Smart City

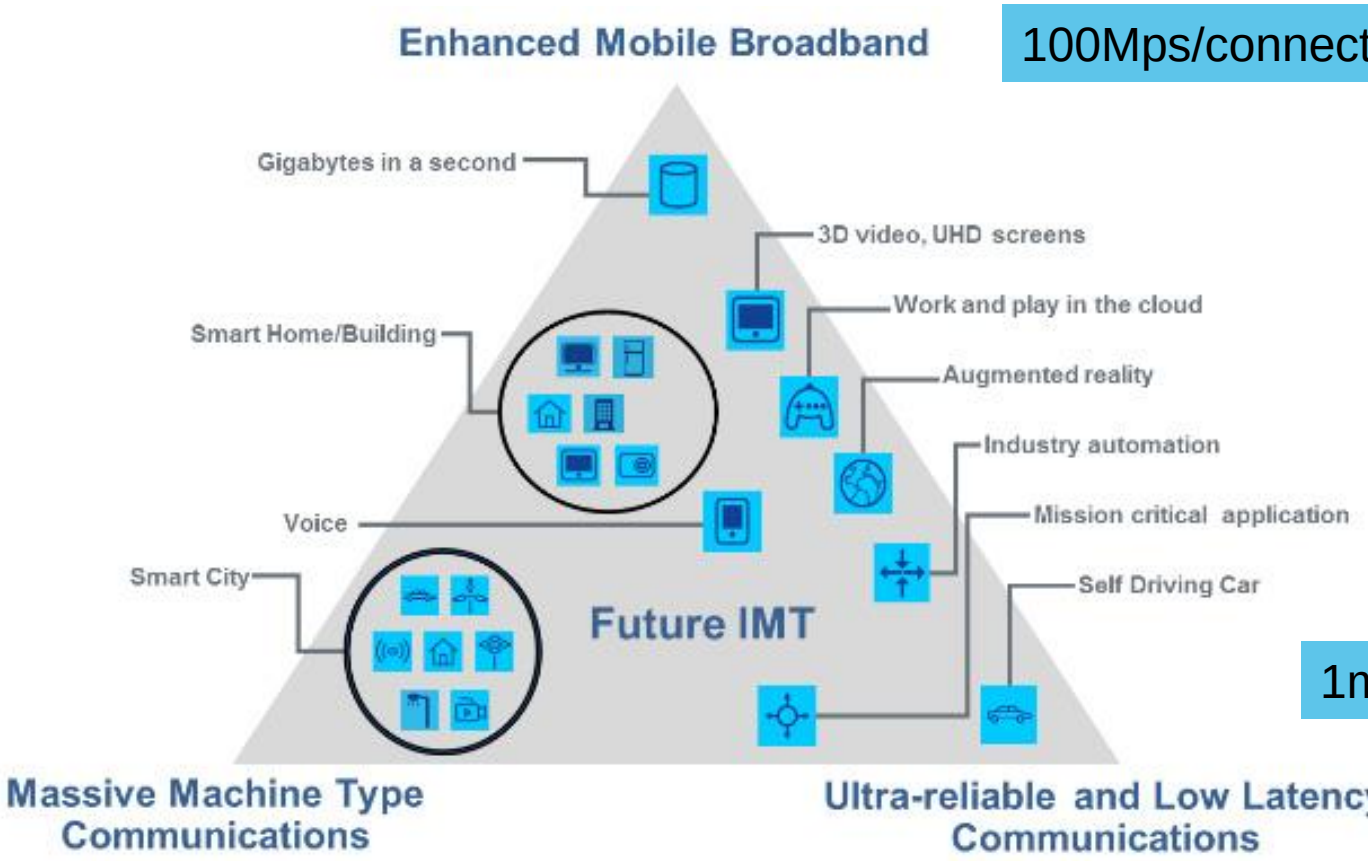
Focus to the new mobile revolution

Smart ?

Nexans
BRINGS ENERGY TO LIFE

The « Smart » evolution

- SMART city and SMART building are strongly dependent from the new mobile network deployment and efficiency



WHAT IS 5G? CONTRIBUTION OF EU RESEARCH

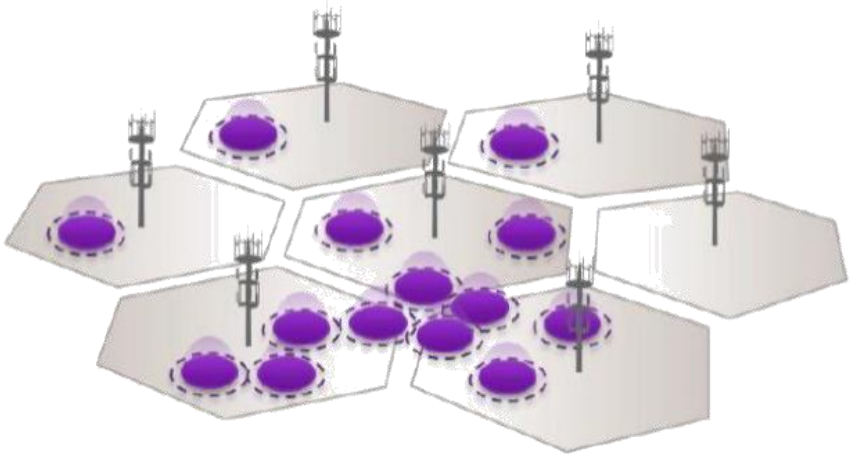
European Commission

What 5G will bring to you?	What's new with 5G?	EU projects	5G applications	Why not today?
amazing volume amazingly fast	spectrum extension; millimetre waves; cell densification; increase spectrum efficiency; advanced antennas; 3D beam-forming techniques; new electronic components; backhaul optimization; D2D; moving networks (vehicle based cells)	METIS, SEMAFOUR, 5GNOW, HARP, duplo, MOWEBA, MiWaveS, ENETWORK	 hologram TV, immersive presence, augmented reality, ultra large volume transfers	spectrum saturation; limited spectrum aggregation; current hardware not able to function at high frequencies; expensive deployment & maintenance of small cells
always best connected	combination of 4G, 3G, Wi-Fi, & new radio access to create an integrated & dynamic radio access network; connectivity management mechanisms	METIS, SEMAFOUR, MCN, Tropic, CROWD	 staying connected everywhere including high-speed trains, planes, crowds	seamless handover (e.g. cellular to Wi-Fi) not supported
no perceived delay	ultra-low latency; software-defined networks; decoupling functional architecture from the underlying physical infrastructure; network intelligence closer to users; MEC (mobile edge computing), D2D	METIS, MCN, iJOIN	 tactile internet; reactive interfaces; electricity grid control, vehicle to vehicle, robot control; connected cars, remote surgery	4G latency ≥ 10ms
massive amount of connected things & people	new waveform; cell densification; much less signalling traffic & no synchronisation; RAN architecture	METIS, 5GNOW, iJOIN	 internet of things, smart cities, connected cars, e-health	current OFDM waveform limitations; interference prevents scaling up; 4G chipsets cost; energy consumption
energy efficiency	millimetre waves for front-haul & backhaul; new operation mechanisms for dense networks; pooling of base station processing; on-demand consumption; massive machine communications; power amplifiers; DSP (digital signal processing) – enabled optical transceivers; harvesting ambient energy; optimization of sleep mode switching	MCN, iJOIN, CROWD	 80% energy saving; deployment in developing countries	Base stations idle time not optimised; unused functions activated; air interface/hardware not energy optimized
flexible programmable networks	software-defined networks; network function virtualisation; decoupling functional architecture from the underlying physical infrastructure; APIs	unify, TNOVA	 new business models for innovative SMEs providing network functions; emergence of super MVNOs; pan European operators, faster innovation in network services	many various network management software; not interoperable; bundling of network functions in hardware boxes
secure networks	physical channel authentication; virtualised authentication	SPRYLAWS	 networks for police & security professionals; privacy	Security as add-on not by design; fragmented approach

Vexans

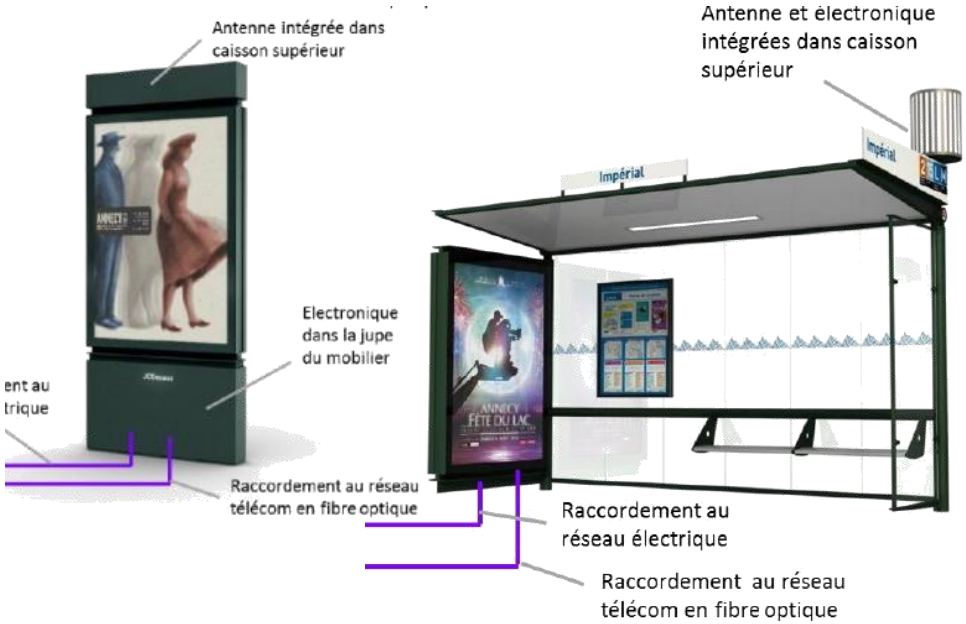
Proliferation of the connecting points

- To be efficient and redundant, the 5G network shall be **associated with small cells** every 100 m (and maybe less)
- Deployment of indoor antennas
- Implementation of large antennas in dense cities will be almost impossible.
- IoT and 5G is also based on **low energy consumption**.. It implies a much **high density of connecting point**s (limits distance of emission)
- A complete Network will be the association of classical high capacity FTTx deployment and new smallCell FTTa/5G antennas



Small Cells

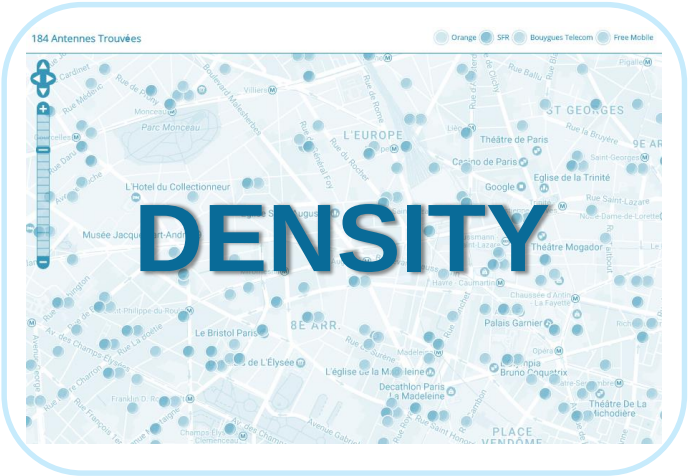
- **Integration of small cell** in urban structures.
- More small devices => **More connections** to build with fiber/energy
- More small devices => need for **faster installation,** plug & play
- **Integration in non Telecom** infrastructure



Impacts on the network deployment

Nexans
BRINGS ENERGY TO LIFE

3 blocks of the Network evolution



Nexans

Convergence of objects

- Antenna will be part of a manufactured urban furniture
- High sensitivity to the design in urban environment
- Passive furniture will become active and invisible

Convergence of functions

- Small cells is also a charging station, a screen, a transport infrastructure

Convergence of Installers

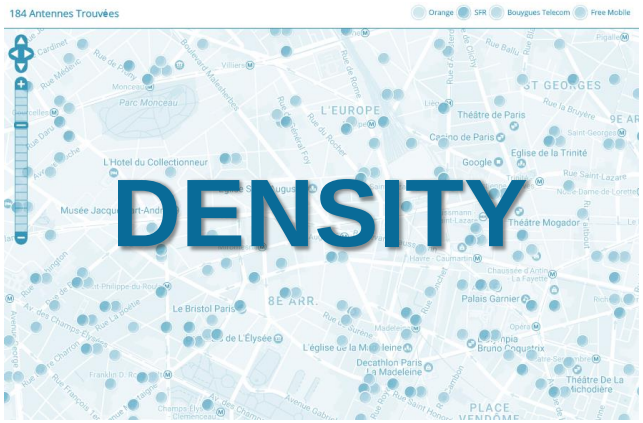
- Fast connectivity of energy and data: the same installer shall be able to connect the whole system
- Low expertise installation : plug & play

Convergence of Networks

- Higher compatibility between FTTA and FTTH infrastructure.
- Energy and data infrastructure deployed in the same micro zoning
- Datacenter/Central office/NRO to rethink
- Unified fixed and radio access network
- Structured cabling connecting antennas indoor

Convergence of Players in installation

- Network not necessary installed by operators
- Key role of urban furniture + cities
- Urbanism merger with Data network planning



Densification of the Network

- More last miles and short connection with low FC
- More smaller components

Dispersed installations

- Need a lot of small packing
- Installer mobility is key
- More connections (splicing/pre-connectorized)

Smaller installation due to lack of space

- Hybrid cables to limit the space of cabling
- Need efficient ways of cable installation (underground +aerial, short bending radius, fast blowing)
- High temperature rating cables and component due du space confinement

Fast installation

- Plug & Play systems
- Reinforced connectivity role
- Simplification of systems and instruction (failure proof)

Training of installers

- Electrician = optical fiber installer
- Need to train installers to systems

Availability

- Rapid change of technology needs a strong availability of solutions.
- Increases role of wholesalers for quick access to the full panel

Evolutions

- Normative evolutions foreseen over the next years on cables and components to avoid multiple systems.
- Question mark about health impact perception in populations
- Question mark about the visual pollution in city centers

Q&A

Contact

Jean-Jacques Sage
Product & Solution Manager

jean-jacques.sage@nexans.com
+33 6 09 98 51 28

Nexans
BRINGS ENERGY TO LIFE