Smart Energy 2017, Halden, Feb 2017

# Collaboration for a more secure Smart Grid operation

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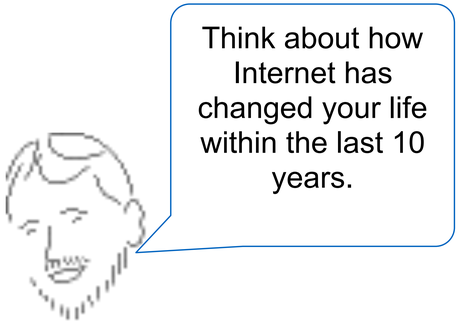
*UiO*
*IoTSec Project leader/COO*
*jnoll@uio.no, christi@ifi.uio.no*

*#IoTSec, #IoTSecNO*

# IoT - how will it influence us?



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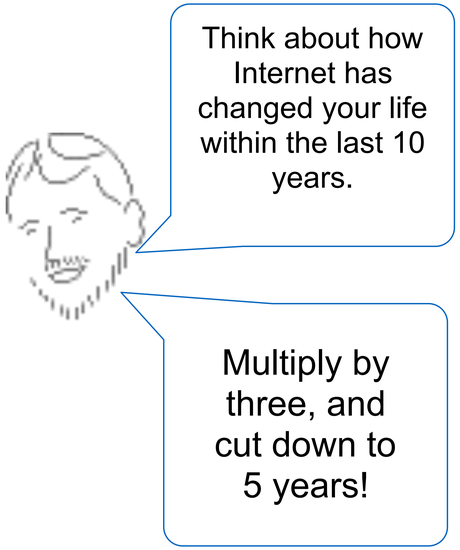

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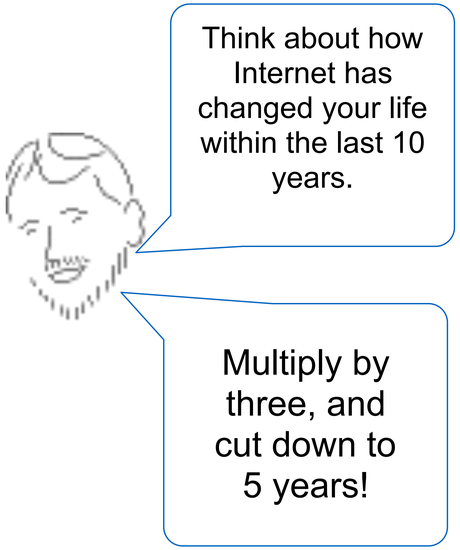


- Faster
- More difficult to understand
- Autonomous
- Less secure?
- Sustainable?
  - ➡ Waste, CO2
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  - ➡ Noise

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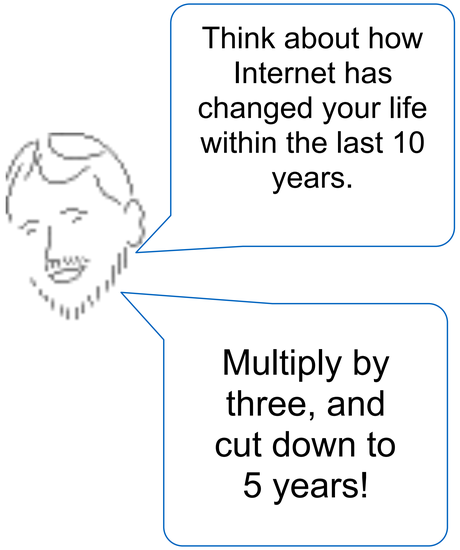


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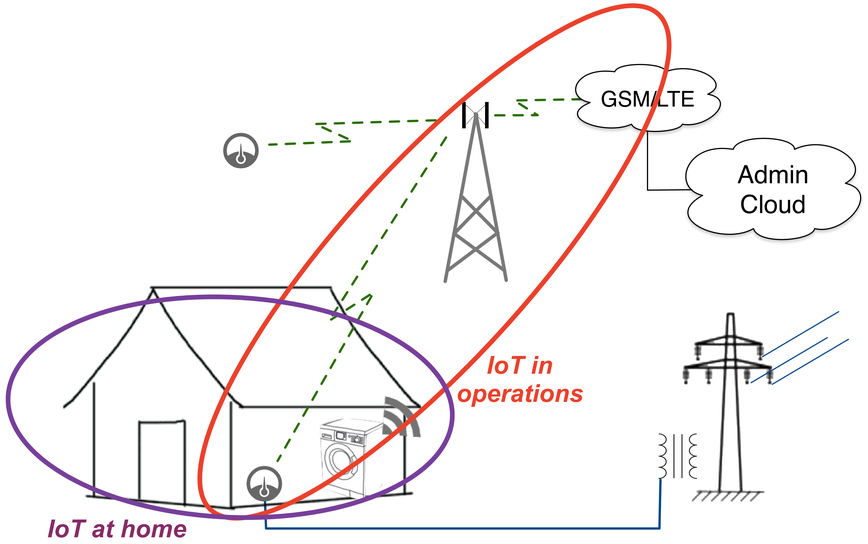
**Kronikk: Som gjesteland på G20-toppmøtet må vi bidra til å endre verden | Erna Solberg**

ERNA SOLBERG (H), STATSMINISTER
OPPDATERT: 30.JAN.2017 21:39 | PUBLISERT: 30.JAN.2017 19:58

# IoTSec.no - Security for IoT for Smart Grids



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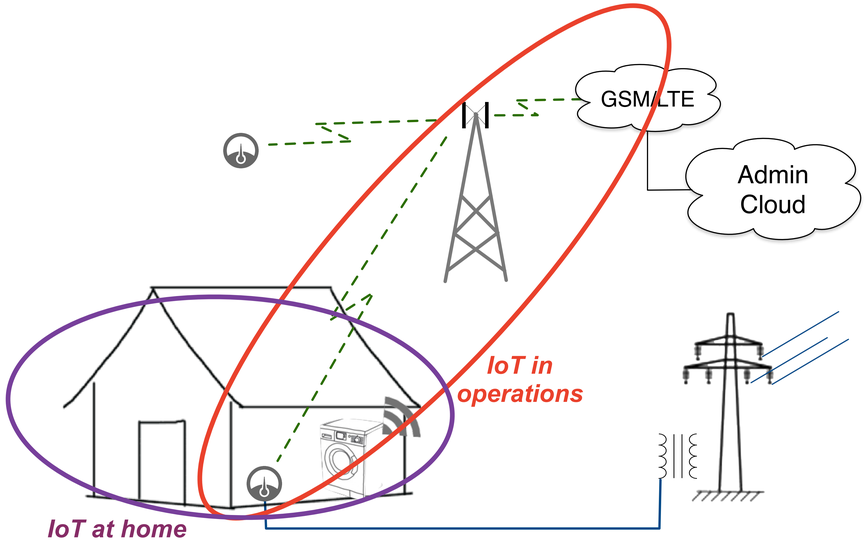


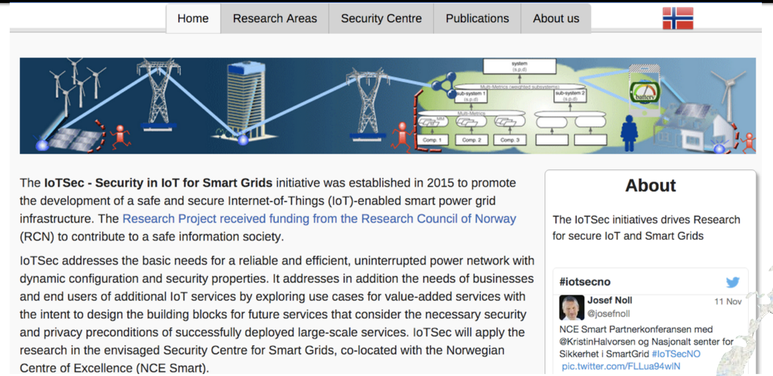


«Open World Approach»
*everything that is not declared closed is open*

National initiative for a more secure future in IoT

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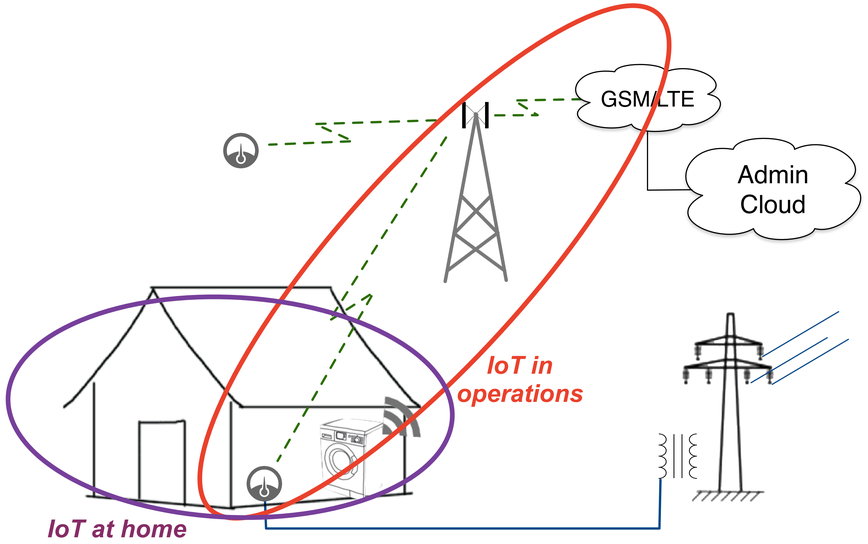


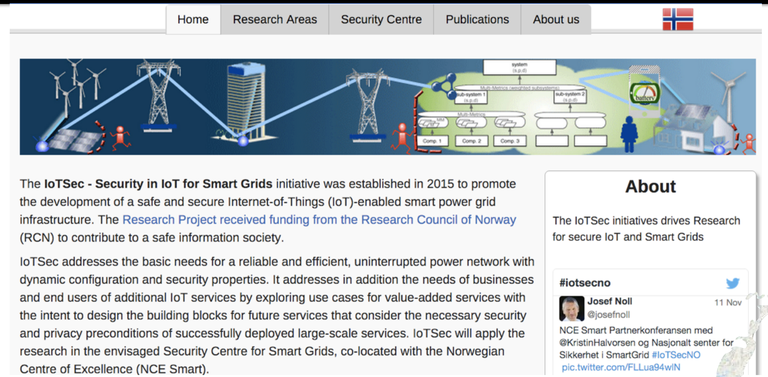


«Open World Approach»
*everything that is not declared closed is open*


**Partners and Collaborations**

Academia
- UiO/Ifi
- UiO/ITS
- NR
- Simula
- NTNU
- UiA
- Smart Innovation Østfold

Industry
- Smart Innovation Østfold
- eSmart Systems
- Fredrikstad Energi
- Glitre Energi Nett
- Movation
- EyeSaaS
- mnemonic
- Open Innovation Lab

Interest Org.
- Norw. Data Protection Auth.
- Forbrukerrådet

International
- Mondragon Unibersitatea
- University of Victoria
- Universidad Carlos III
- La Sapienza
- COINS Research School
- Nimbeo
- H2020 and ECSEL projects
- Academic Collaborators

# Future Service Requirements (in a wireless infrastructure)

- *“we have no control of what is going on in Wifi”*
- “only 25% of broadband customers experience the speed they got promised”
- more than 75% of all calls to ISPs is related to wireless
- over 90% of boxes sent to ISP are fully functionable

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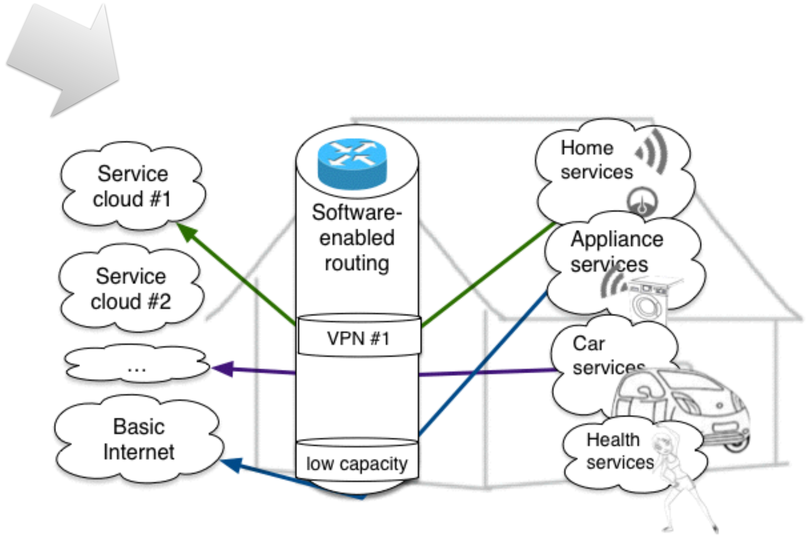

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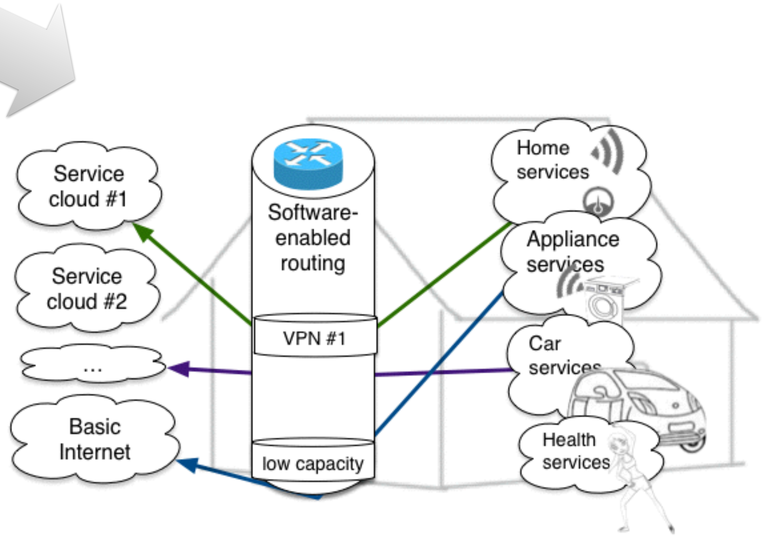


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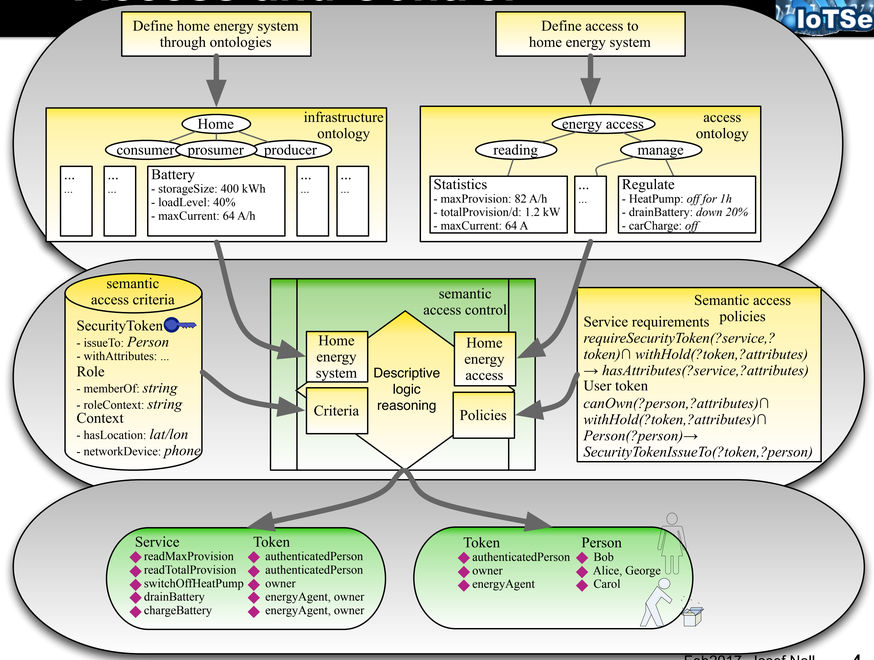
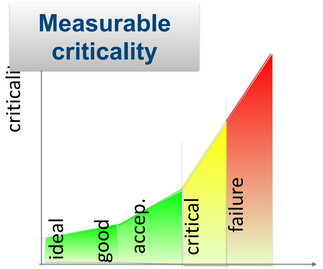
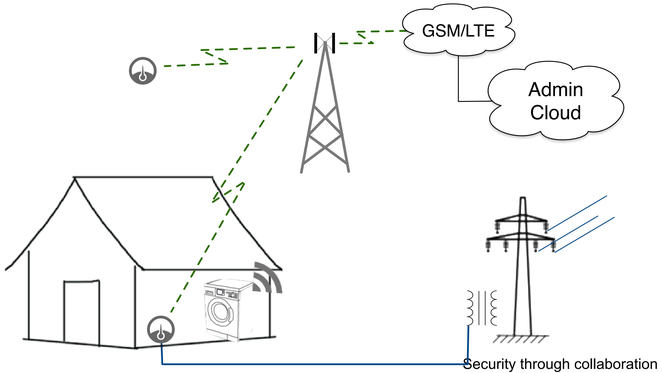


# Scientific focus and achievements

- Semantic system description
  - Understanding the system and describing security through security functionality
  - Measurable security - the novel security concept




- Security modelling
  - Privacy-aware models and measures
  - Adaptive security for system of systems
  - Formal languages for semantically proving signalling




- System versus Goal analysis
  - Application-specific security/privacy, e.g. billing vs
  - Human/technical interface, security usability

**to measurable:**
**security, privacy and dependability**

| SPD level | SPD vs $SPD_{Goal}$ |
|---|---|
| (67,61,47) | (●,●,●) |
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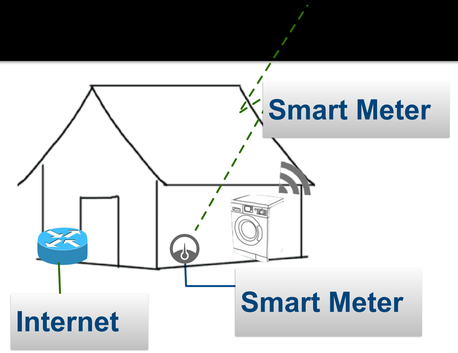
- Operational security for IoT-based critical infrastructure
  - IoTSec ecosystem -> extended network
  - Smart Grid Security Centre (SGSC)
  - (Gap Analysis of security methods for critical infrastructures)

# Opportunities

- Monitoring the grid to achieve a grid stability of at least 99,96%,
- Alarm functionality, addressing
  - ➡ failure of components in the grid,
  - ➡ alarms related to the Smart Home, e.g. burglary, fire, or water leakage,
- Intrusion detection, monitoring both hacking attempts to the home as well as the control center and any entity in between,
- Billing functionality, providing at least the total consumption every hour, or even providing information such as max usage,
- Remote home control, interacting with e.g. the heating system
- Fault tolerance and failure recovery, providing a quick recovery from a failure.
- Future services
  - ➡ Monitoring of activity at home, e.g. “virtual fall sensor”



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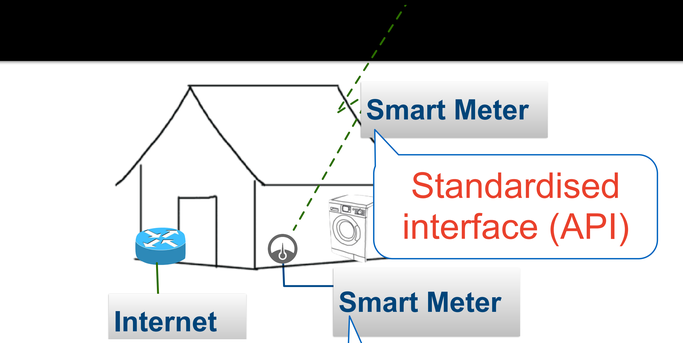

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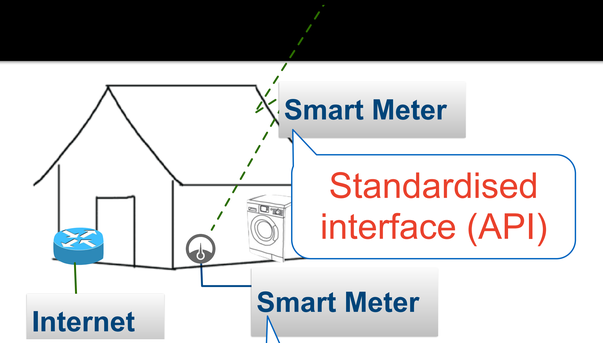
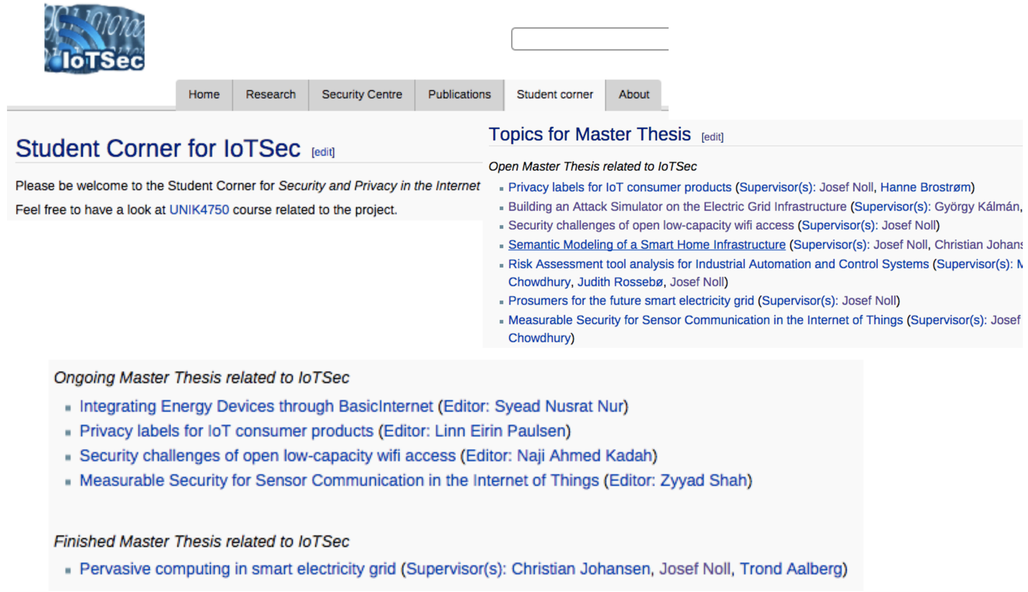



# Student Corner of IoTSec.no



# Privacy Labelling

http://PrivacyLabel.IoTSec.no

- “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

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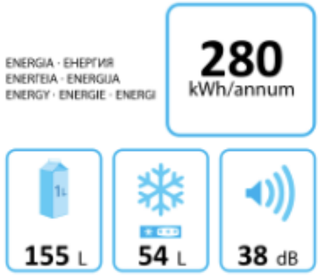

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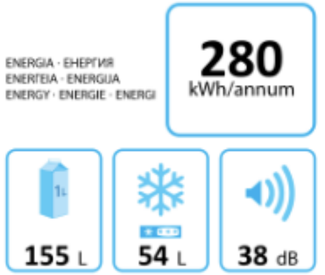


In collaboration with Consumer Services (Forbrukerrådet)
- Paul Chaffey (Statssekretær) support
- Finn Myrstad (Forbrukerrådet) -> EU

**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.

# Collaborate to answer the questions

- Smart Meter
  - read and control
    - soft switch, remote switch off
  - logic?

- Challenges
  - Logic: Centralised ⟷ Fog
  - Smart Meter: Information ⟷ Control
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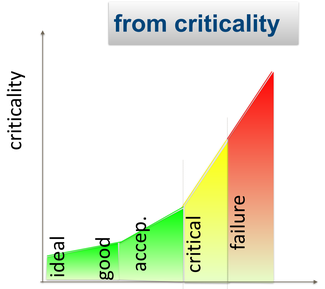


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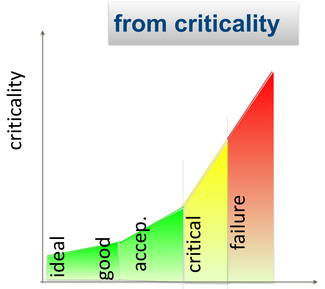


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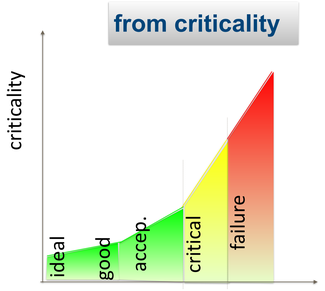


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## IoT security challenges

- Mirai attack
  - “security by obscurity”
  - different security viewpoint
- “it is just the beginning”

**21 OCT 16 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.