Mobile Comm

$P_T = 20 - 25W$

$P_{sens} = -115 dBm$

(Motorola $-119 dBm$)

$P_T \sim 2W$ GSM
$1W$ (100mW) UMTS/LTE ← battery

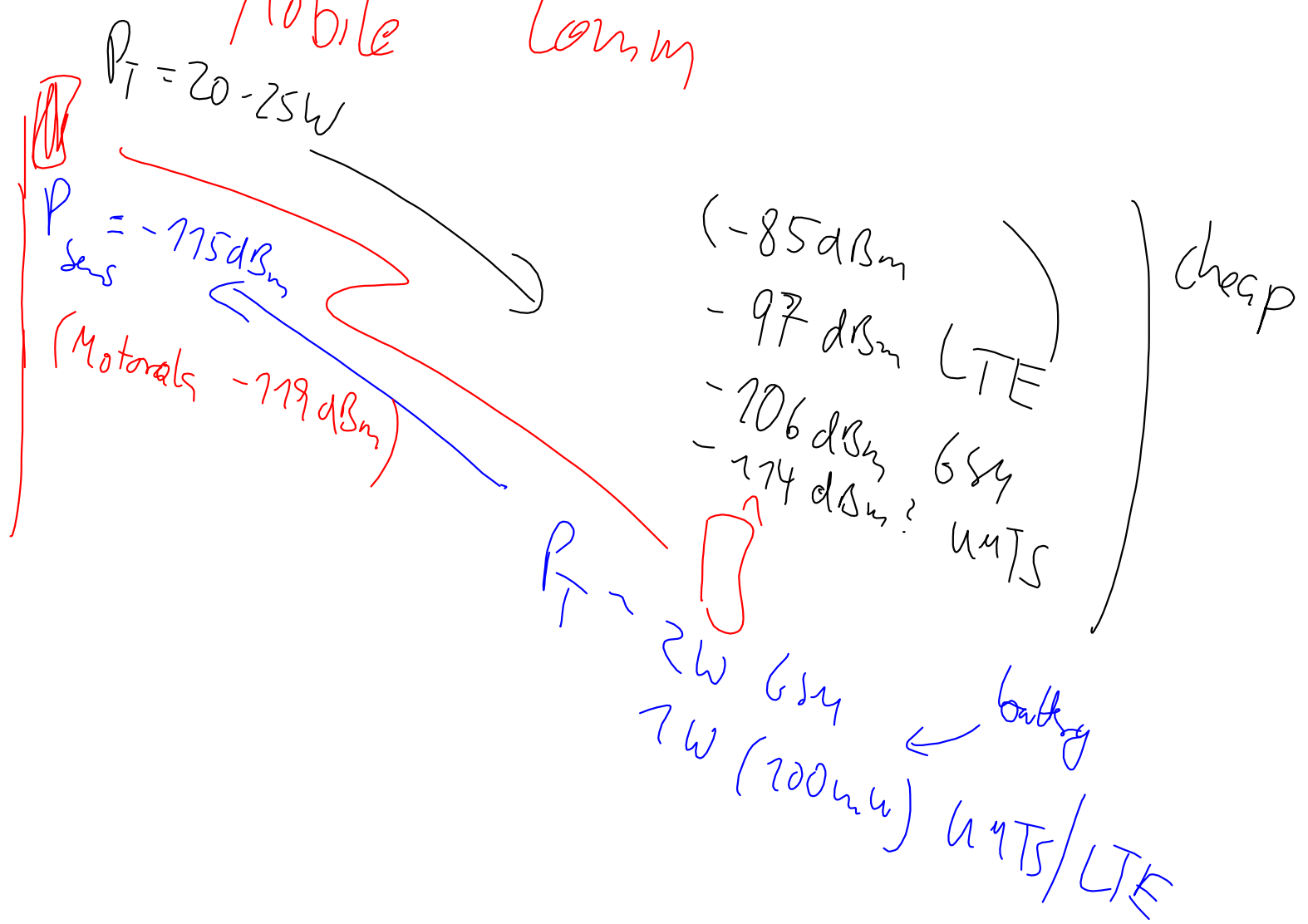($-85 dBm$
$-97 dBm$ LTE
$-106 dBm$ GSM
$-114 dBm$? UMTS

cheap

Wireless Sensor Networks WSN
- cost (chip)
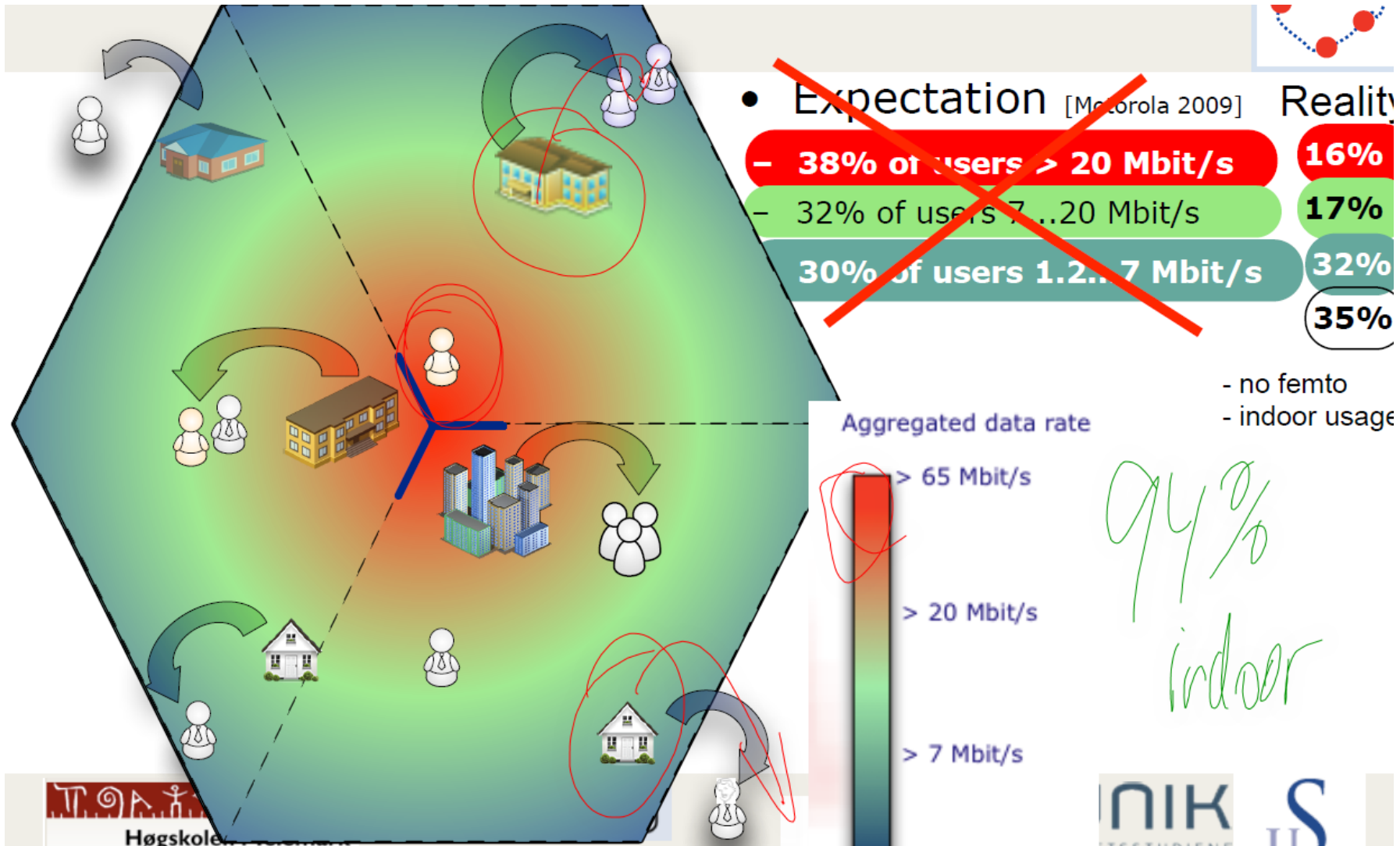
- battery : goal 5-20 years

- range

- availability

Optimization

LTE

network slicing

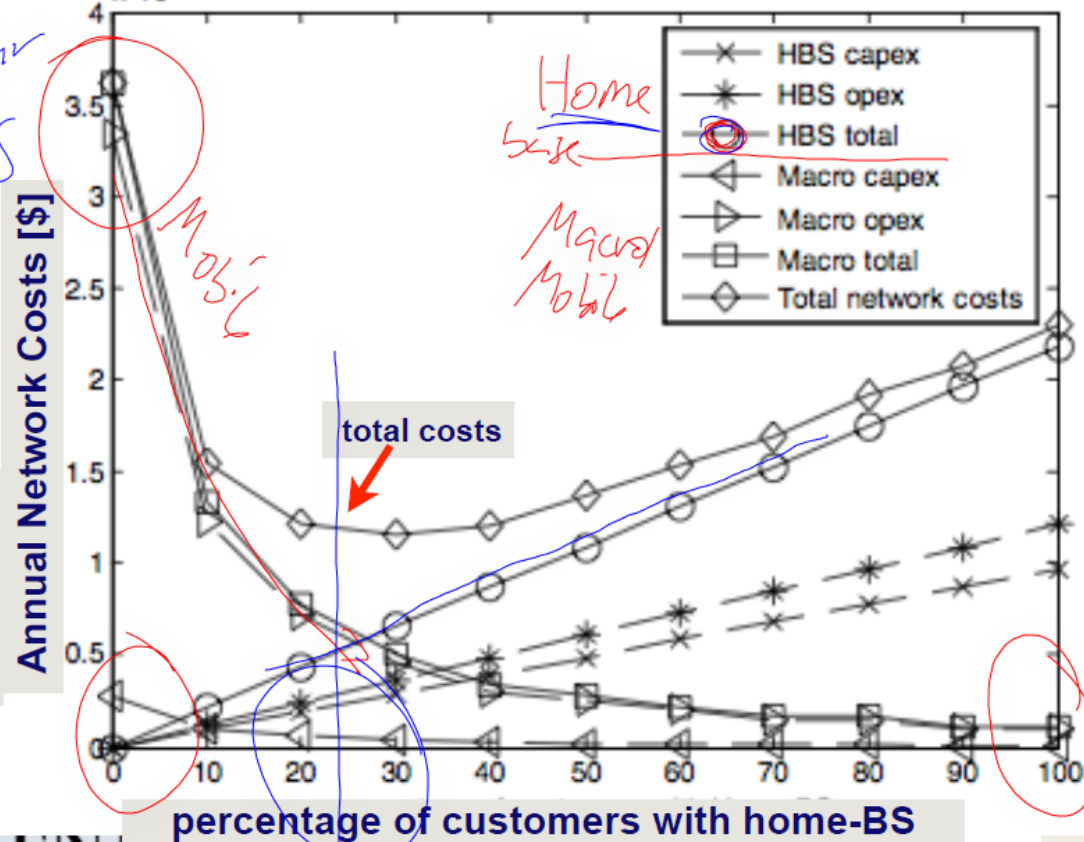- guard band
  "no interference"

- coding for long range

IoT +40dB SNR {

7-54h

- Expectation [Motorola 2009]   Reality
  - 38% of users > 20 Mbit/s   16%
  - 32% of users 7 ..20 Mbit/s   17%
  - 30% of users 1.2.. 7 Mbit/s   32%
                                        35%

- no femto
- indoor usage

Aggregated data rate

> 65 Mbit/s

> 20 Mbit/s

> 7 Mbit/s

94% indoor

OpEx and CapEx calculations based on "free provisioning" of home base stations

[source: H. Claussen, 2007]

- 70-80% of   indoor 3G from   users

	expectation	reality
>20 Mbit/s	38 %	16 %
7-20 Mbit/s	32 %	17 %
1.2-7 Mbit/s	30 %	32 %

-35%

- Open issues
- usage pattern for LTE (>90%?)
- Reduction of network load through femtocells
- user experience "where is my operator"
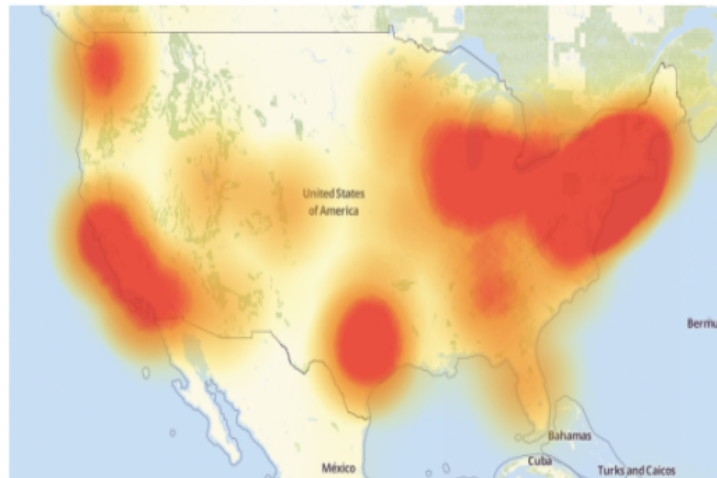- Suggestion for national project

NTNU

JUST CLOSE YOUR EYES AND IMAGINE THE WIRE.

LTE   LTE

#1
Wifi

Security
Firewall
VIRUS

LTE   #2
Wifi

80-90% LTE
indoor

- no voice support
- convenience
- Security

#3
Wifi

Security
- use guest
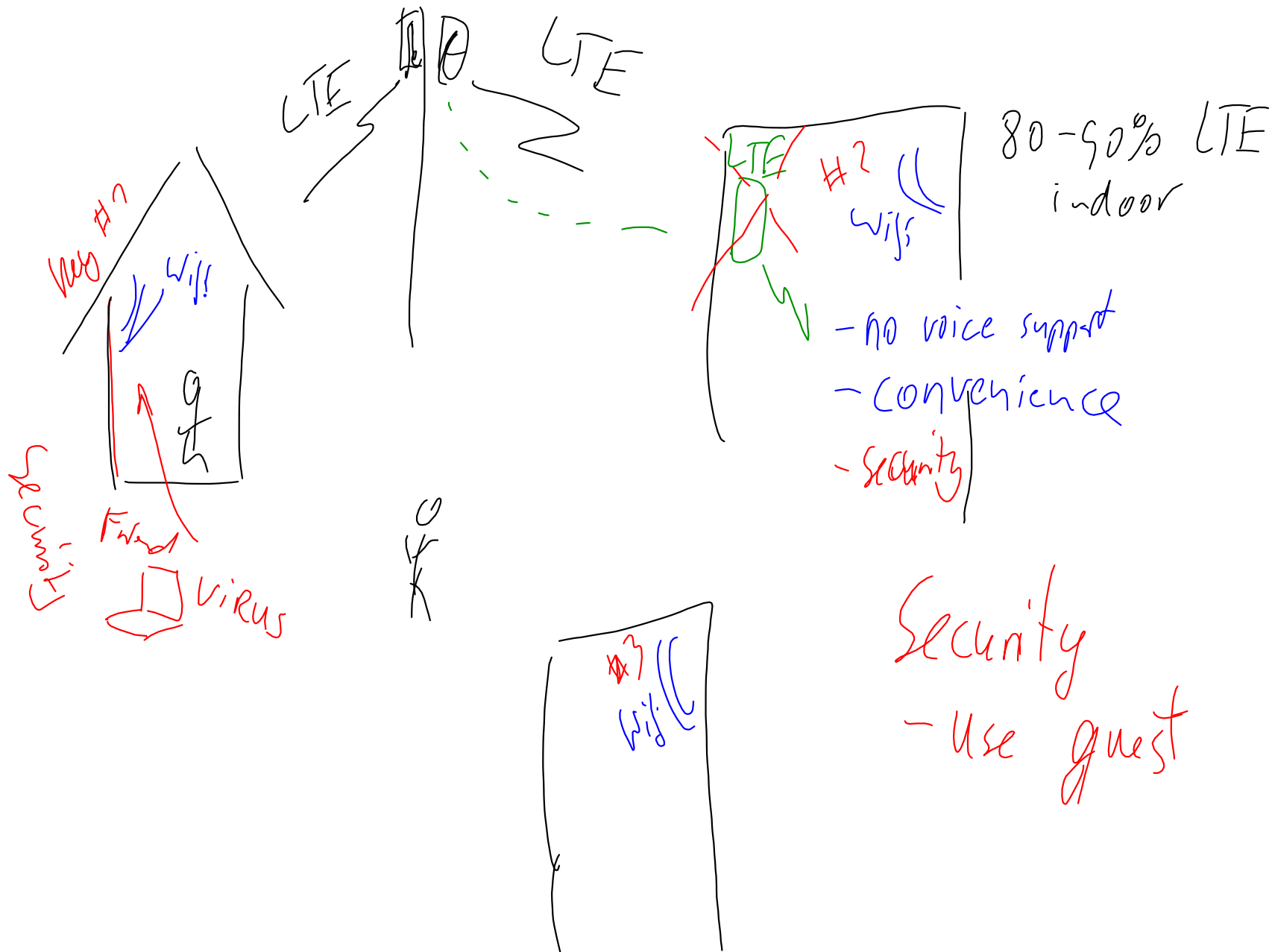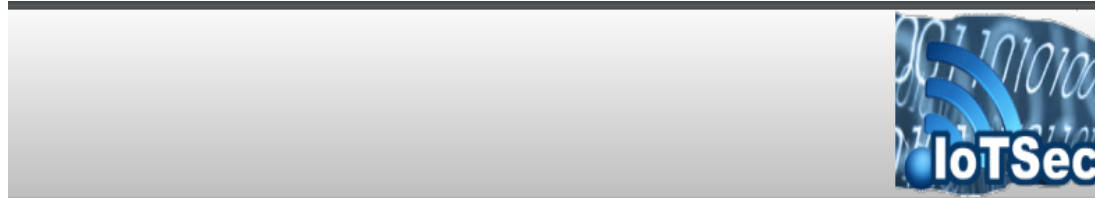
21 Hacked Cameras, DVRs Powered Today's
Massive Internet Outage   16Oct2016

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.

bution grid

iewpoint

ailable information,

e.g. focus on grid

y Centre (SGSC)

ce

[Source: https://krebsonsecurity.com/2016/10/hacked-cameras-dvrs-powered-todays-massive-internet-outage/

Mirai   Dyn
1.2 Tbps   IoT
                 botnet
Linux
Busybox   admin
root   root
admin   admin
          0000
          1111
          7234

7

2600 MHz

5+5+5...

Opr 1   Op 2   Op 3

20 MHz

Spectrum Issue
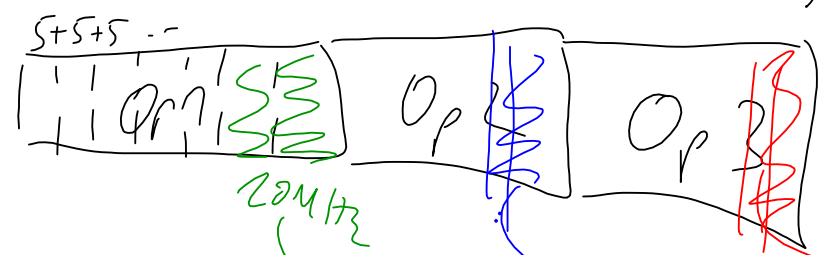
why Vo Wifi
- cost   LTE indoor
- LTE tunnel to operator

Opt   LTE LTE LTE
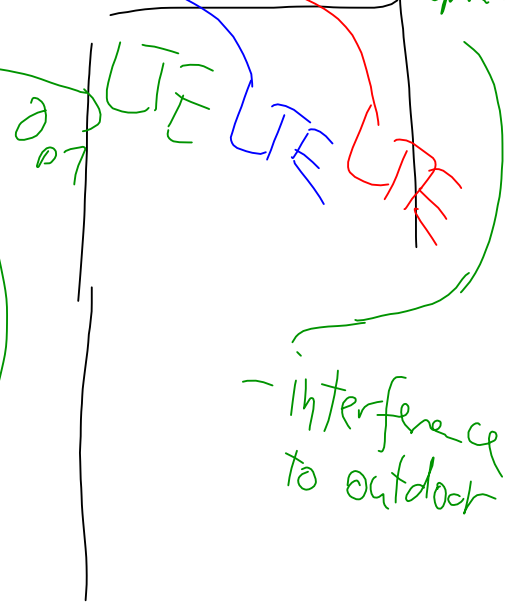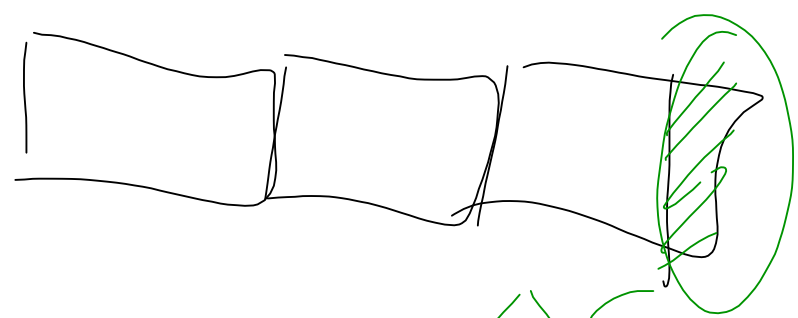
- interference to outdoor

different View

Common
LTE indoor

- operator sharing
- M Operator, Ui.O, Hi.O ...

Future Wifi

Appl. specific routing

1.) discover open wifi

2. announce itself
https://supplier/hello
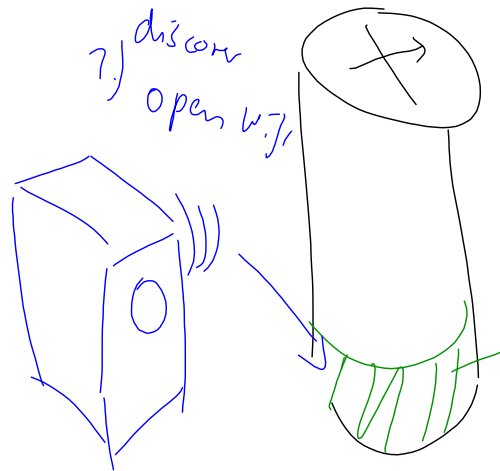
3. user got a
Credential
   - sms
   - app
   - code

4. take ownership

Info Internet   white listed party
open

Challenges
- Spoofing (Web site)

- poison DNS

- Man in the middle
   → https:--
   PDU, out of date

- certificate management

- new owners of washing machine

- end of lifetime
   - certificate
   - device

Recommendation:
   - install honey pots to capture attacks

"too much information"
Expectation — real values (theory)
            — what to focus on, e.g. worst ranked but

Recommendations
UNIk 4700

Guidelines for presentations

	A	B	C	D	-E
Struktur	/////				
Understanding		/////	/////		
Style	/////				
:					
:					

Evaluation criteria

Your presentation is expected to last for 15-20 min (not longer). That means you need to identify the key messages of the selecte
presentation will be evaluated with respect to the following criteria:

Knowledge and Overview over topics in the paper

- *what is the paper about, which specific aspects are addressed?*

Identification of key findings of the paper:

- *why are the findings key findings, to what extend are they different from the state-of-knowledge?*
- *what are the strengths/weaknesses of the approaches being mentioned*

Scientifically precise presentation

- *Be precise in your formulations, avoid story telling.*
- *Use numbers where appropriate, e.g. 20% more*

Evaluation of the paper

- *what is your take on the paper? Criticism, own thoughts,...*

Style:

- *clear structure, clear and concise slides*
- *Provide examples, and respect the time*