THREE SHORT STORIES

OUTLINE

1. Cellular vs. Mesh Networking

2. An Industry in Trouble

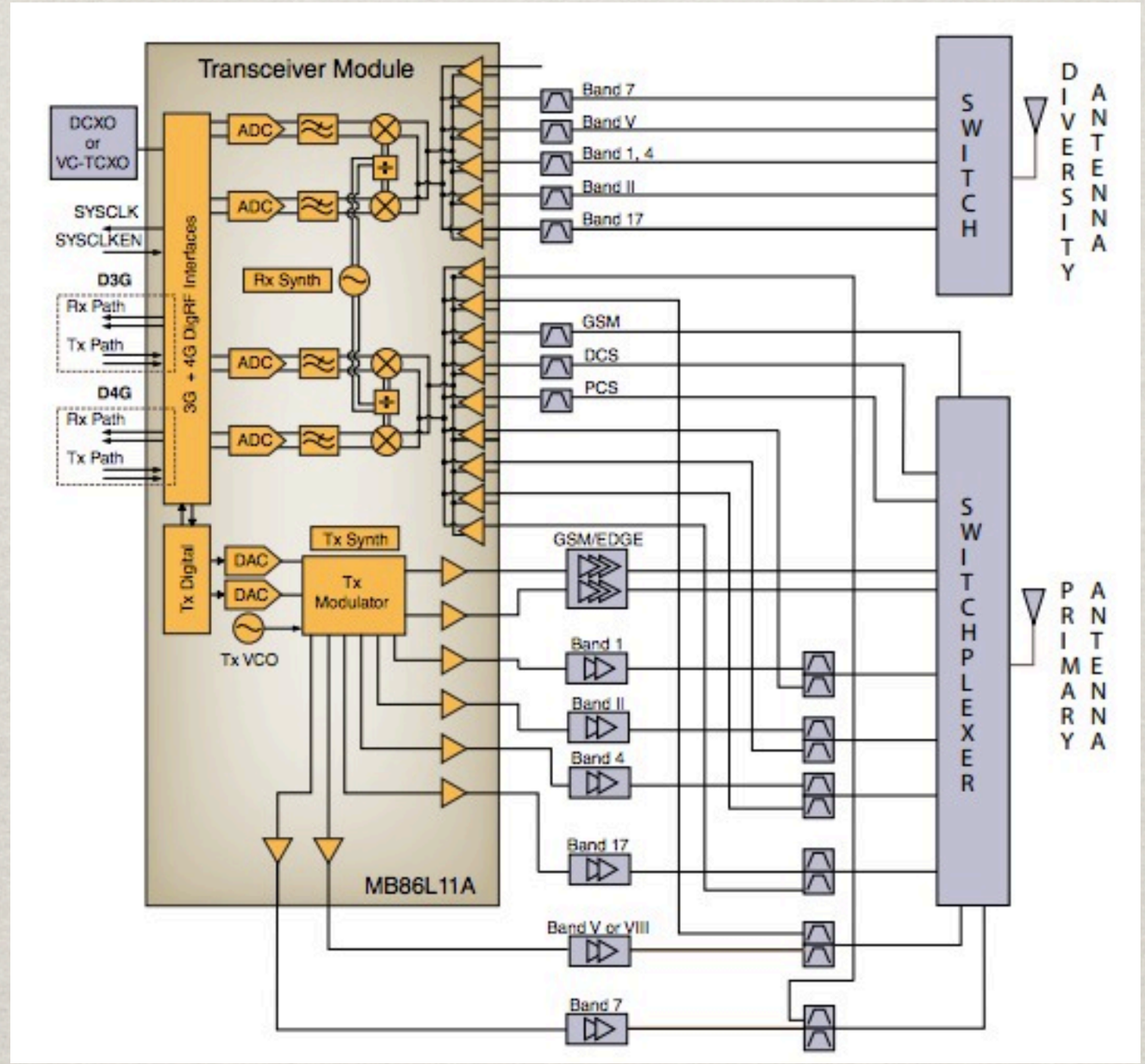
3. Is there Life after 802.11?

Is Community-based GSM or LTE feasible?

- Cellular networks are based on hierarchy
- Frequency Division Duplex not possible in Meshes
- FDD needs “radio network planning”
- FDD-HW is more complex

INTERNATIONAL LTE SPECTRUM HARMONIZATION:

EPIC FAIL!



LTE patents: lose
Cheap Wi-Fi chips: win!

Major Cost Drivers		
Memory		
NAND Flash		$10.40
DRAM	1GByte LPDDR2	$10.45
Display & Touchscreen		$44.00
Processor	A6 Processor	$17.50
Camera(s)	8 Megapixel + 1. 2 Megapixel	$18.00
Wireless Section - BB/RF/PA	Qualcomm MDM9615+RTR8600+Front End*	$34.00
User Interface & Sensors		$6.50
BT / WLAN	BTv4.0 + Dual-Band Wireless-N	$5.00
Power Management		$8.50
Battery	Assumed 1800mAh	$4.50
Mechanical / Electro-Mechanical		$33.00
Box Contents		$7.00

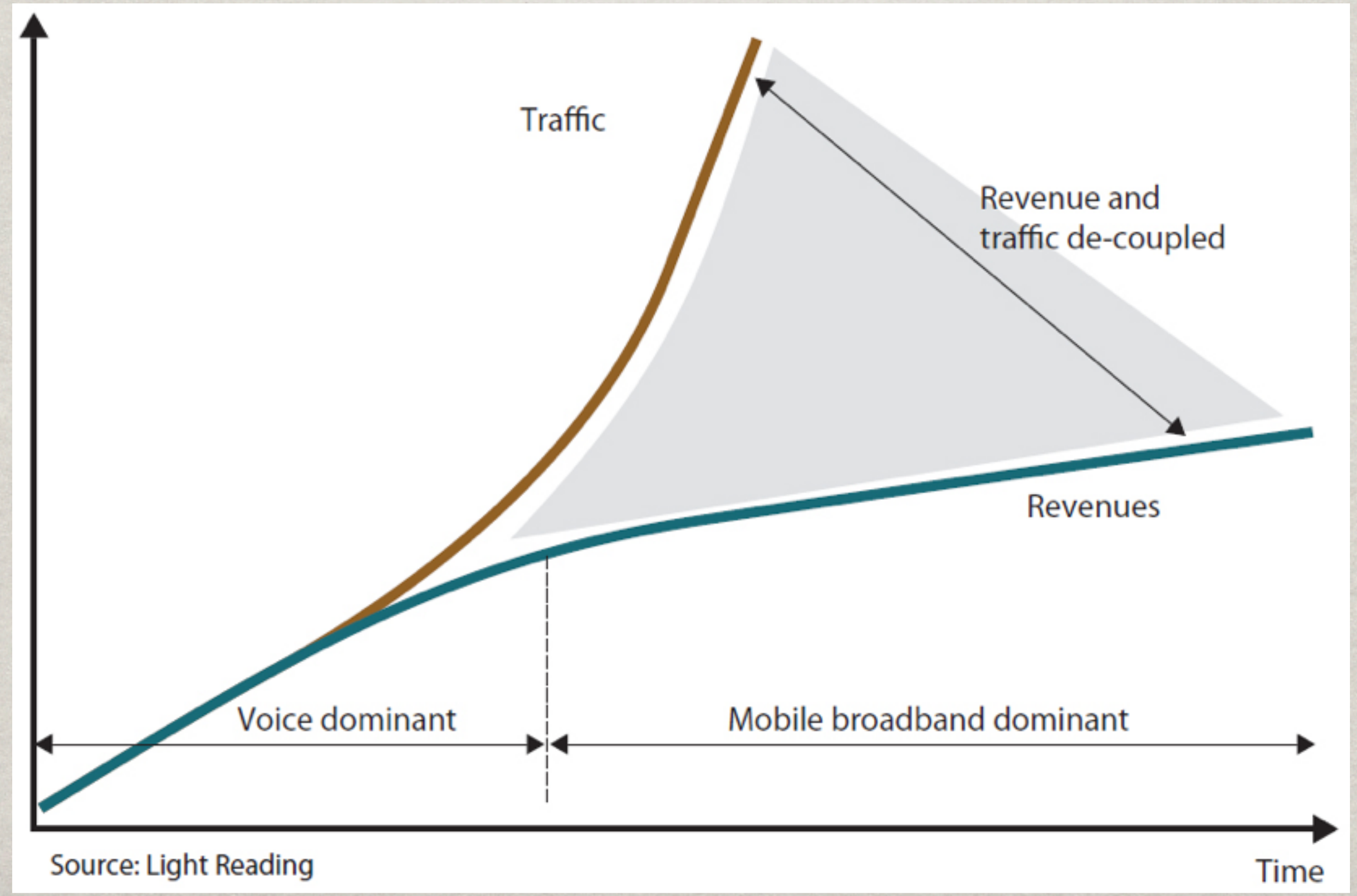
1st Story Recap

- Cellular (FDD) approach makes offering reliable services easier
- but it **NEEDS** strict hierarchy to work
- Cellular (FDD) has systematic complexity disadvantage over mesh (TDD)
- Patents and harmonization: **Cellular-FAIL**

2nd story

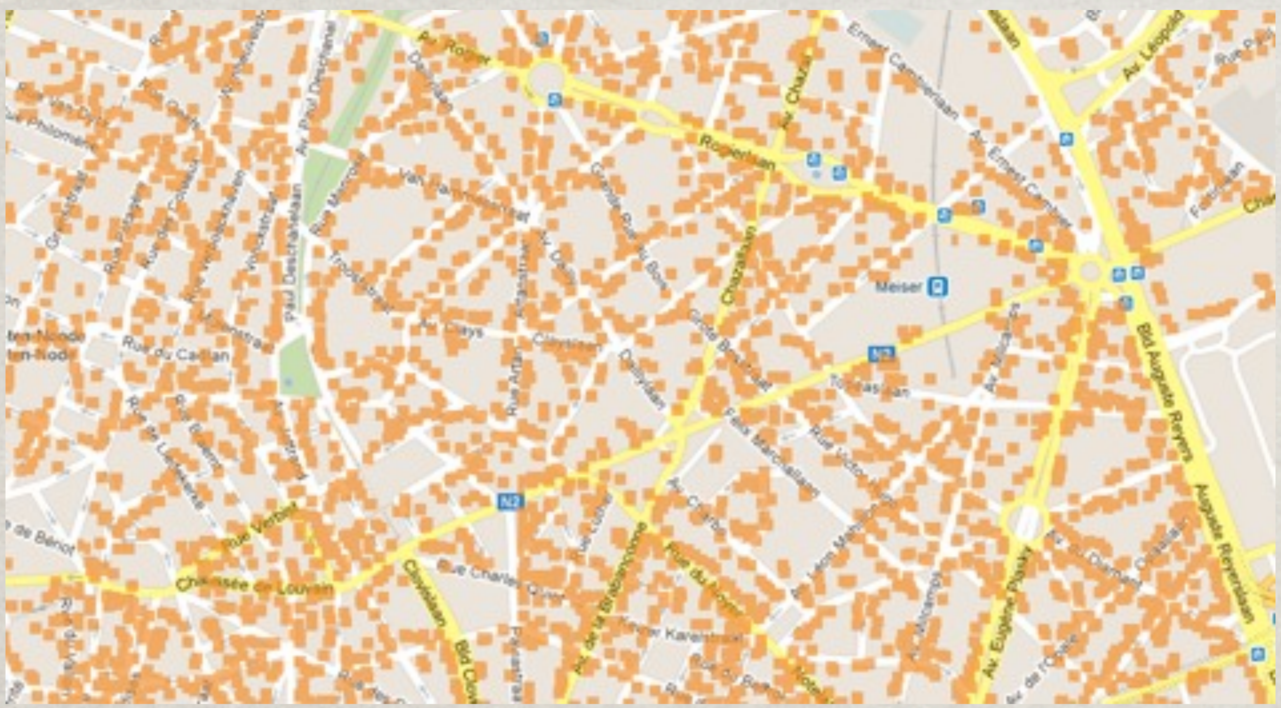
An Industry in Trouble

The Scissor Effect

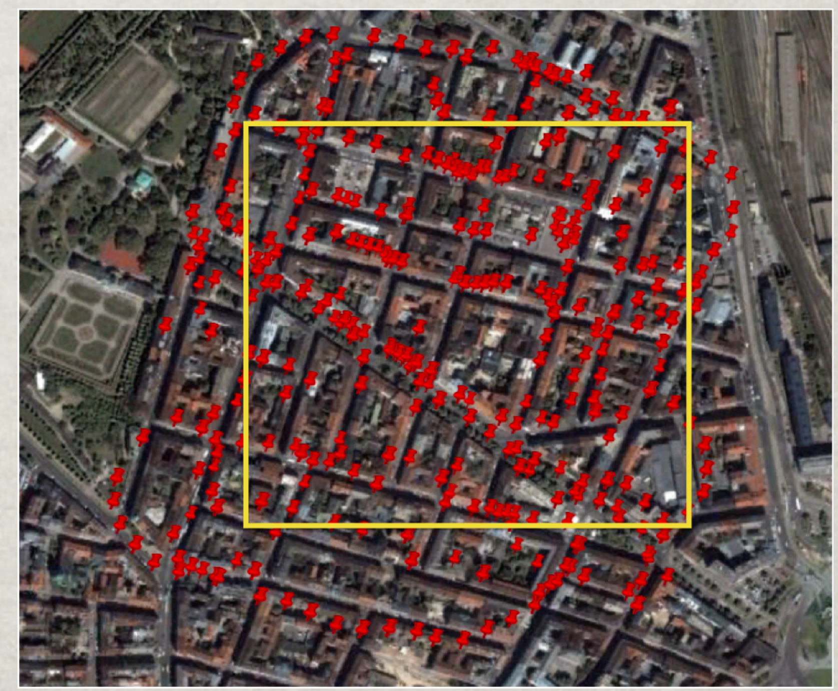


"Let's Exploit Those Cheap Unlicensed Band Technologies"

Bazillions of nodes

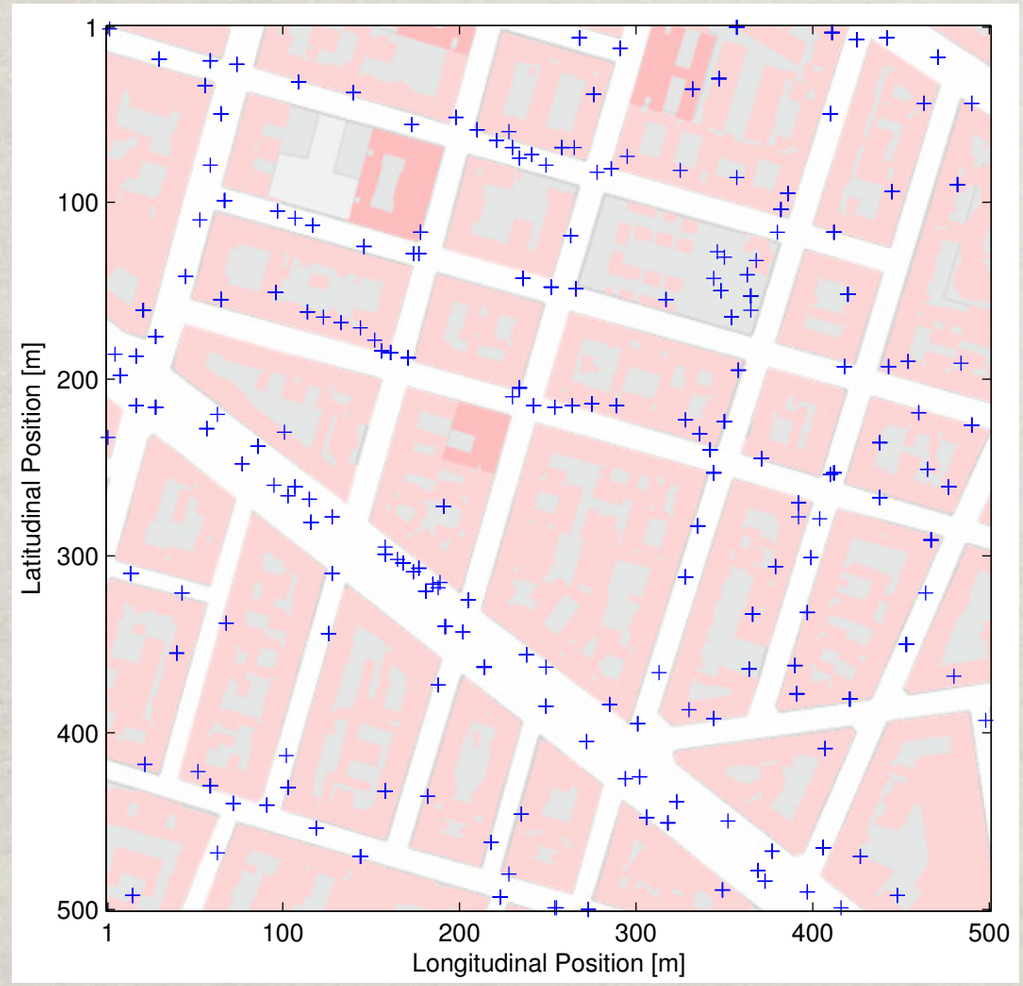


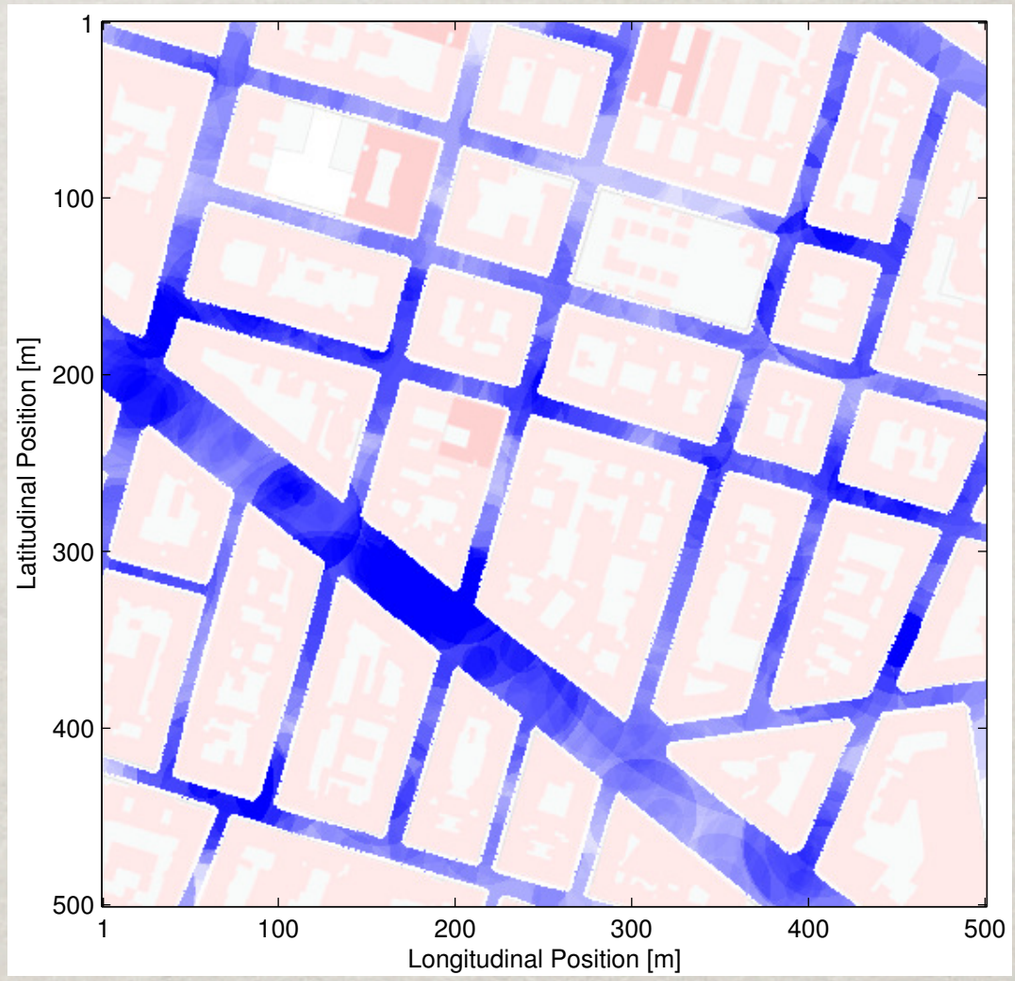
Bruxelles (Belgacom)



Vienna (A1TA)

Who needs Cell-towers anymore?





Ways To Enforce Control over APs

1.ANDSF

2.IEEE802.21

3.Hotspot 2.0

4.Passpoint(TM)

...all of that can be introduced at anytime by reflashing (using TR-069) overnight.

2nd Story Recap

Industry is bound to do crazy things, so let's be vigilant ;-)

We are the (home) site-owners.

We pay that DSL/Cable bills.

We can decide to share our bandwidth.

We should NOT let Operators remote control our APs.

3rd Story:
The Software-Radio revolution

Fixed Silicon

Limited to IEEE802.11

and Wi-Fi ISM Bands

Power consumption: 10Watts

50 USD

Software Radio

Only limited by Imagination

and daugherboard tuning range

Power consumption: 100Watts

2000 USD

Status Update 2012

MIMO
4 Streams
40MHz BW
Max Rate: **600Mbit/s**

small problem: it still needs a 3GHz i7 per stream

3rd Story Recap

802.11n 802.11ac 802.11af 802.22… are all still based on listen-before-talk

Is this the end of the line OR is there a better way to share spectrum?

We Could Do Really Fancy Stuff

1. Interference Alignment
2. Cooperative Medium Access
3. Joint Channel-Network Coding

Don’t FIGHT interference - EMBRACE it!

The Ultimate Goal is:

Capacity Growing Linearly with Number of Nodes

3rd Story recap

1. SDR is getting cheaper day by day.

2. SDRs are in our pockets since years.

3. It's the software-restrictions that matter.

4. Community Driven Innovation!