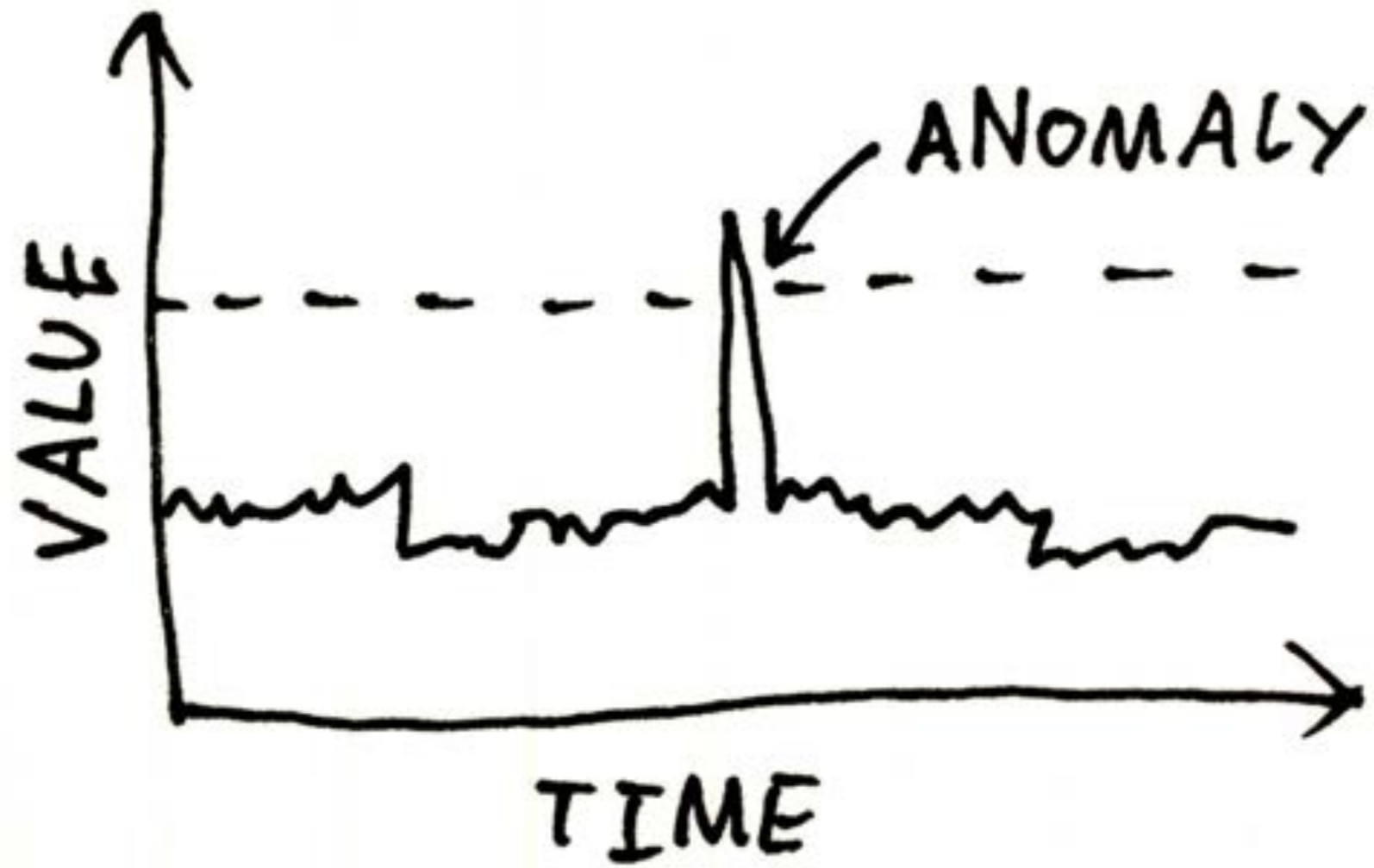












[[Docs](#)] [[txt](#)|[pdf](#)] [[draft-ietf-opsa...](#)] [[Tracker](#)] [[Diff1](#)] [[Diff2](#)] [[Errata](#)]

PROPOSED STANDARD

[Errata](#) [Exist](#)

Internet Engineering Task Force (IETF)

Request for Comments: 8520

Category: Standards Track

ISSN: 2070-1721

E. Lear

Cisco Systems

R. Droms

Google

D. Romascanu

March 2019

## **Manufacturer Usage Description Specification**

### **Abstract**

This memo specifies a component-based architecture for Manufacturer Usage Descriptions (MUDs). The goal of MUD is to provide a means for end devices to signal to the network what sort of access and network functionality they require to properly function. The initial focus is on access control. Later work can delve into other aspects.

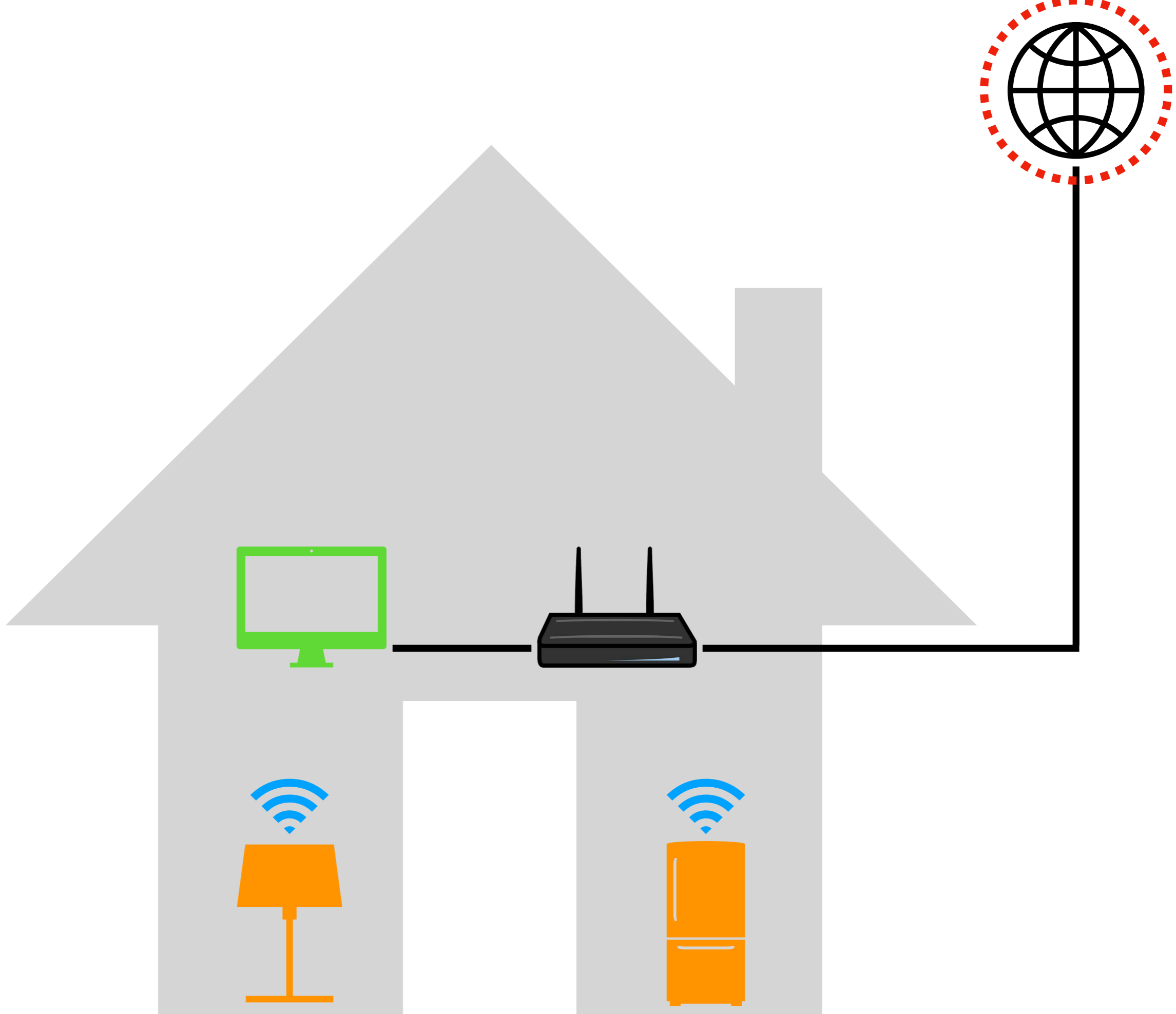
This memo specifies two YANG modules, IPv4 and IPv6 DHCP options, a Link Layer Discovery Protocol (LLDP) TLV, a URL, an X.509 certificate extension, and a means to sign and verify the descriptions.

### **Status of This Memo**

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in [Section 2 of RFC 7841](#).



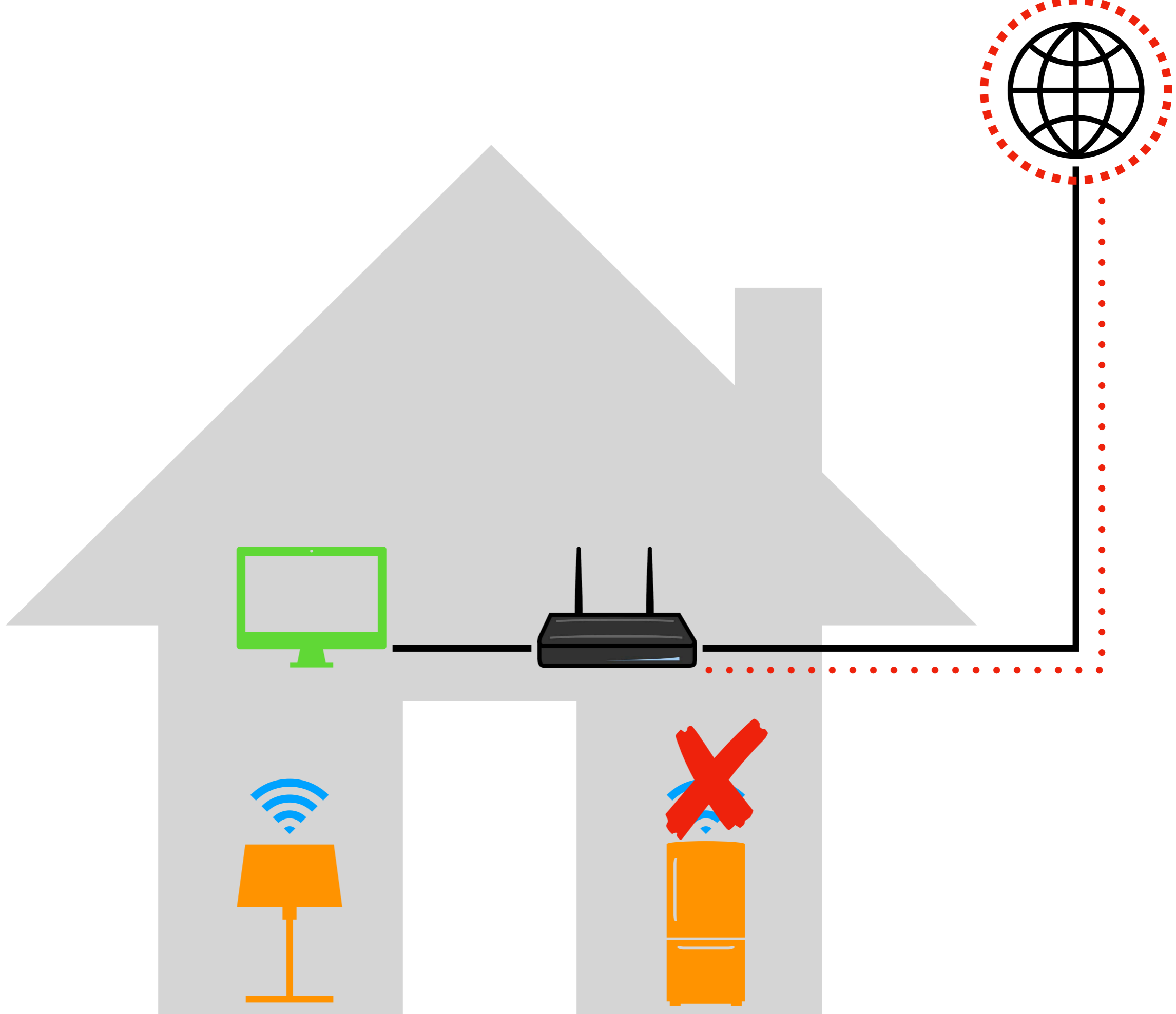


**CAUTION**

**KEEP OUT**

---

**QUARANTINE**







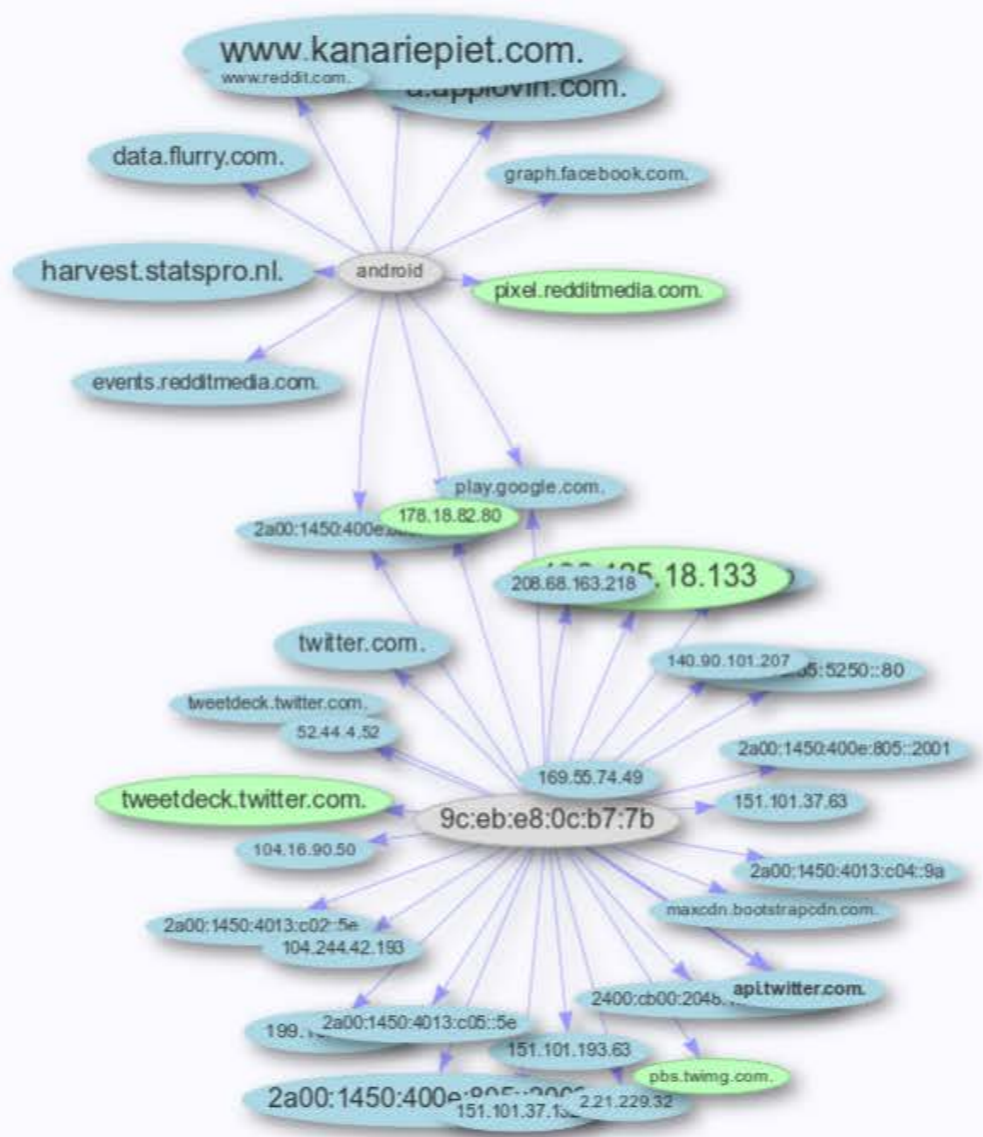
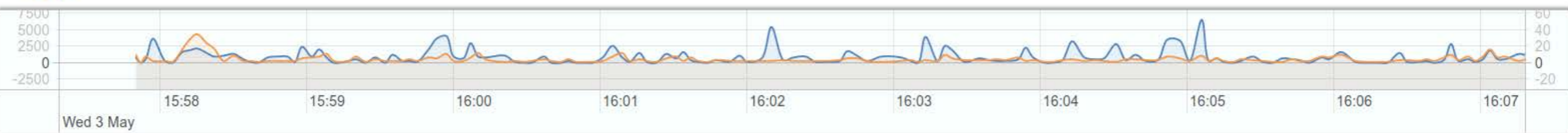


# Security and Privacy for In-home Networks (SPIN)





# SIDN LABS SPIN Traffic monitor prototype





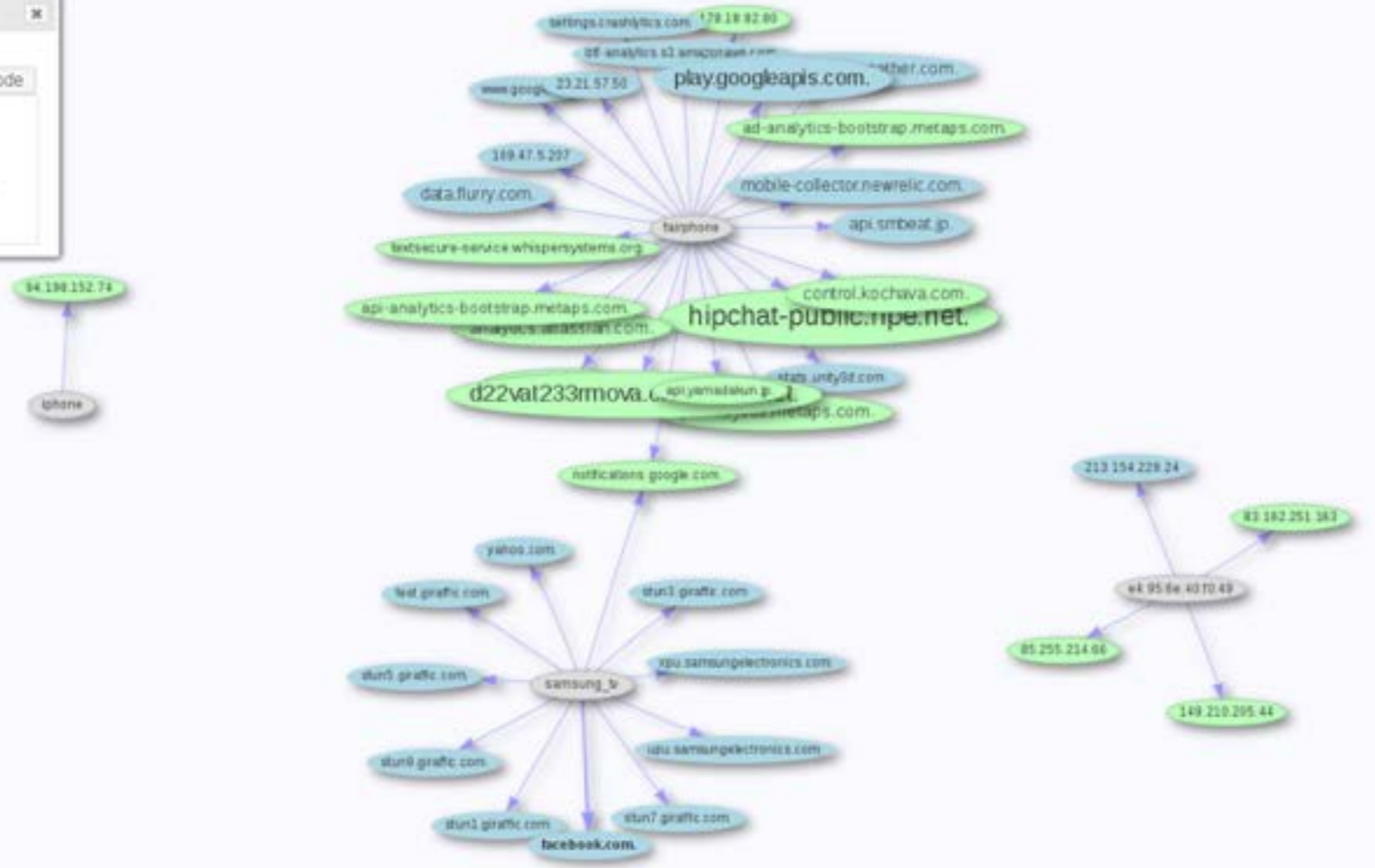
# SDN LABS SPIN Traffic monitor prototype

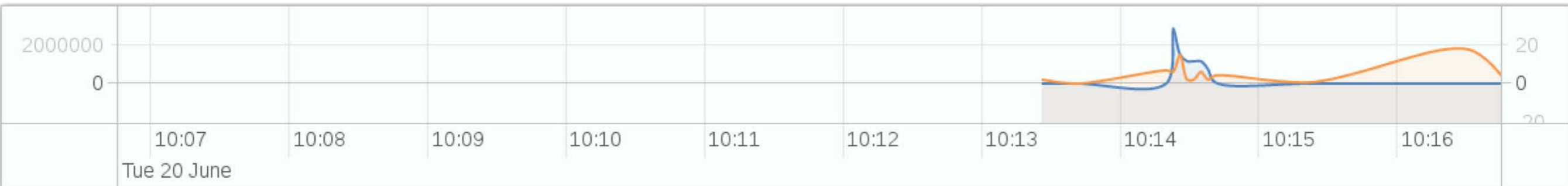


**facebook.com**

Ignore this node  
 Rename this node  
 Block node

Node: 61  
 Connections seen: 5  
 Traffic size: 268  
 Last seen: Fri May 05 2017  
 20:58:11 GMT+0200 (CEST)  
 IP: 157.240.3.35  
 DNS: facebook.com





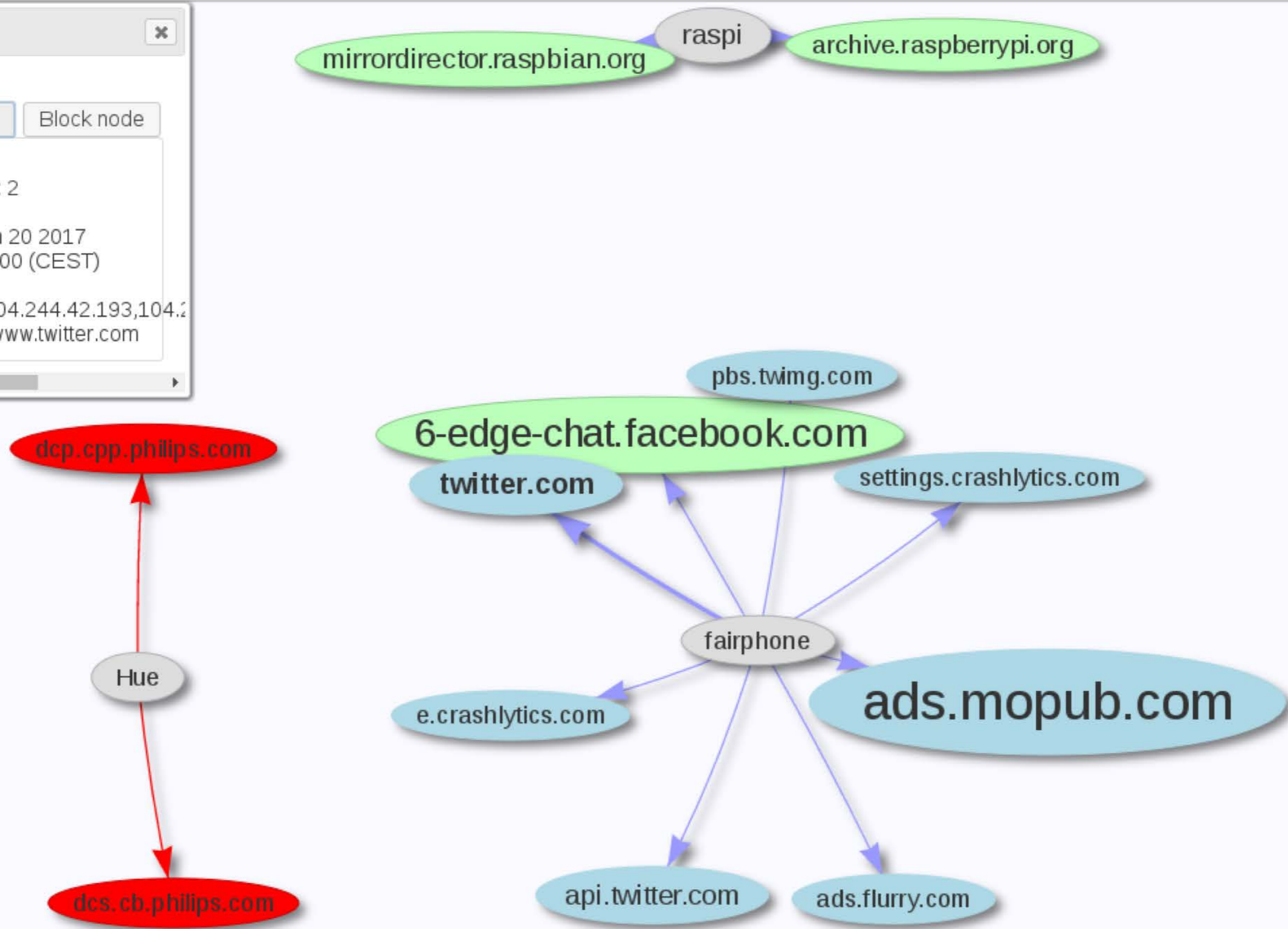
**twitter.com** ✕

Ignore this node

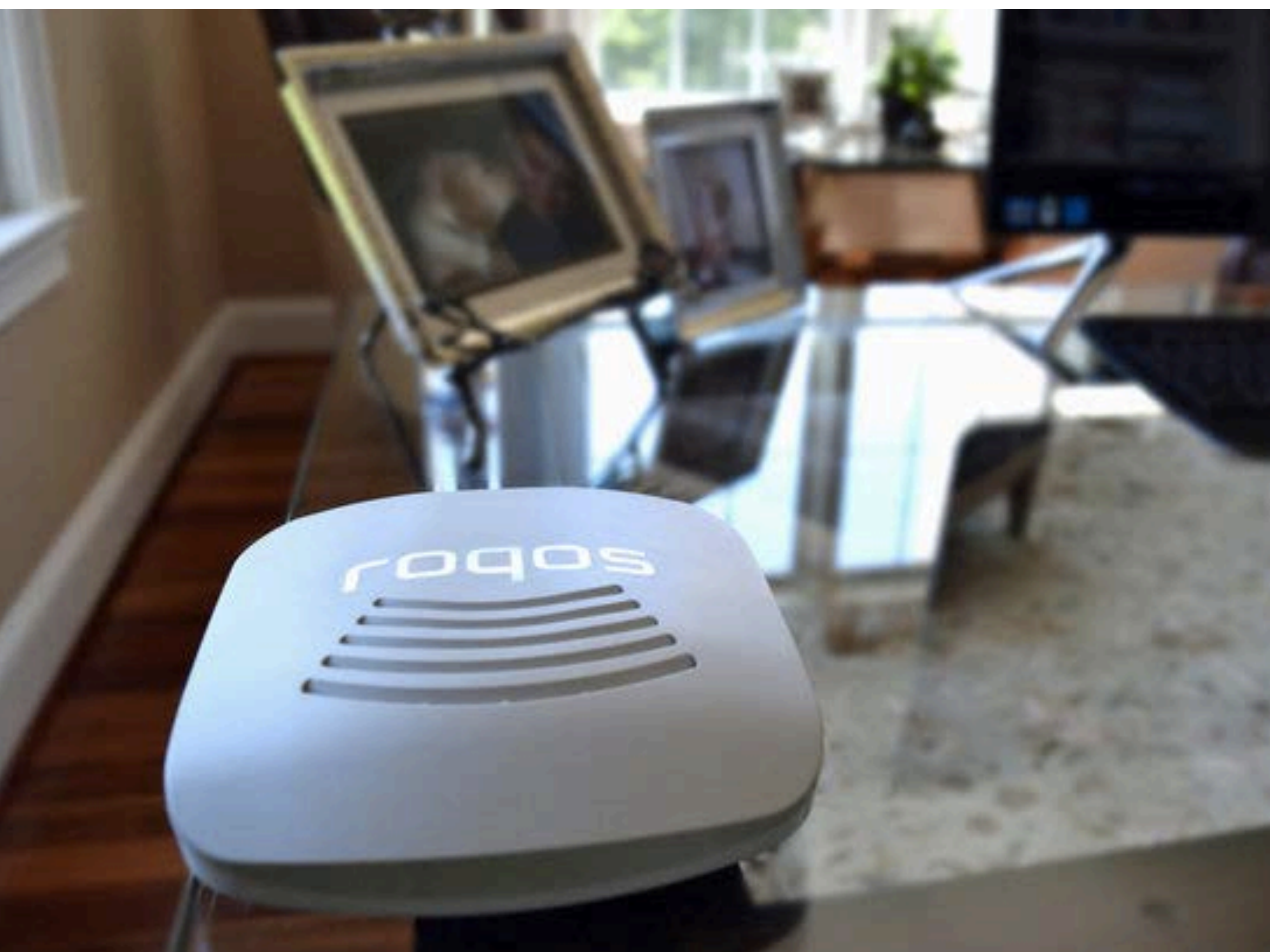
Rename this node Block node

---

Node: 35  
 Connections seen: 2  
 Traffic size: 1850  
 Last seen: Tue Jun 20 2017  
 10:14:35 GMT+0200 (CEST)  
 IP:  
 104.244.42.129,104.244.42.193,104.244.42.201  
 DNS: twitter.com,www.twitter.com





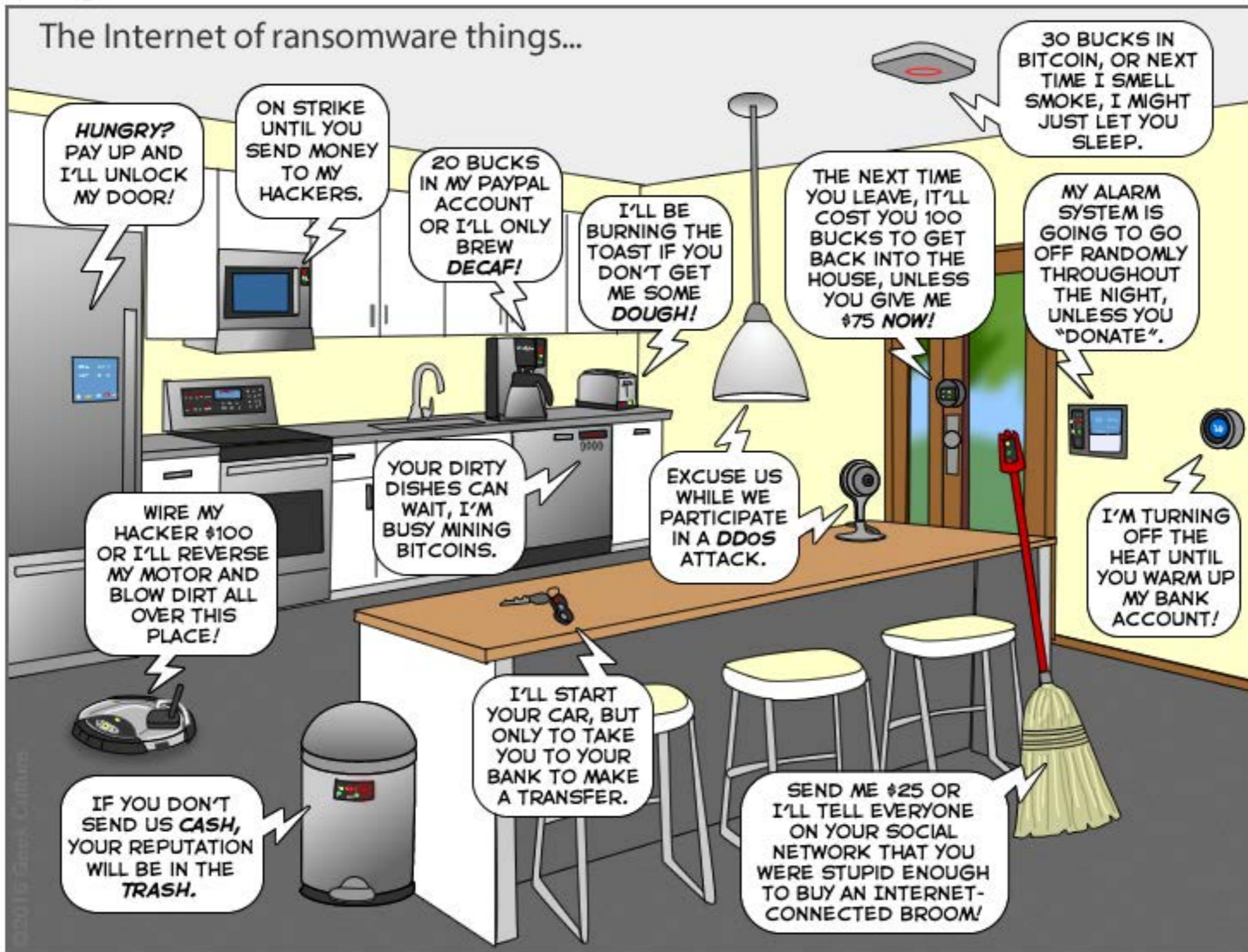






Max input: 230 V  
© 2009





[elmer.lastdrager@sidn.nl](mailto:elmer.lastdrager@sidn.nl)  
<https://spin.sidnlabs.nl>

# Q&A

[spin.sidnlabs.nl](http://spin.sidnlabs.nl)  
[github.com/sidn/spin](https://github.com/sidn/spin)

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