



# Vision toward 5G

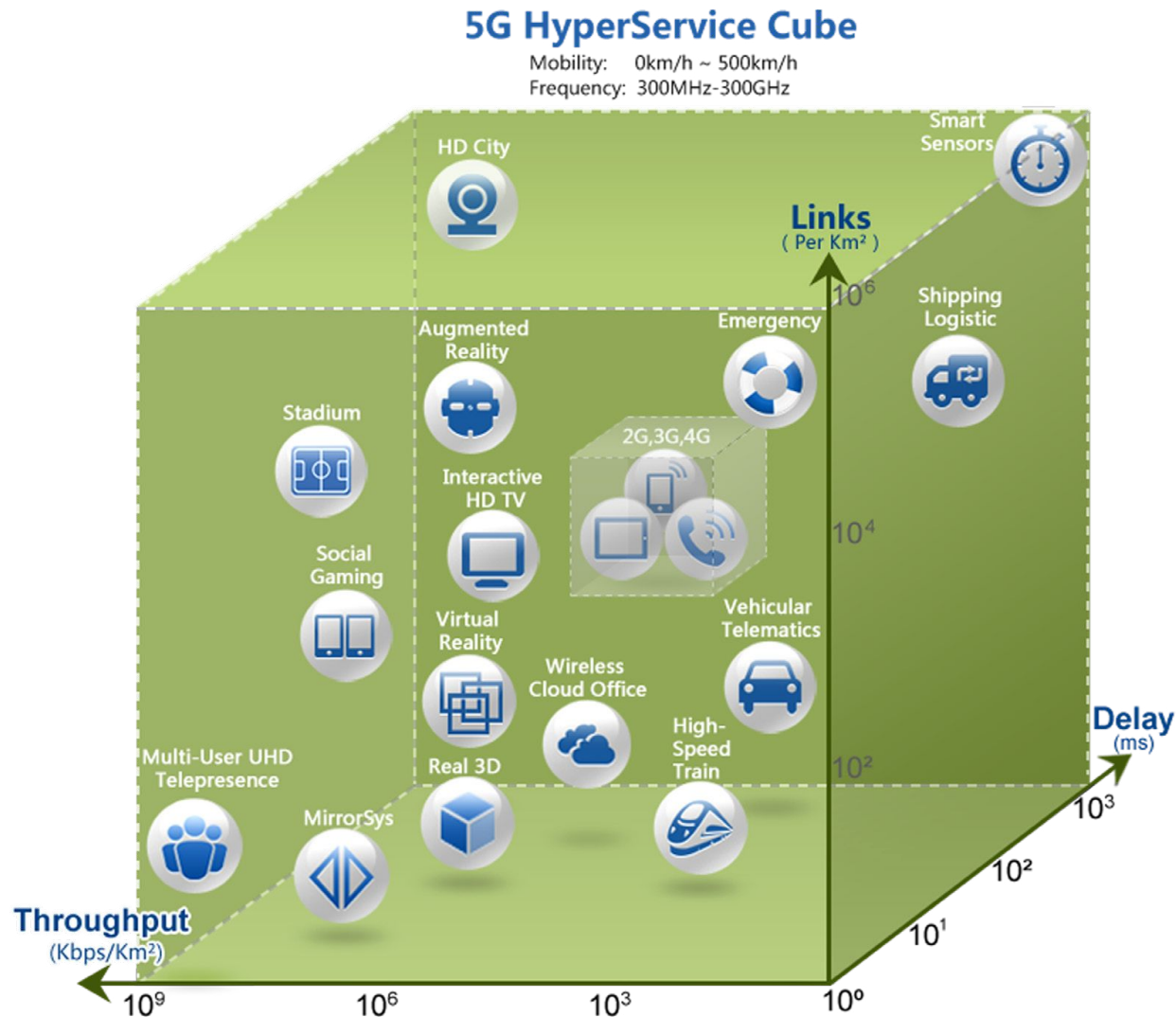
How the industry is preparing 5G



5 ISS

Deyts Audran  
Gautier Renaud

# The insufficiency of existing networks



# 5G is expected to ...

... be launched by 2020



... be fast (ITU : 1Gb/s, 20Gb/s peaks)



... become a major IoT network ...  
... which should thus provide 100 to 1000 times  
higher bandwidth capacity than 4G

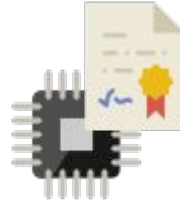


... be very reliable (1ms latency)

# Chip manufacturers' vision toward 5G

## Qualcomm

Dominance on 4G patents for SoC



Capacity enhancement



Millimetric waves  
(30 to 300 GHz)



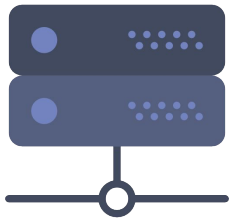
Complex radio  
searching for all  
available networks



Carrier aggregation

# Chip manufacturers' vision toward 5G

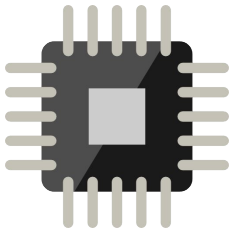
## Intel



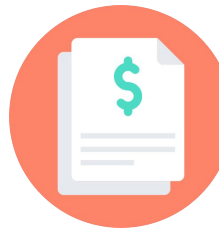
Network based services  
SDN, NFV



Partnerships  
NTT Docomo, Verizon, NGMN, ...



Better I/O



~ 100 patents

# Smartphones manufacturer's vision toward 5G

Apple...

... participates to **Next Generation Mobile Networks** (NGMN) Alliance



... does not have cutting-edge cellular radios for 5G yet ...  
... but seems to be hiring specialized wireless engineers



Nokia

Various uses: Smart Grid, Health, Industrial, Logistics  
Design: Flexible and Reliable



# Pluridisciplinary actor's vision

Samsung



Immersive AR & VR  
Ultra High Resolution



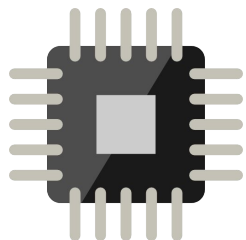
Low Latency  
PHY/MAC, TTI, FTSDMA, ...



Ubiquitous Computing  
Smart office, home, ...



Standardization effort  
By 2017



mmWave chipset  
Giga class data rate

And much more...

# Pluridisciplinary actor's vision

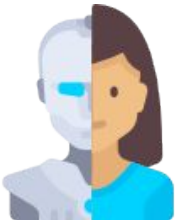
Huawei



R&D work on 5G since 2009 - tests ongoing



Technology : heterogenous networks + MIMO + high freqs  
(Optus-Huawei : 36 Gb/s)



5G for humans and for things



Wants to provide “one click”  
5G on day 1 (approx. 2020)



# Operator's vision

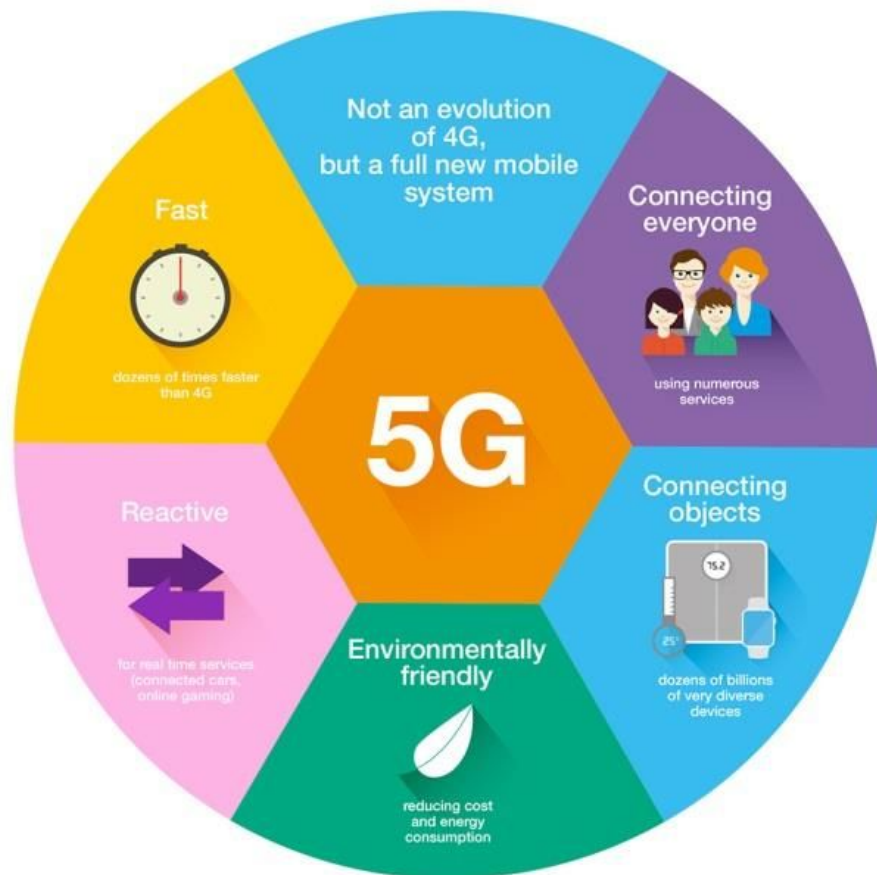
Orange



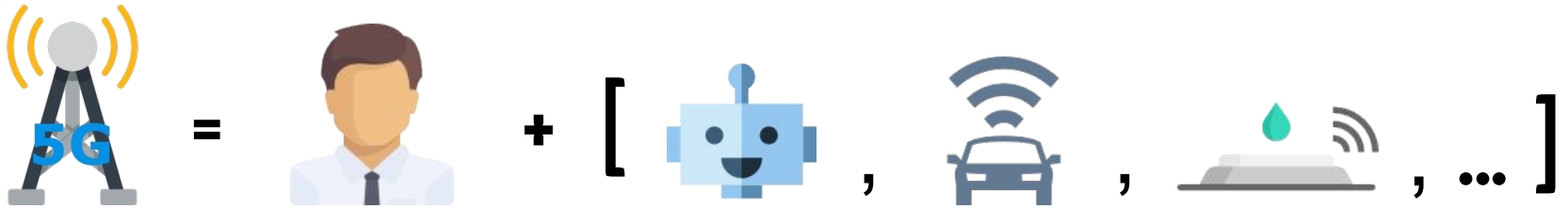
Various stakeholders  
Industry, energy, health ...



Studies effort  
5GPPP, NGMN, 3GPP, ITU



# Conclusion



Numerous partnerships / consortiums (MGMN)  $\Rightarrow$  Towards more interoperability

But ...



It's a race against time and competitors !  $\Rightarrow$  2020?

Juniper Research estimation  $\Rightarrow$  65 G\$ in 2025

