

Nokia Siemens
Networks



Single RAN advanced



Agenda

- **Industry Trends and why single RAN**
- **Single RAN advanced**
- **Single RAN evolution outlook 2020**

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Key Industry Trends

Customer experience in a smart device world



Video, video, video

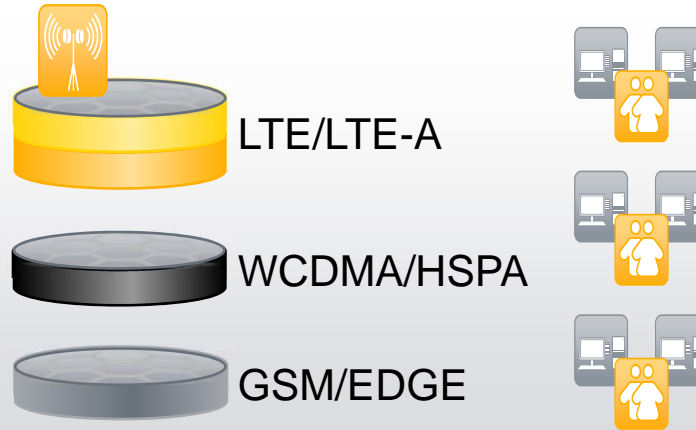
CAPEX & OPEX bubble indigestion



Why do you need Single RAN Advanced?

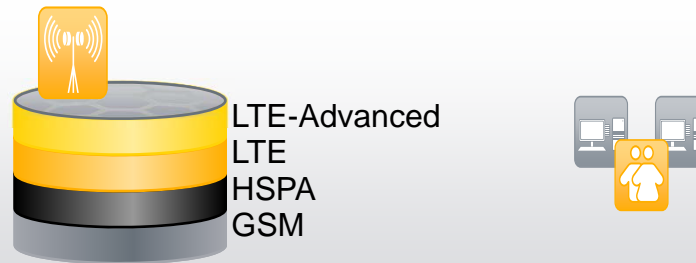
Current model

- High costs
- Difficult to manage
- Hard to maintain
- Complexity increasing over time



Network cost optimization increases profit

Single RAN makes it simpler – All 3GPP technologies in one single module

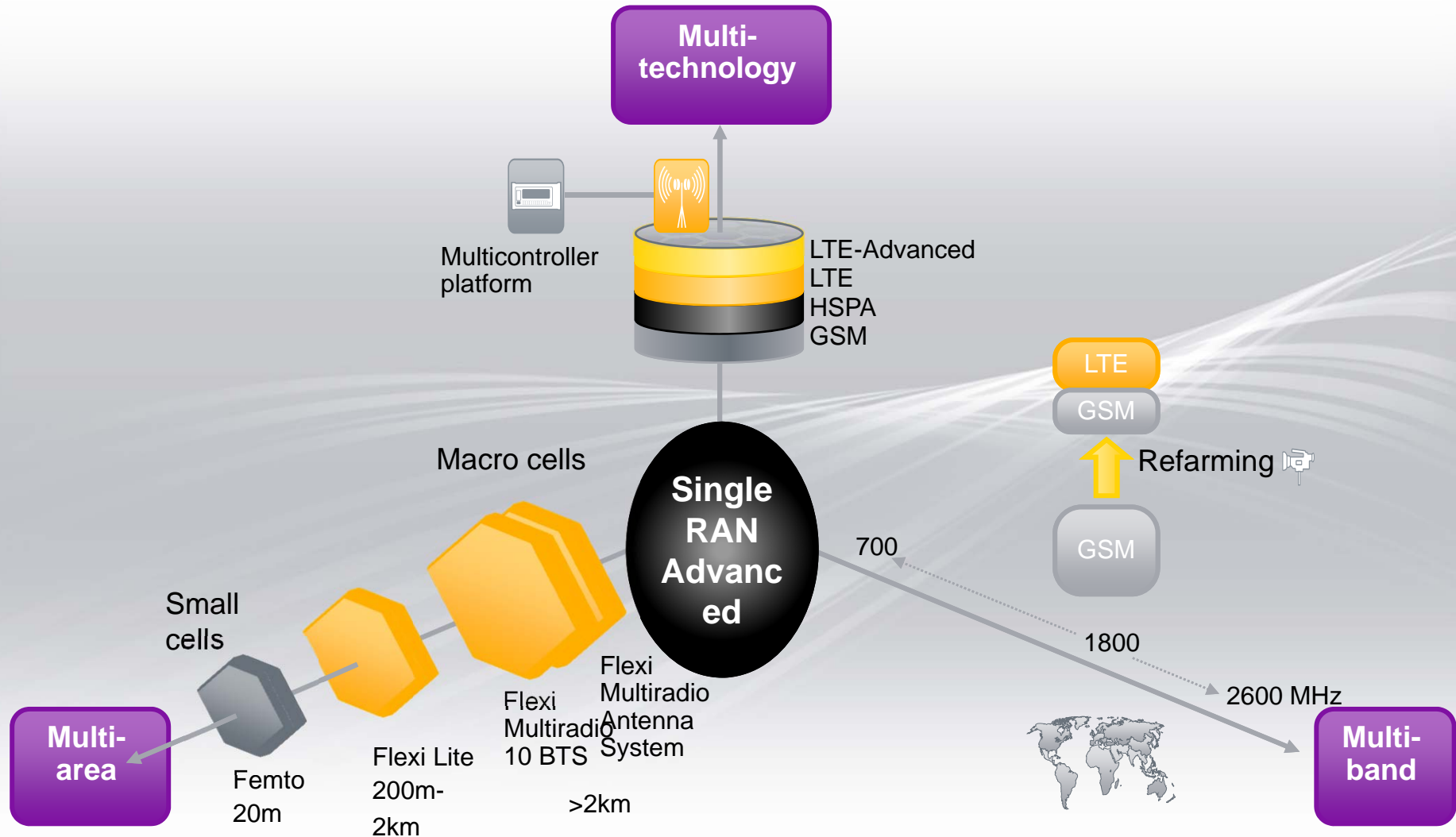


One efficient, simple and adaptive network

Agenda

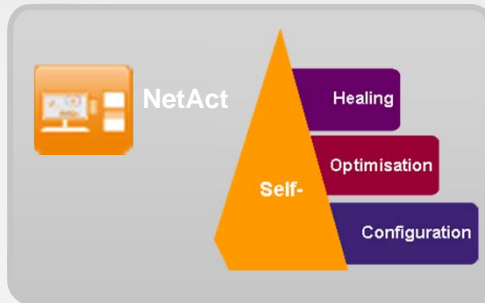
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Single RAN Advanced for all needs



Single RAN – One Radio Network

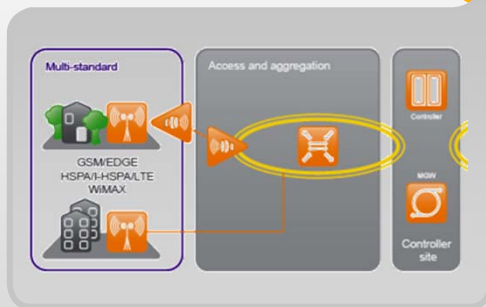
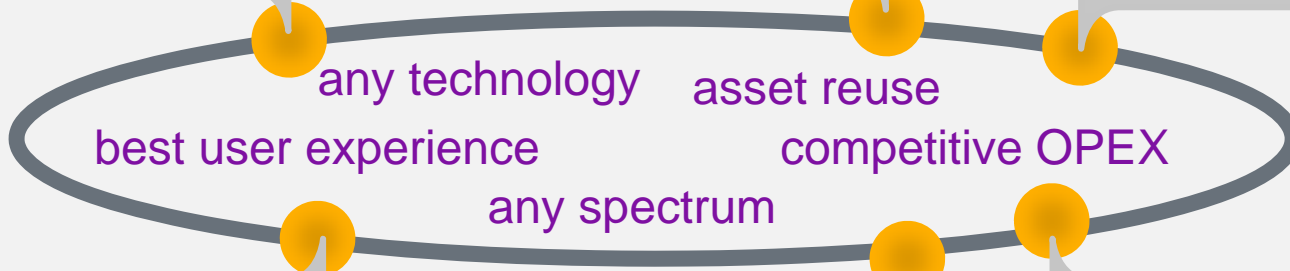
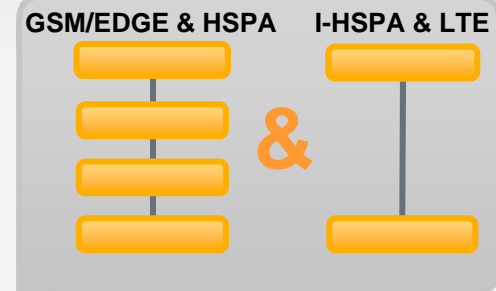
Operation system



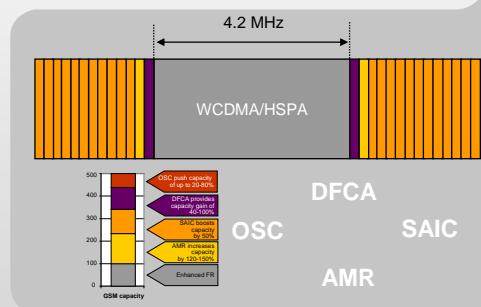
Site solution



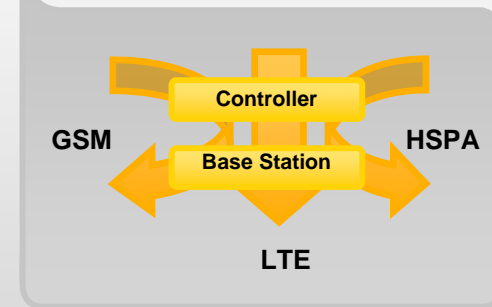
Network architecture



Transport



Efficient Spectrum Refarming

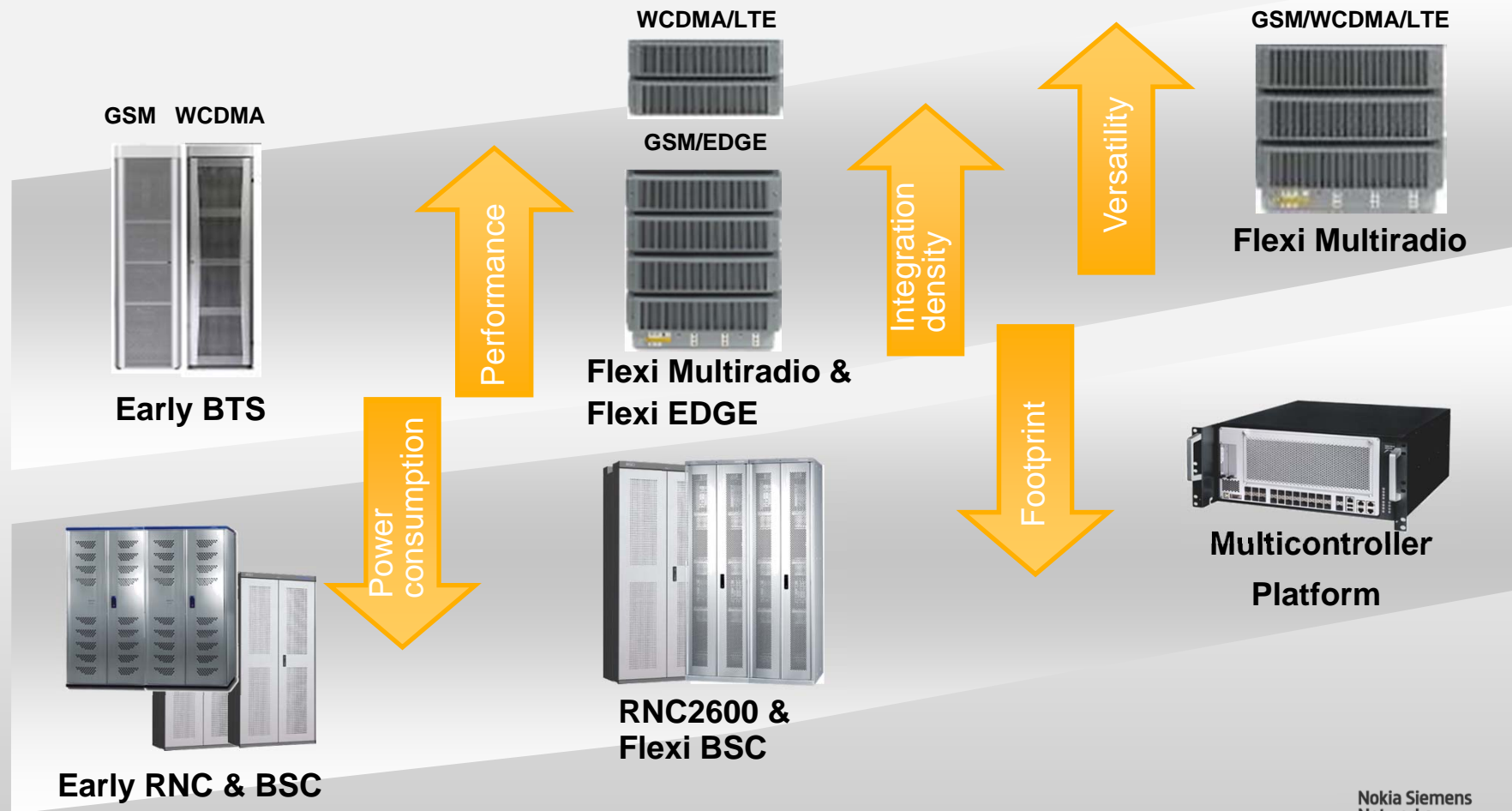


Common platforms

From Dedicated Hardware to Software Defined

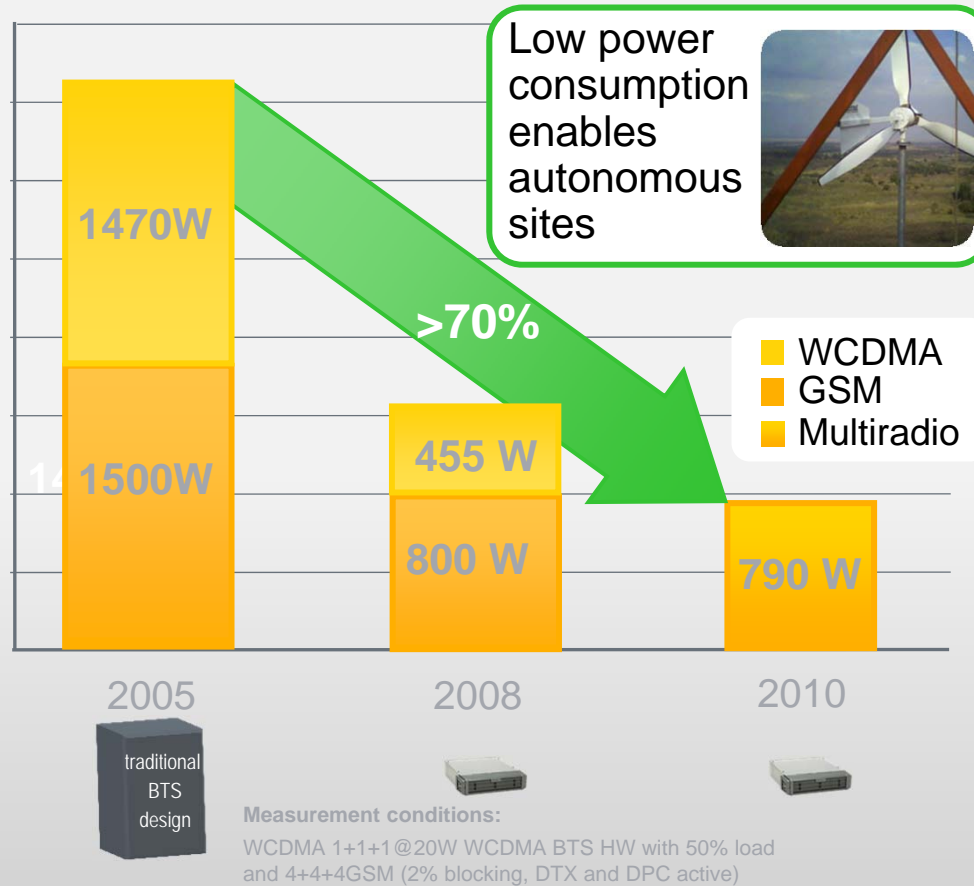
Investment protection and smooth evolution with new platforms

- Integration density and performance improves over time
- Existing equipment can be expanded and evolved with new BTS and Controllers

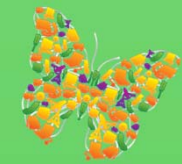


Flexi Base Station enables Green Radio: 70% lower energy consumption and CO2 footprint

Power consumption of a complete GSM & WCDMA BTS site



Green over the entire life-cycle



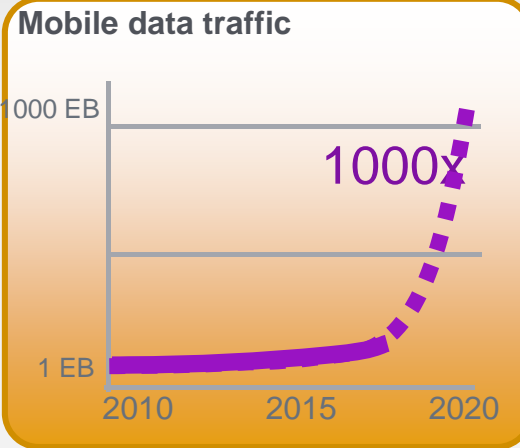
1. Production
 - 80% less material
2. Transport & installation
 - 25 l, <25 kg modules
 - minimize logistics related environmental impact
3. Operation
 - 70% less energy
4. Extended operation
 - remote software-upgrade instead HW-exchange
5. End-of-operation
 - 95% recyclable

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What will the world want from wireless by 2020?

Support up to 1000 times more traffic

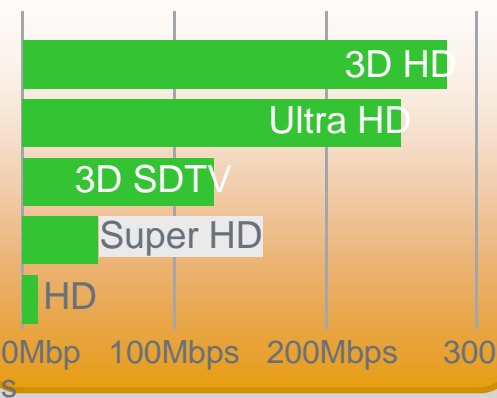


Rock solid, ubiquitous connectivity



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Apps bandwidth demand



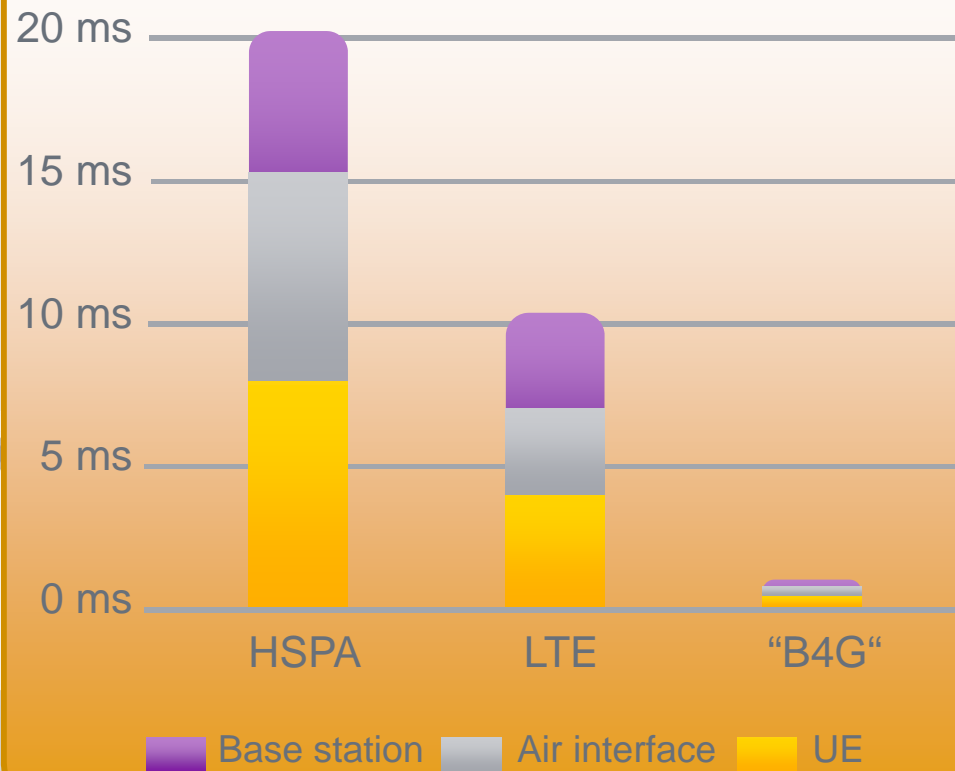
Gbps peak speeds



Millisecond latency for true "local feel"

By 2020 – radio can reduce latency 10x

Latency in radio networks

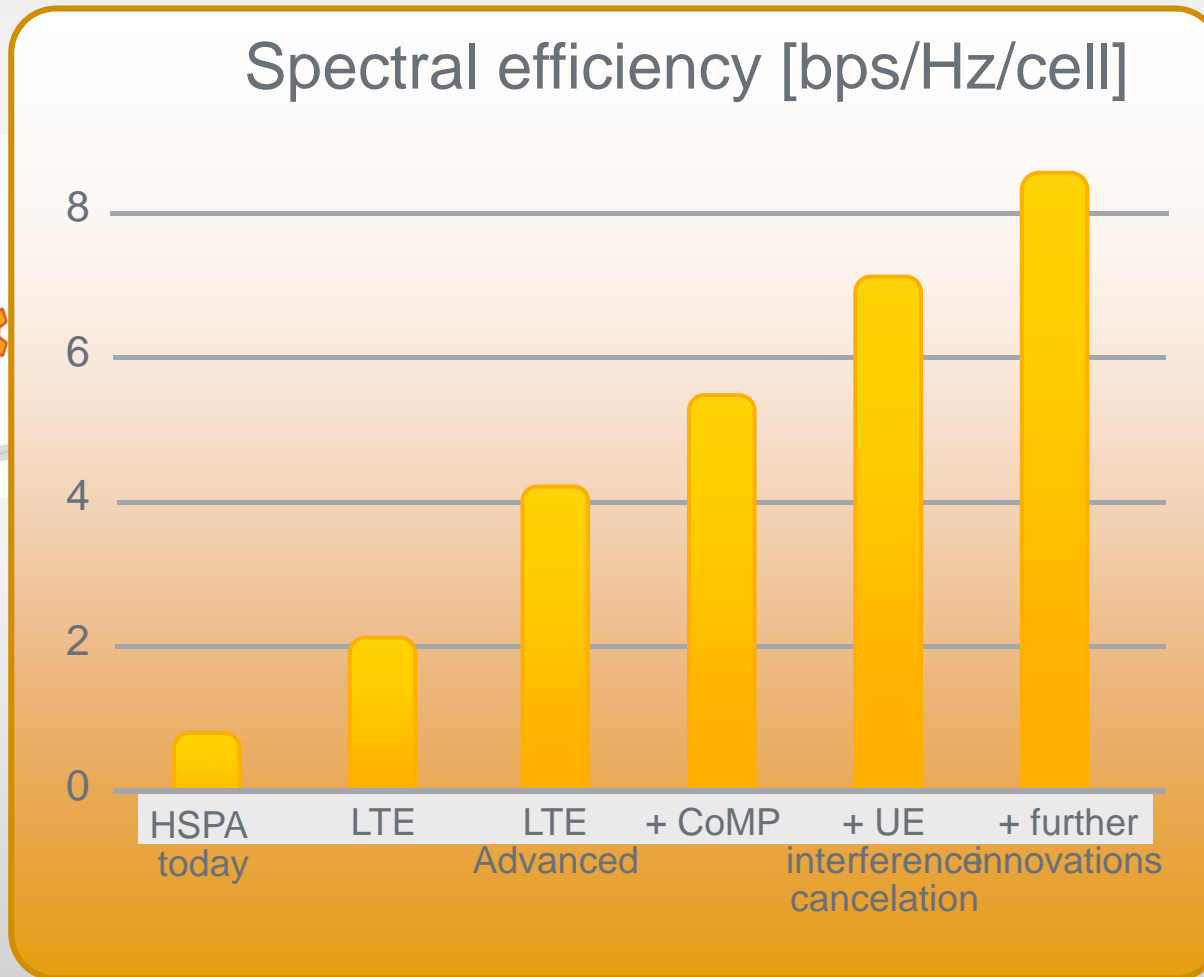


Radio latency can be pushed to 1 ms by 2020

Limited only by the speed of light

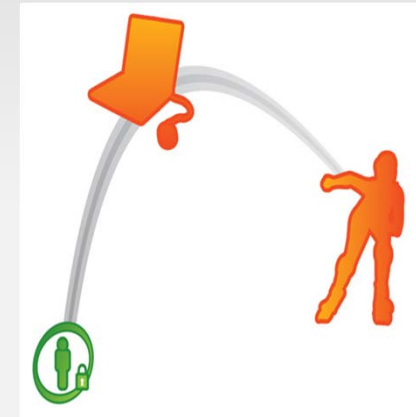
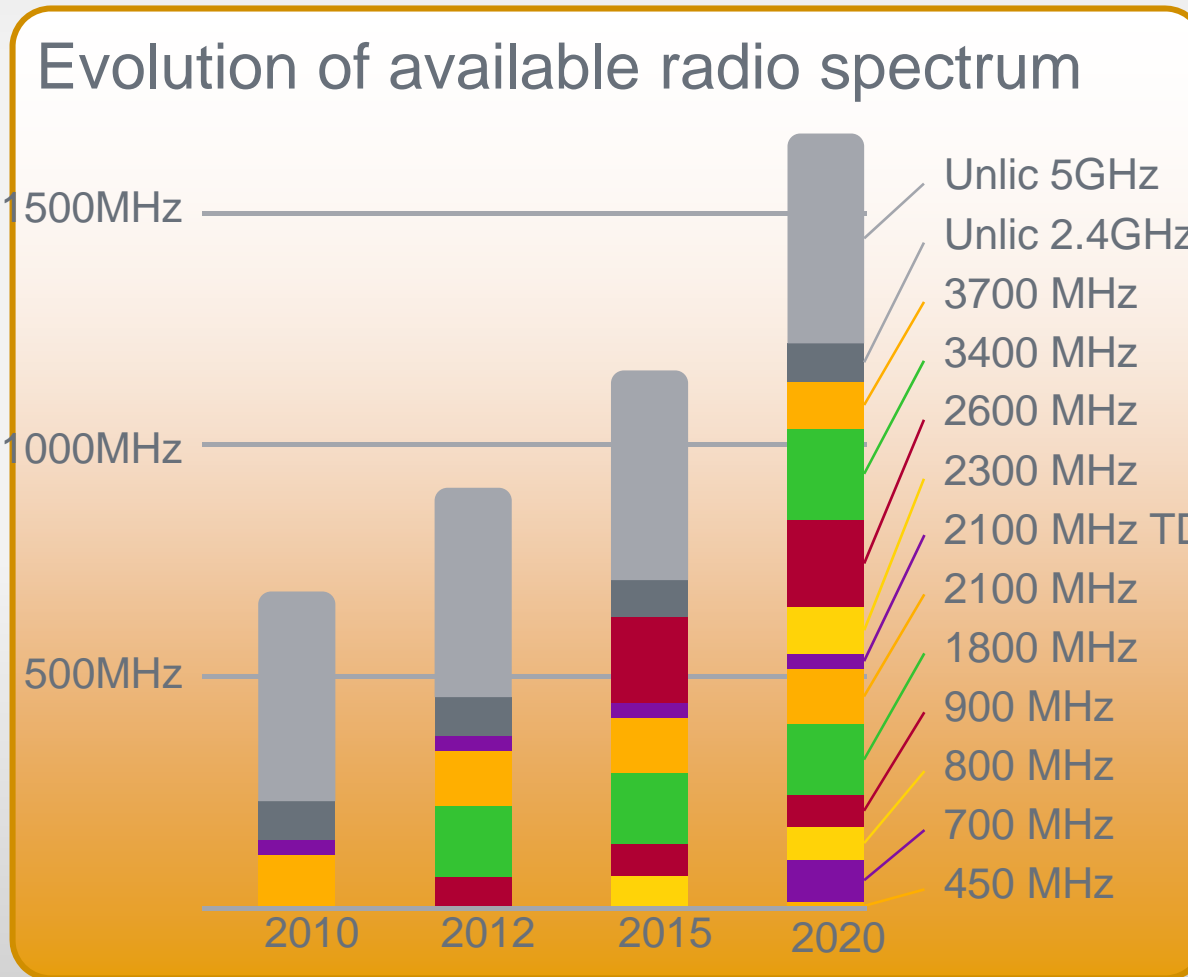
Enable low-latency M2M solutions

By 2020 - radio can improve in spectral efficiency 10x



Spectral efficiency can be improved by managing inter-cell interference.

By 2020 - there can be 10x more spectrum available



10 times more spectrum can be made available if we drive for it.

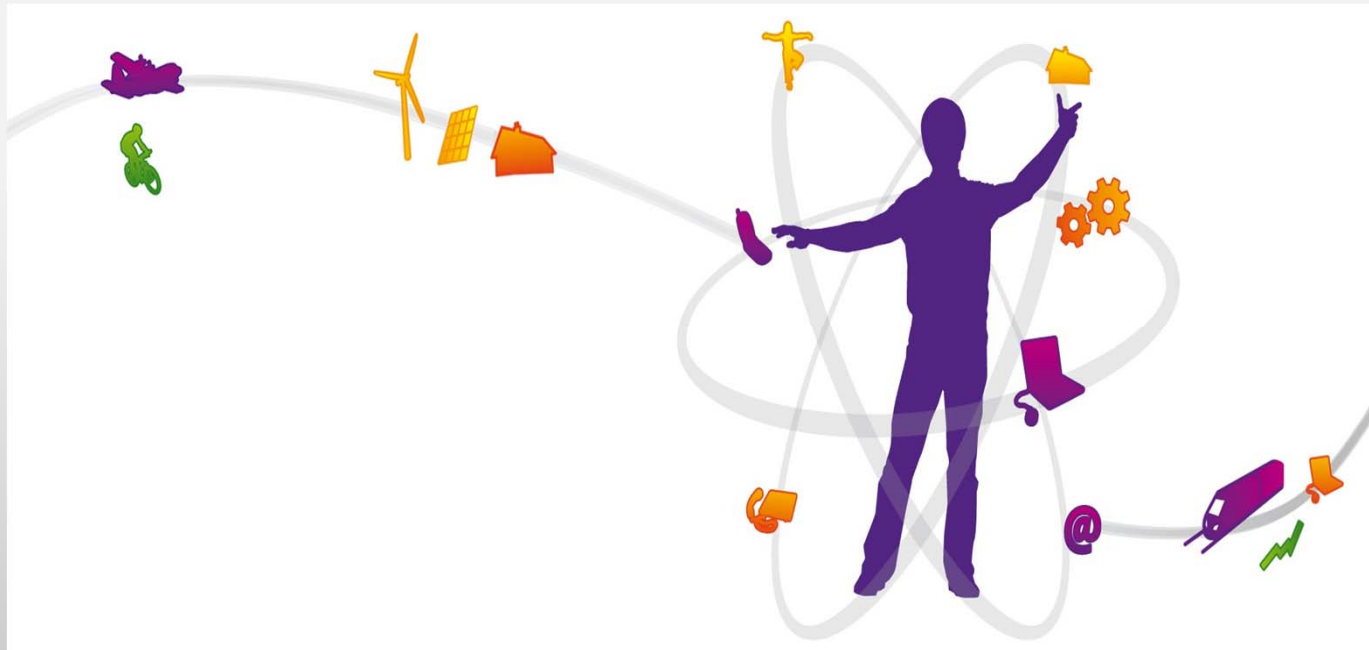
Cognitive radio enables optimized spectrum usage over multiple operators

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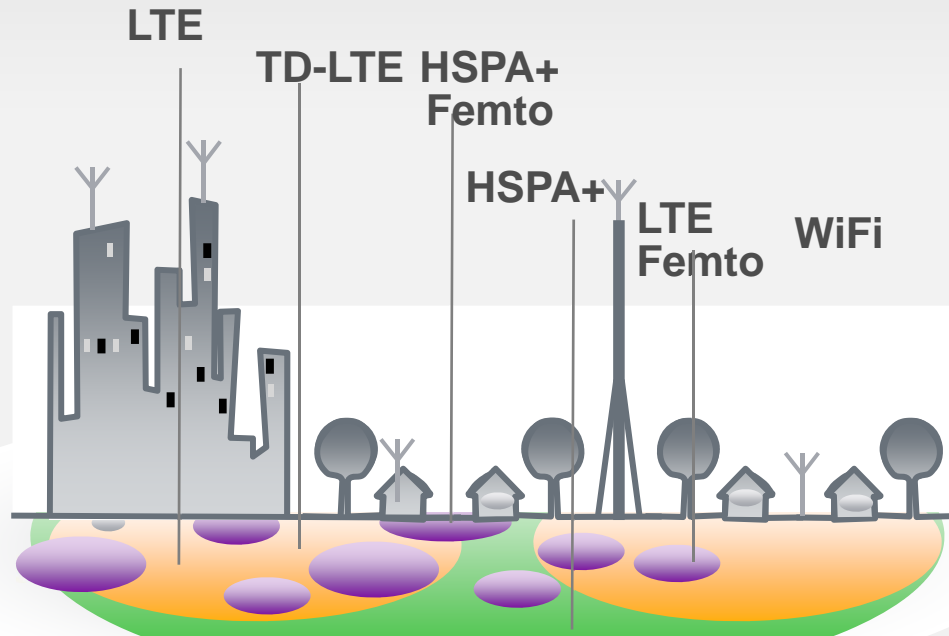
How about the “old” radio technologies in 2020

GSM will still be around driven e.g. by installed M2M base and billions of legacy devices

HSPA and LTE networks will deliver the ubiquitous mobile broadband experience.



Heterogeneous Networks – more cells, technologies, bands



Wide Area

- Majority of cells
- Beyond 300 m

Medium Area

- Share growing
- 100-300m

Hot spots

- Share growing
- 10-100m

Indoor

- Emerging
- < 10m

LTE networks will coexist in parallel with existing 2G & 3G networks for many more years

Multi-radio traffic and interference mgmt. are needed to manage the traffic growth

Smaller cells will enable offload of local high capacity traffic from wide area network

The myriad of cells and layers requires smart optimization and network mgmt. solutions

Heterogeneous Networks cannot be handled in the traditional way

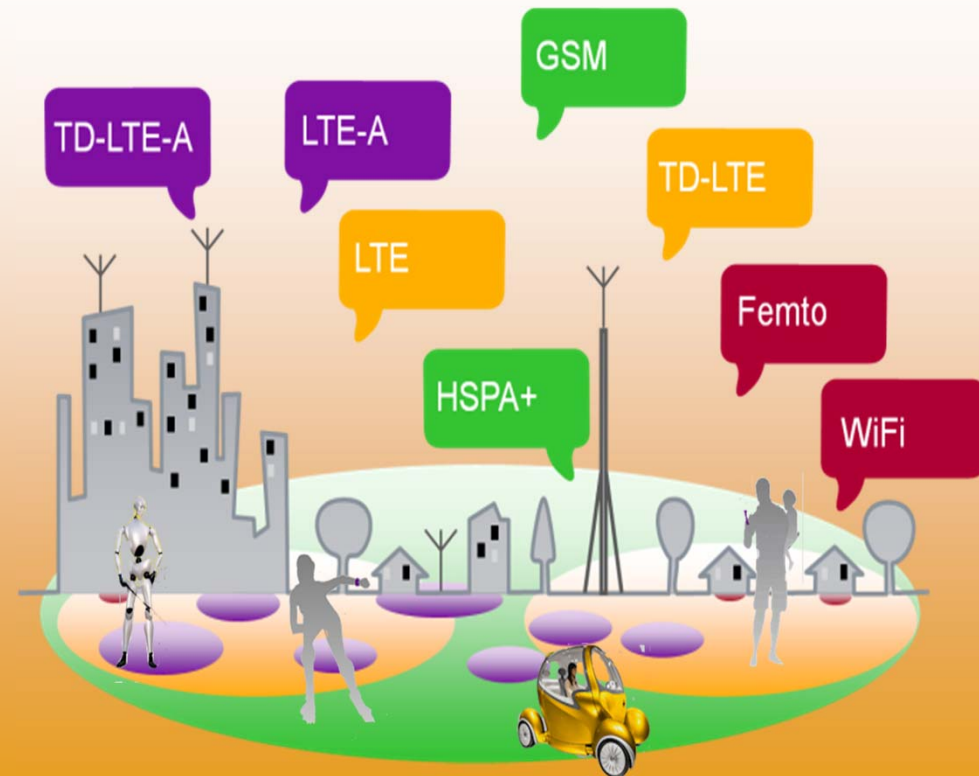
How can we deploy, commission and maintain all the radio technologies, frequency bands and layers?

All cells and frequency layers automatically managed by advanced SON

All spectrum under unified resource management for instant capacity and coverage optimization

Cognitive networks will reduce errors, improve quality and lower operation and energy costs

Virtually one ubiquitous connectivity



Gigabit Experience

Reliable, Efficient and Personal



Ubiquitous
Connectivity

Unified
Radio
Resource
Management

Cognitive
Networks

Active
Antennas

Wideband
Multiradio

Liquid
Radio

Multi-
Carrier

Multi-
Standard

Heterogeneous
Networks

Self
Organized
Networks

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Thank You

