

UiO : **Universitetet i Oslo**

**EyeNetworks Fagdag “Home Networks 2025”, Oslo, April 2017**

# **Challenges for the Home Service Providers**



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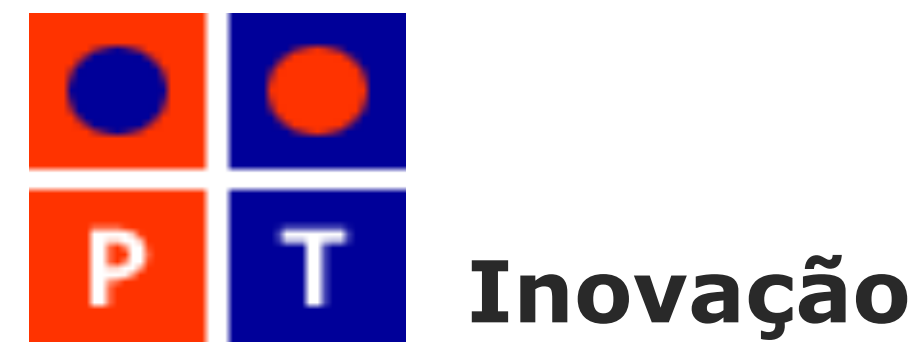
Co-Founder and Secretary General at Basic Internet Foundation  
Professor at University of Oslo, Department of Technology Systems







**Eurescom P1401 OSIAN**  
**User needs, technologies and markets**  
**for home systems**



Project leader: Josef Noll, Josef.Noll@telenor.com  
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[www.eurescom.de](http://www.eurescom.de) → **P1401**

**Eurescom Summit 2005, Home Services**



2017

# Home Services Areas (P1401)

2017

2005

Entertainment  
On-Demand

VoD, News, Music  
Fast Internet

Social Inclusion  
Health - Care

“Take part” in life  
Positive monitoring  
Heart rate, EKG

Personal  
Enrichment

eLearning  
Virtual communities  
eGaming

Home Automation  
Security

Safety & Security  
Appliance management  
Energy savings

► User needs in these areas

☐ Mass market relevance

“It shall **make money**”

☐ Help customer up to the very end ‘it will work’

► How support is provided?

☐ Telecom: “**Works** first time and **forever**”

☐ Connectivity support

☐ Service support

Wifi needs  
to work

?

2025(?)

Security &  
Privacy

IoT, Things

2025(?)



## Your Role as Home Network provider

### Today

- “Get it working”
  - ➔ QoS overall: “Netflix on the toilet”
  - ➔ No failure
- Price competition
  - ➔ last mile CAPEX & OPEX costs
  - ➔ Bundling of services
  - ➔ Upcoming IoT services

### In 2025

- Vision: Service provider for 98% of time
  - ➔ seamless maintenance
  - ➔ security for all IoT devices
  - ➔ privacy provider
  - ➔ personalised services
- Incentives
  - ➔ Service unbundling
  - ➔ no revenue on “black connectivity”

you have 5 years to





# The Internet of Things (IoT)

- IoT =
  - Things +
  - Internet +
  - Semantics
- Tingene som snakker
  - med en datamaskin,
  - som forstår hva det dreier seg om,
  - og tar selvstendige beslutninger

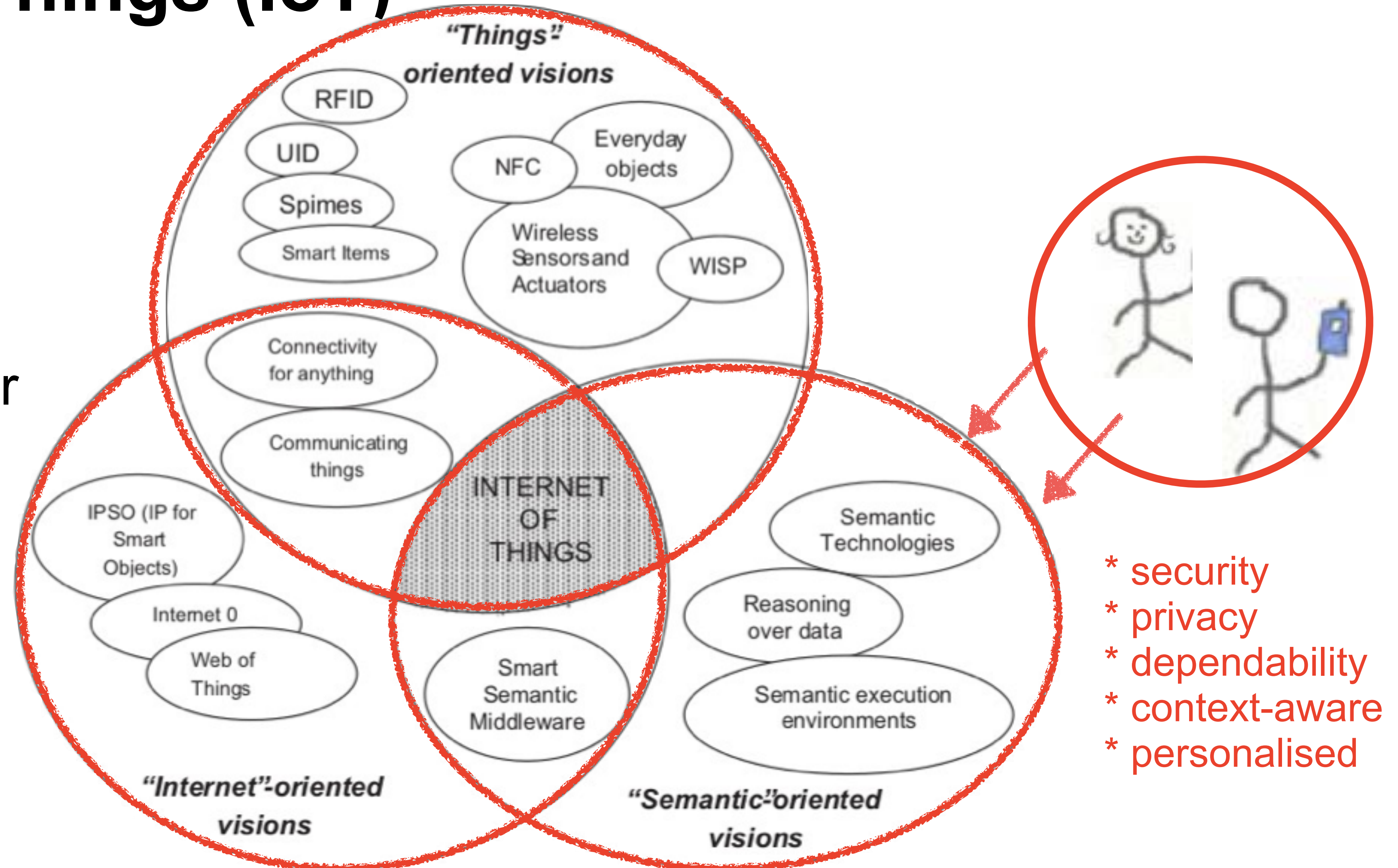


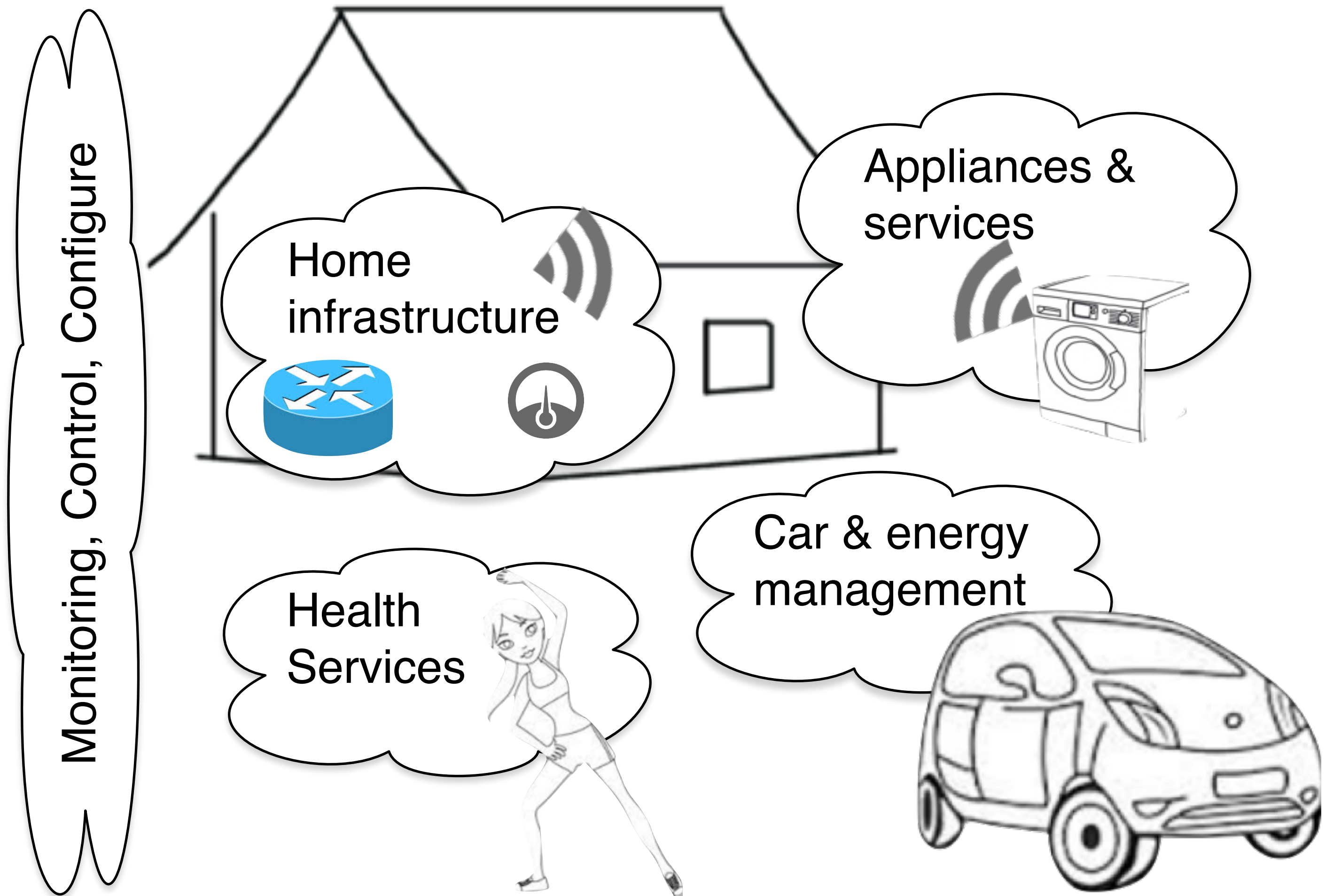
Fig. 1. "Internet of Things" paradigm as a result of the convergence of different visions.





## Considerations for your way

- A variety of services
- Security and Privacy requirements
- Novel trends, flexibility
- My Home is everywhere





# IoT threats

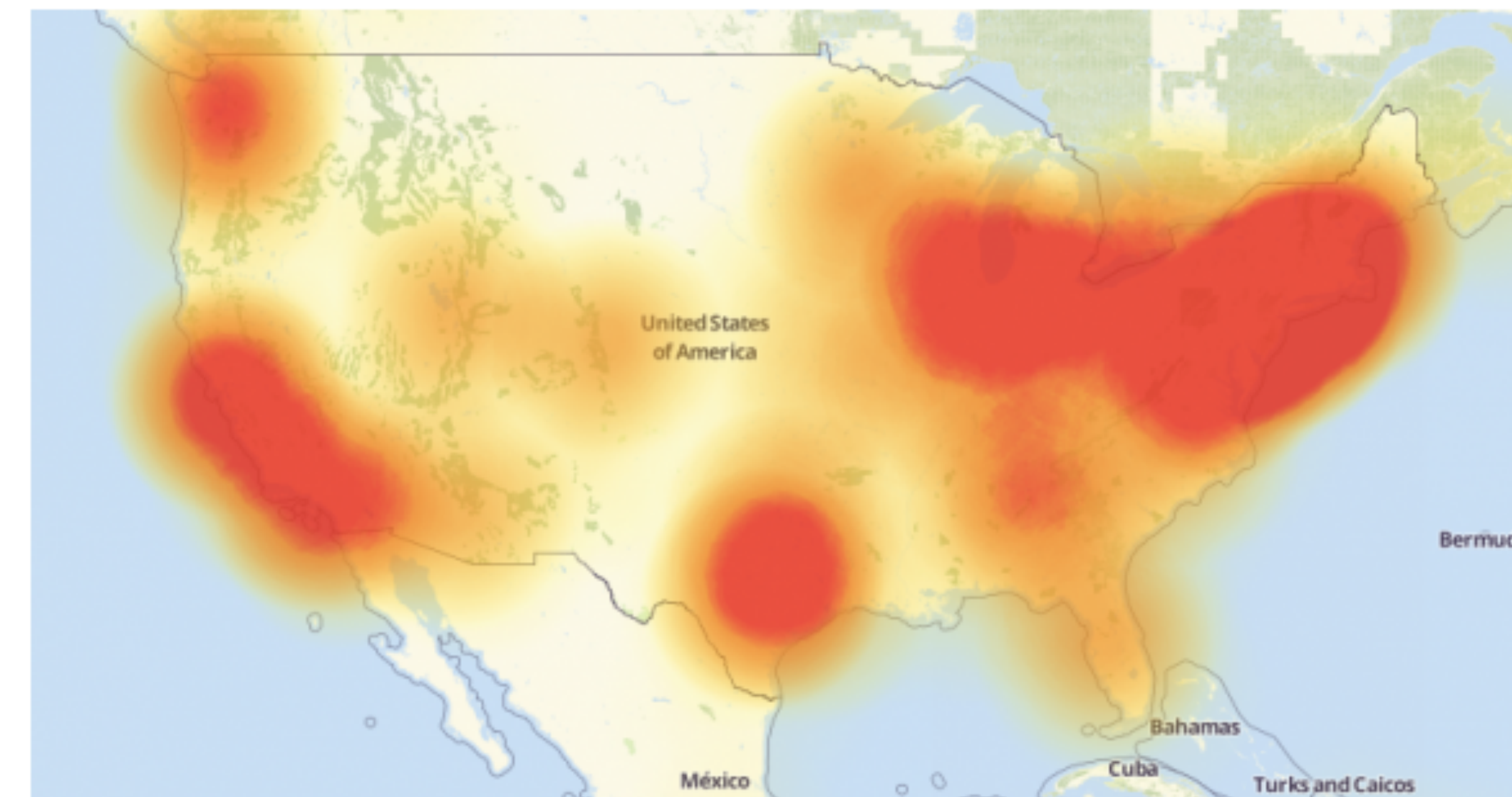
- First massive attack from IoT devices
  - ➔ 16Oct2016 IoT botnet attack on Dyn
  - ➔ Camera (CCTV), video recorder, TV,...
  - ➔ 1.2 Gbps Denial-of-Service attack
- How?
- All using Linux BusyBox for authentication
  - ➔ admin - admin, root - root, admin - 1111...
  - ➔ simple “test” was enough to convert IoTs into botnet



## 21 Hacked Cameras, DVRs Powered Today's Massive Internet Outage

A massive and sustained Internet attack that has caused outages and network congestion today for a large number of Web sites was launched with the help of hacked “Internet of Things” (IoT) devices, such as CCTV video cameras and digital video recorders, new data suggests.

Earlier today cyber criminals began training their attack cannons on **Dyn**, an Internet infrastructure company that provides critical technology services to some of the Internet's top destinations. The attack began creating problems for Internet users reaching an array of sites, including Twitter, Amazon, Tumblr, Reddit, Spotify and Netflix.



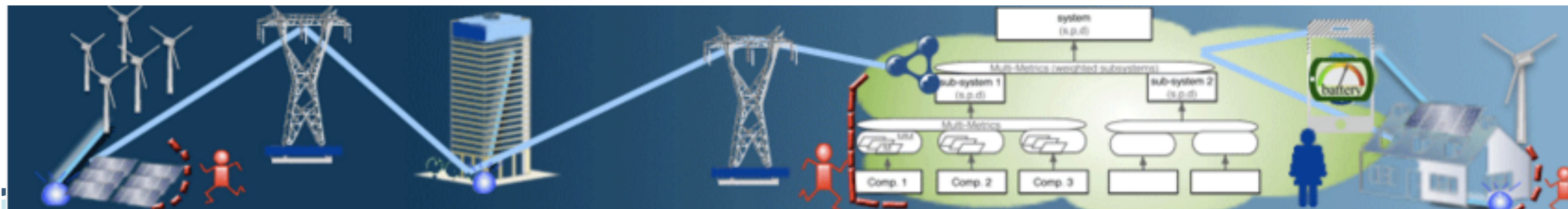
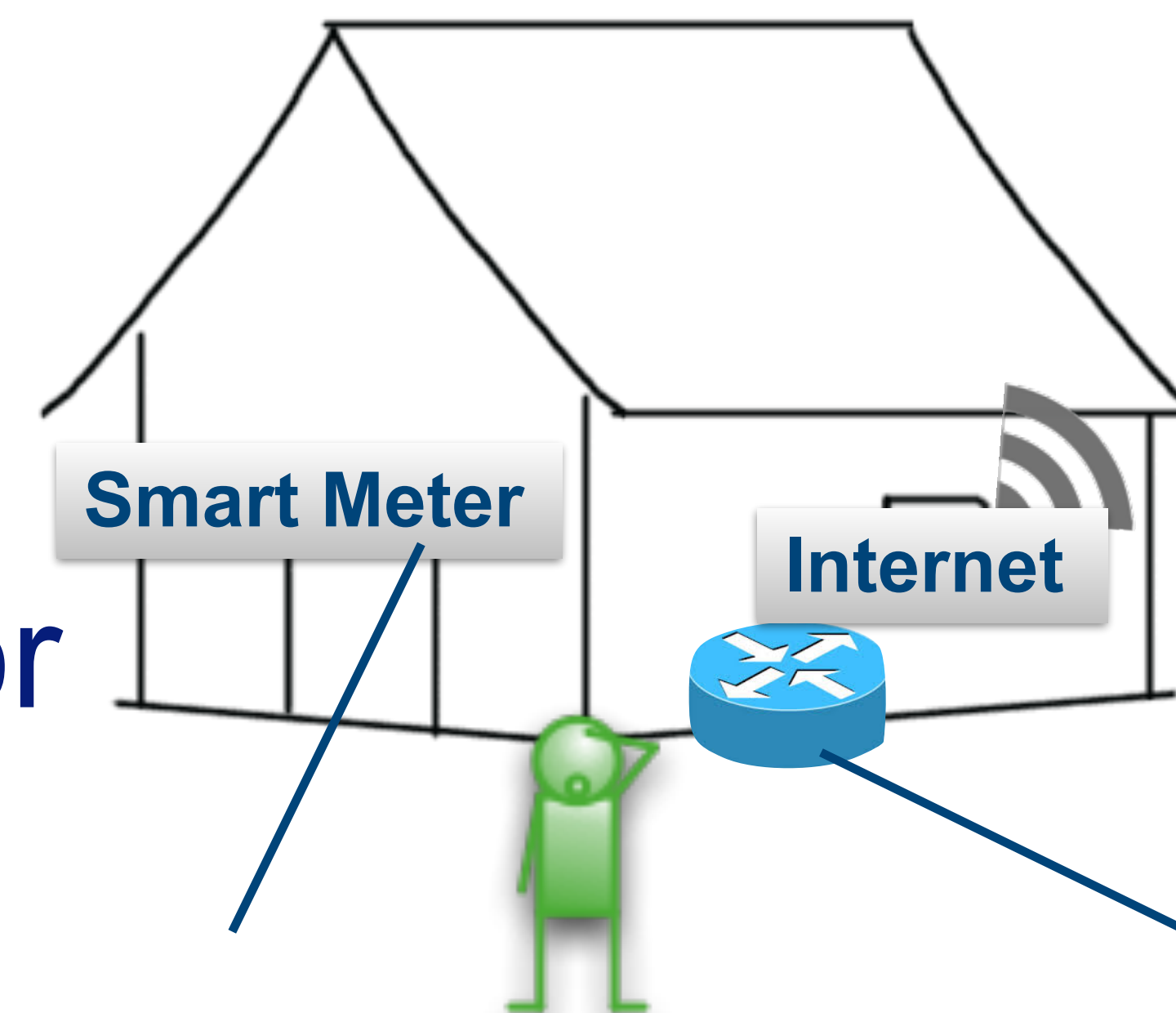
[Source: <https://krebsonsecurity.com/2016/05/01/0day-exploits-are-not-just-for-the-elite/>]



## IoTSec.no

“Research on IoT security”  
“Building the national Security Centre for  
Smart Grid”

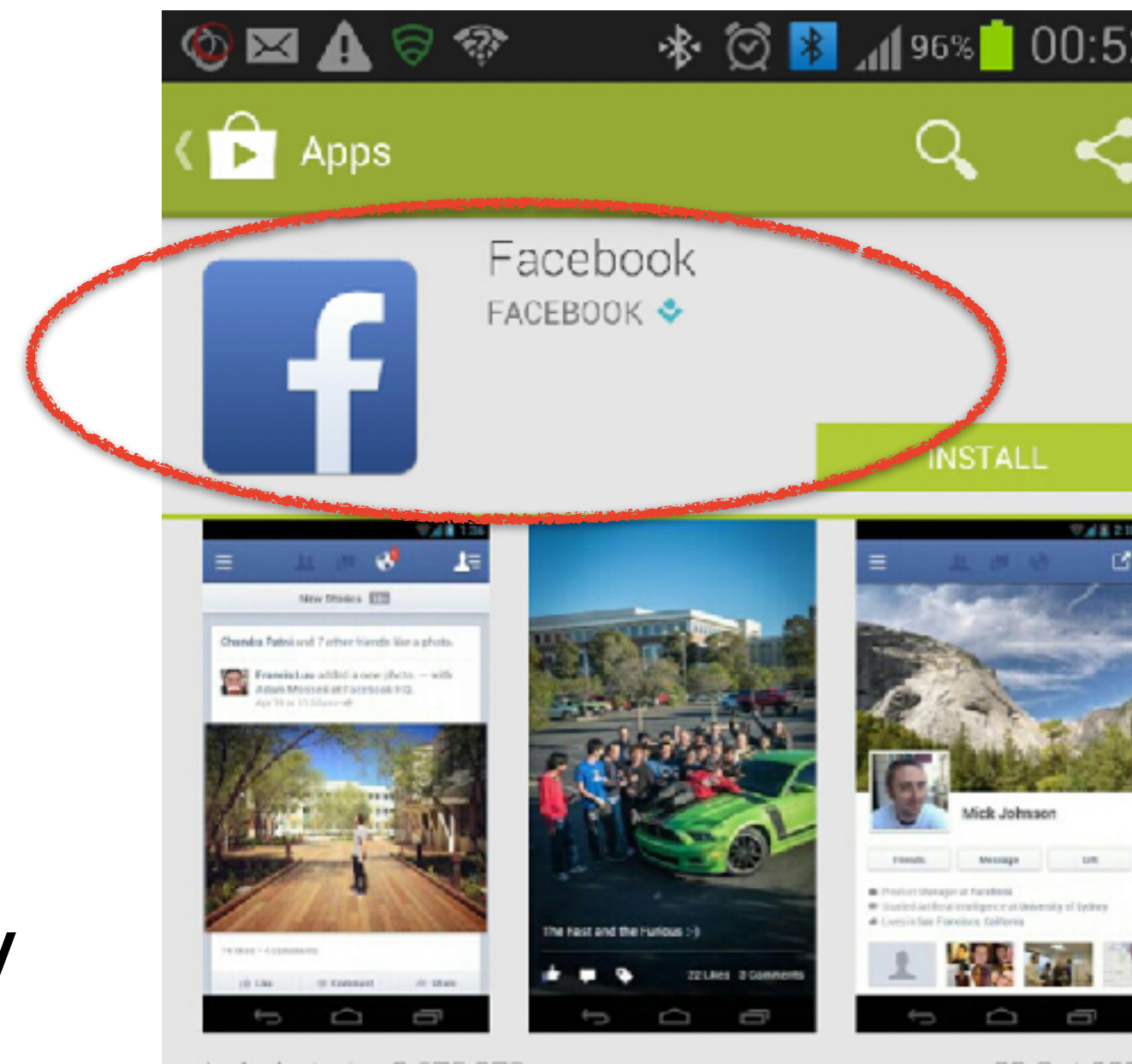
<http://IoTSec.no>





# IoT: Mobile service usage

- IoT & Mobile merge
  - ➔ health applications
  - ➔ puls meter
  - ➔ blood sugar meter
- Facebook example:
  - ➔ record audio
  - ➔ read phone status and identity
- For what?



## App permissions

Modify or delete the contents of your USB storage

## System tools

Draw over other apps, prevent phone from sleeping, re-order running apps, retrieve running apps, toggle sync on and off

## Your location

Approximate (network-based) location, precise (GPS) location

## Services that cost you money

Directly call phone numbers

## Hardware controls

Record audio, take pictures and videos

## Your accounts

Add or remove accounts, create accounts and set passwords

## Your personal information

Modify your contacts, read call log, read your contacts, write call log

## Network communication

Full network access

## Phone calls

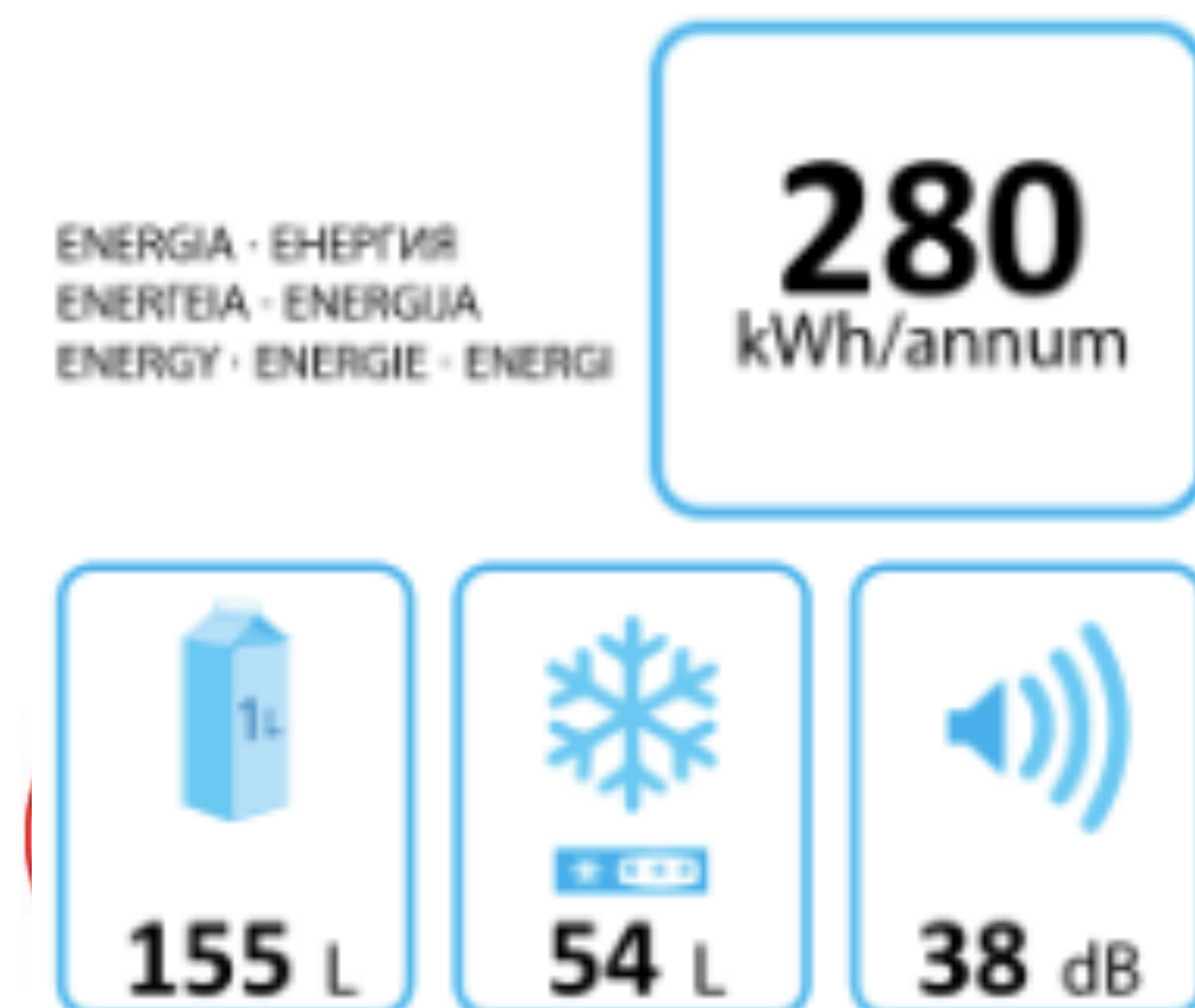
Read phone status and identity

ACCEPT





# Towards Measurable Privacy - Privacy Labelling



- “Measure, what you can measure - Make measurable, what you can’t measure” - Galileo
- Privacy today
  - based on lawyer terminology
  - 250.000 words on app terms and conditions
- Privacy tomorrow
  - A++: sharing with no others
  - A: ...
  - C: sharing with ....
- The Privacy label for apps and devices



## Appfail Report - Threats to Consumers in Mobile Apps

The Norwegian Consumer Council analysed the terms of 20 mobile apps. The purpose is to uncover potential threats to consumer protection hidden in the end-user terms and privacy policies of apps.



# Google translate Partnership for Digital Africa

<http://www.aftenposten.no/meninger/debatt/Kronikk-Som-gjesteland-pa-G20-toppmotet-ma-vi-bidra-til-a-endre-verden--Erna-Solberg-614076b.html>



**Comment: As a guest country at the G20 summit, we must help to change the world | Erna Solberg**

ERNA SOLBERG (H), PRIME MINISTER

UPDATED: 30.JAN.2017 9:39 P.M. | PUBLISHED: 30.JAN.2017 7:58 P.M.



In July last year was Erna Solberg invited by Angela Merkel for this year's G20 meeting. Here from a meeting between the German Chancellor and the Norwegian Prime Minister in Berlin in November, where Norway's participation as guest country at the economic summit were among issues discussed.

## 1. UN sustainability goals and Agenda 2030:

Germany has chosen this agenda as a backdrop for their entire program for the presidency, and I lead a group at the United Nations that will drive towards implementation.

We will work to ensure that the G20 goes ahead with its own specific commitments to help achieve sustainability goals.

## 2. Migration and partnership with Africa:

The world is experiencing the greatest influx of refugees since World War II. Europe, and especially Germany, have seen the consequences of that.

**It is necessary to improve the situation where people break up close.** Germany will use its chairmanship to do something about the problems which people belong. There is no minimum job creation and private investment. There are agreements with African countries wishing to achieve it.

G20 can therefore help the countries and international organizations use their resources more on measures which create growth and job creation.

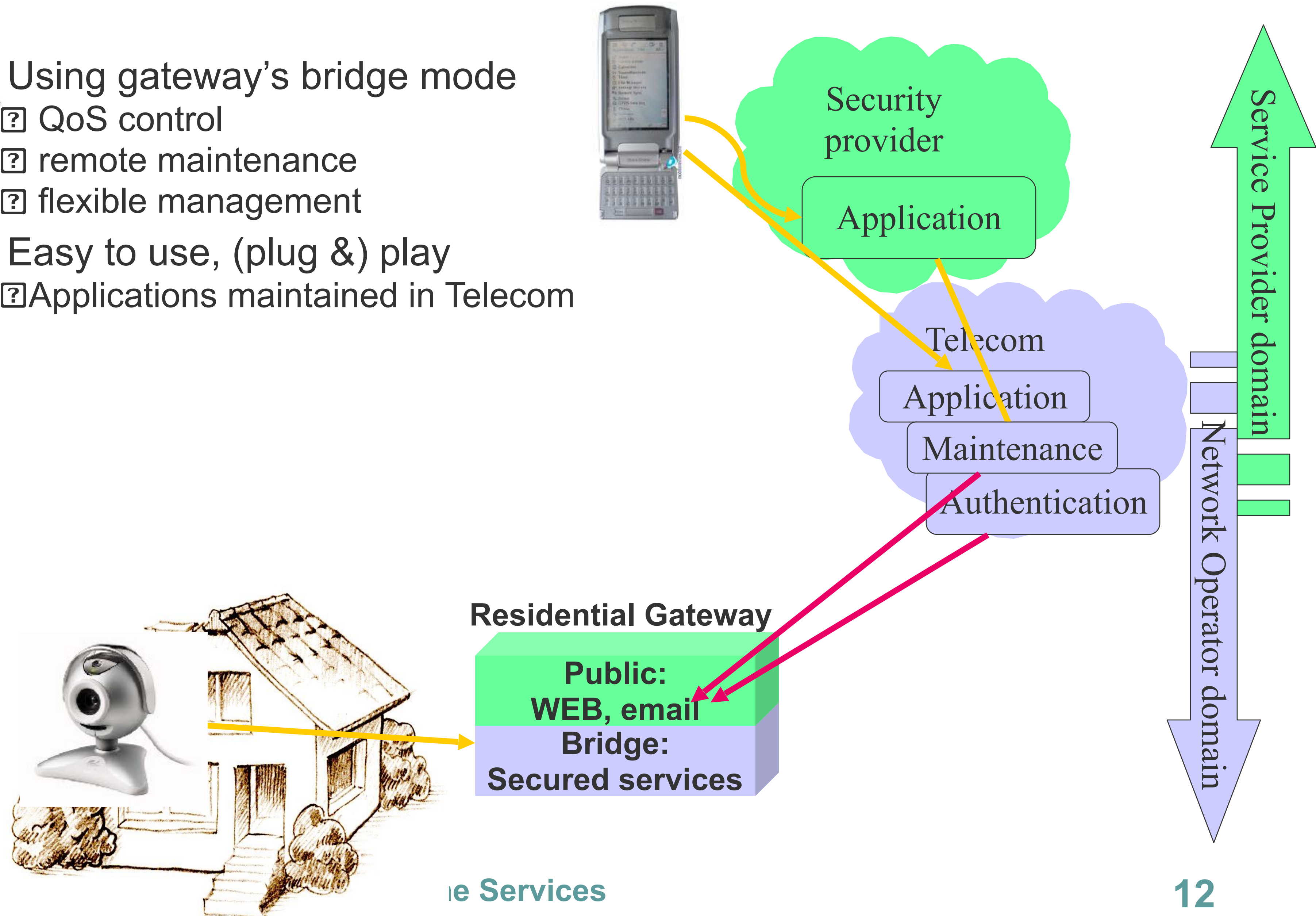
## 3. Health and education.

Norway has long had a heavy international involvement. Education and health are associated with economic growth.



2005

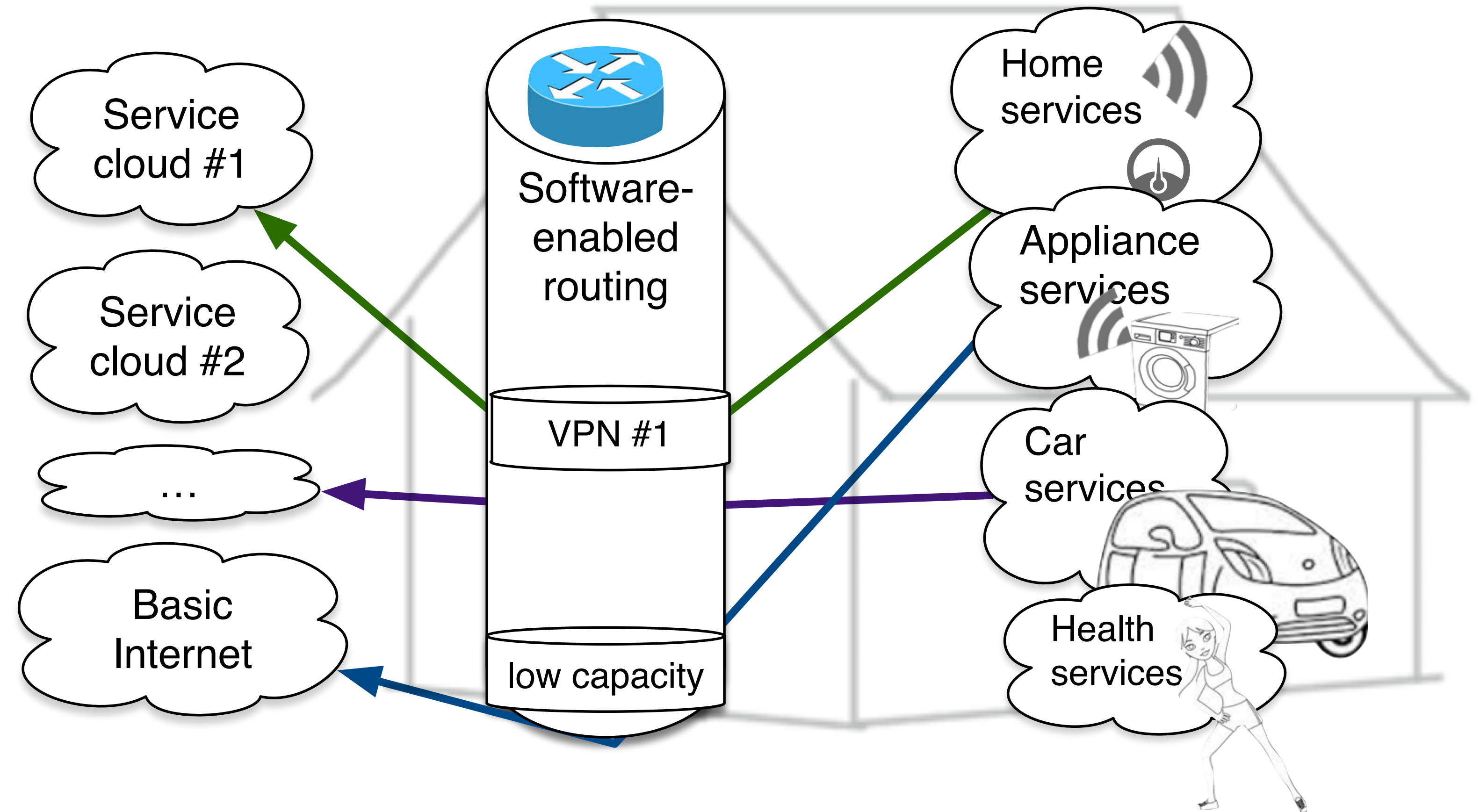
- ▶ Using gateway's bridge mode
  - ❑ QoS control
  - ❑ remote maintenance
  - ❑ flexible management
- ▶ Easy to use, (plug &) play
  - ❑ Applications maintained in Telecom





## Learn from Industrial Automation and Mobile Networks

- “What to secure?”
- Network segregation  
→ *Network slicing*
- From Confidentiality, Integrity, Availability (CIA)
- to Availability, Integrity, Confidentiality (AIC)





# Conclusions for 2025

- Things (IoT) are driving the digital societies
- Novel services at home
  - Internet + Semantics + Things = IoT
  - Digitisation of the Society
- IoT Security and privacy
  - privacy/security through network slicing
  - Privacy label (A++, A+...D)
- Free access to basic information: InfoInternet
  - addressing the UN Sustainable Development Goals



(SDG 2030)

