

Future Networks in Barcelona



5G Deployment:
Vision, focus and projects of the
City of Barcelona

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Vision



Technology as an enabler for:

- ✓ *Urban mobility more efficient and sustainable*
- ✓ *Environmental sustainability*
- ✓ *Business-friendly and attracting capital*
- ✓ *Integration and social cohesion*
- ✓ *Communication and proximity with people*
- ✓ *Knowledge, creativity and innovation*
- ✓ *Transparency and democratic culture*
- ✓ *Universal access to culture, education and health care*

Improve citizens' welfare and
quality of life



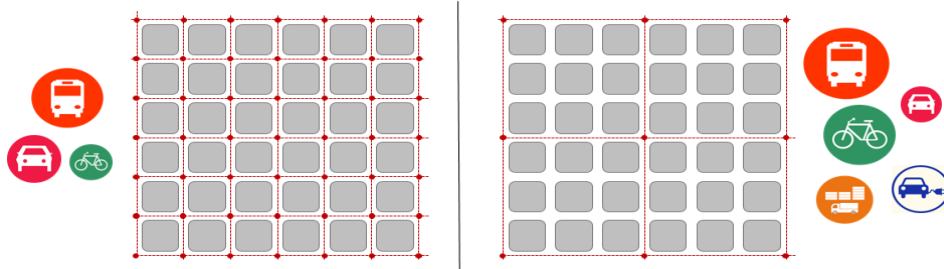
Economic progress





Our Urban Model: Macroblok Project

Ajuntament de
Barcelona



CONCEPT

The superblocks are defined theoretically as an "area of urban organization, from which a series of structured transformation strategies towards a new urban model, where mobility and reorganization of public space represent the first step".

Inside the superblocks the traffic and the environmental pollution (noise and gas) are reduced.

SERVICES

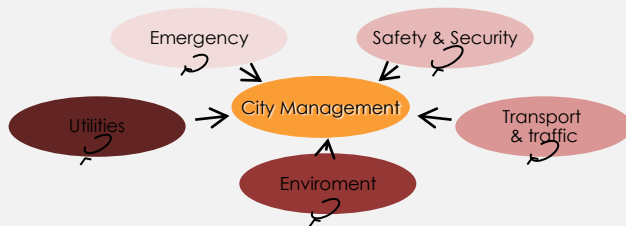
Each Macroblok is based on a combination of City user services (US).

Each US is composed by elements (Basic City Services).

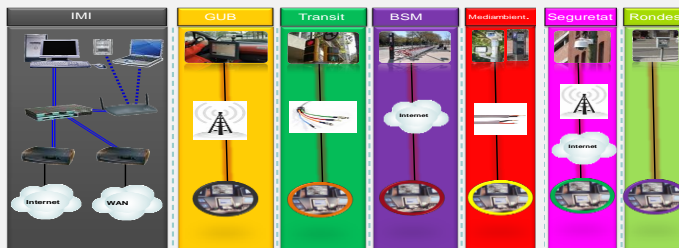


From Nightmare...

Resources **Vertical Management**



Today: Vertical Applications

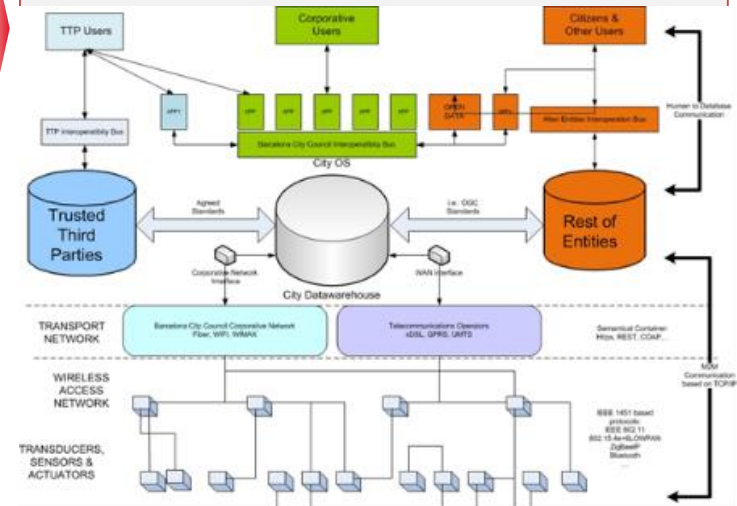


... To Paradise

Dinamic Management of Services

Bidirectional Relationship between citizens and Administration

Common Data Warehousing & Use of Open Data



Y4000 compliant

Infrastructure

Optical & Wireless integration to enlarge capillarity. Barcelona City Council as own ICT Operator

City fiber infrastructure:

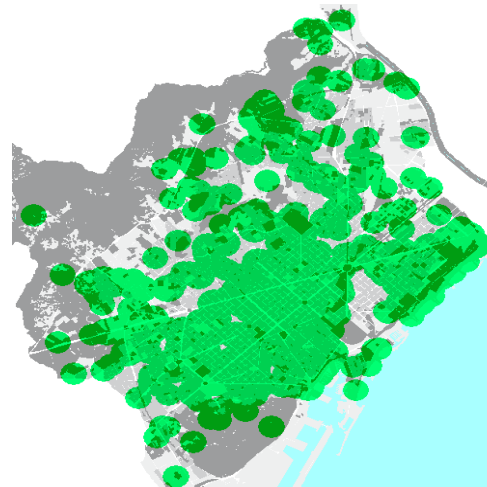
- Barcelona City Council property. Started in 1994.
- High capacity (100 Mbps to 10 Gbps/MPLS)
- >900 Km optical fiber
- Deployed through: Subway tunnels, Services galleries, Sewer system and PPP with telecom operators

City wireless infrastructure:

- Barcelona City Council property. Started in 2007.
- >600 WIFI / WIMAX Routers (30% urban area)
- >2000 WIFI Indoor Nodes
- Deployed through city council poles and premises

Complementary Actions:

- Each civil work in city implies installation of ducts, dark fiber, sensors, networking and wireless devices.
- FTTH Deployment extended to almost all the urban city

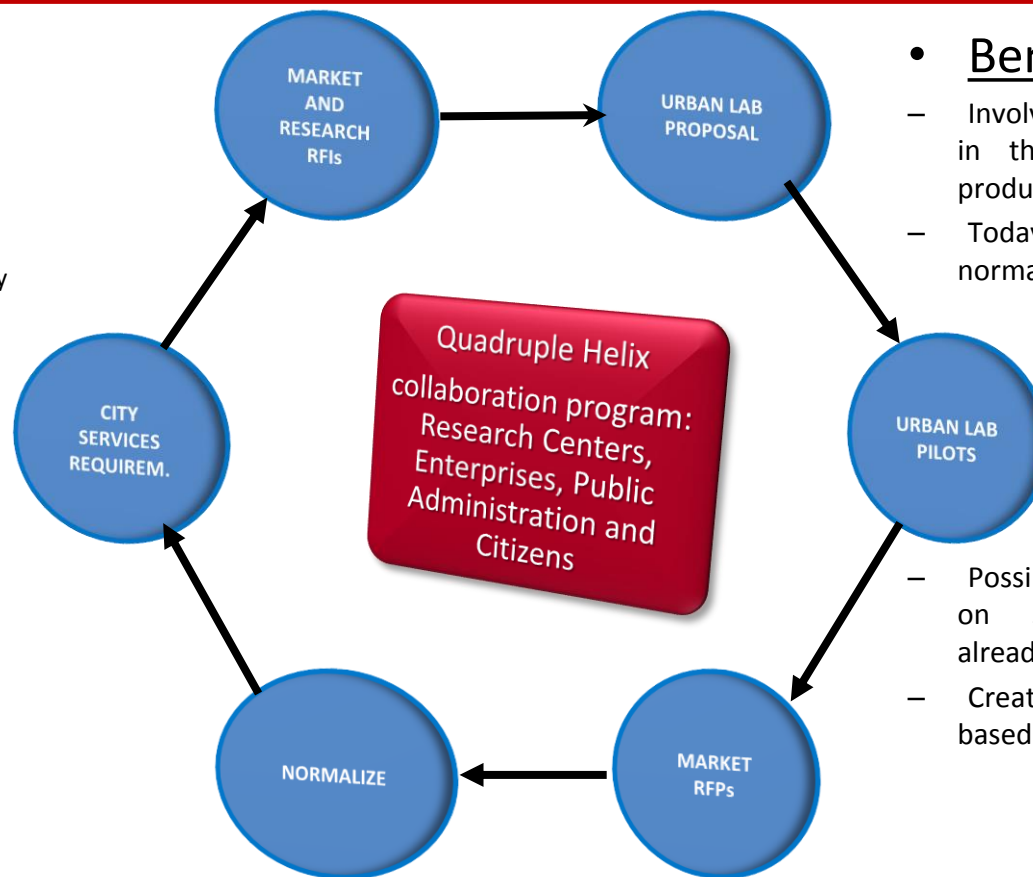


GOAL

Maximum coverage to allow easy
service deployment in the city

• How works:

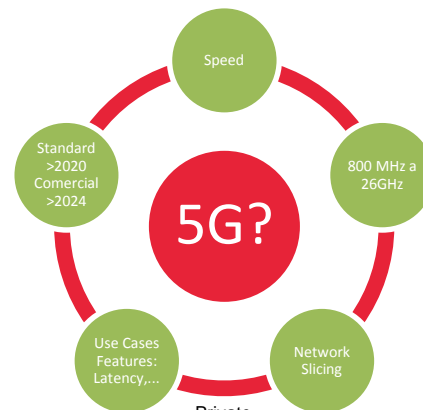
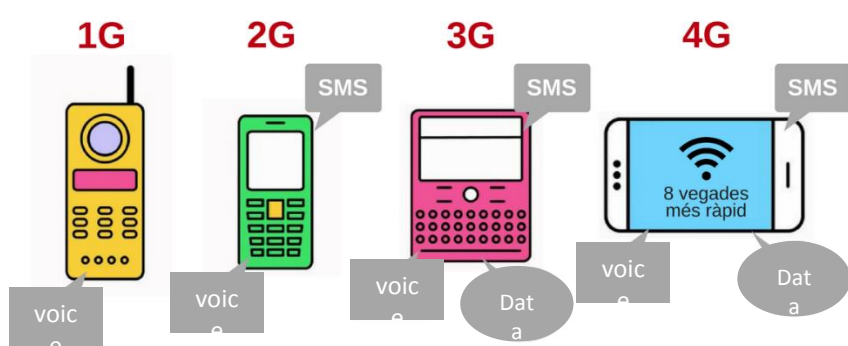
- Once the proposal is accepted, the municipality assigns a project manager, who will:
 - ✓ Study and agree on the feasibility of the proposed project.
 - ✓ Facilitate the access to the infrastructures
 - ✓ Negotiate with local contractors installation and maintenance for proposed living lab.
 - ✓ Participate in results analysis
- Costs associated with the project are not covered by the municipality.
- However, if project have interest for BCN we provide funding programs in order to collaborate with entities.



• Benefits

- Involvement of city-knowledge in the development of new products and research actions.
- Today integrated in all city and normal operations.
- Possibility of generating patents on state-of-the-art products already tested in a city.
- Creation of economical activity based in these actions

Based in Innovative Public Procurement of EU!!!



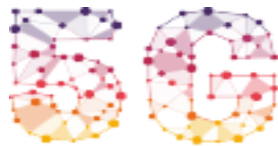
OPEN issues:

- USE cases paradigma. Speed? Latency?
- Macrostations vs Smallcells / Terminal Technology
- How integrate Legacy? Devices Reduction?
- Worldwide Massive Impact in Technology and Society
 - What about:
 - Digital Divide?,
 - Enviroment Impact?
 - Urban Furniture and Radomos?



Organize a PPP Working Group

5G Technology is coming but not mature, so it is difficult to evaluate cities and citizens impact.



5GBarcelona is a public-private initiative working to transform the metropolitan area of Barcelona into an **open and neutral city-wide lab** for the validation and adoption of 5G technologies and verticals in a real-life environment. The initiative is powered by



Current Use Cases under development in 5GBarcelona

Industry 4.0 (mMTC)



Health – Ambulance (Multi-connectivity)



Health – Assisted Surgery (URLLC)



Connected Car (MEC – low latency)



Public Transport (5GPICTURE - mmWave)



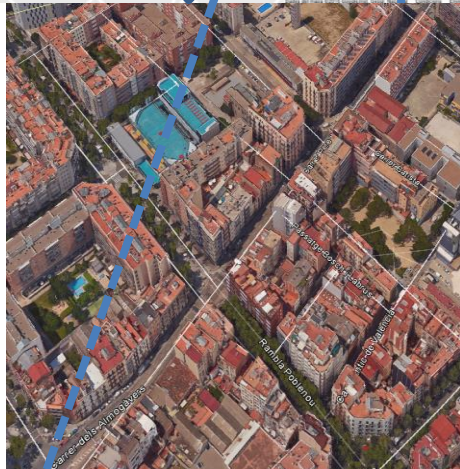
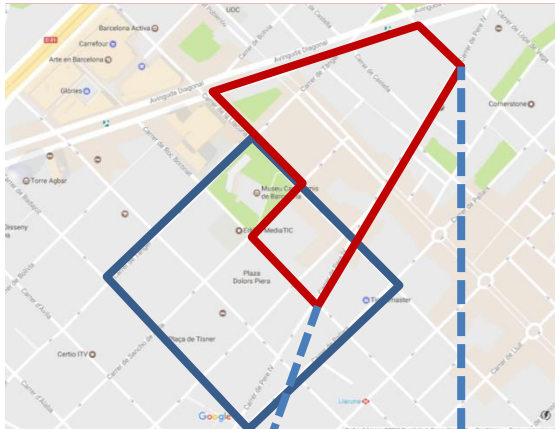
Remote Media Production (5GCITY – Infra. Slicing)



Goal: cross-sector 5GBarcelona use cases and possibility to use existing pre-5G infrastructure



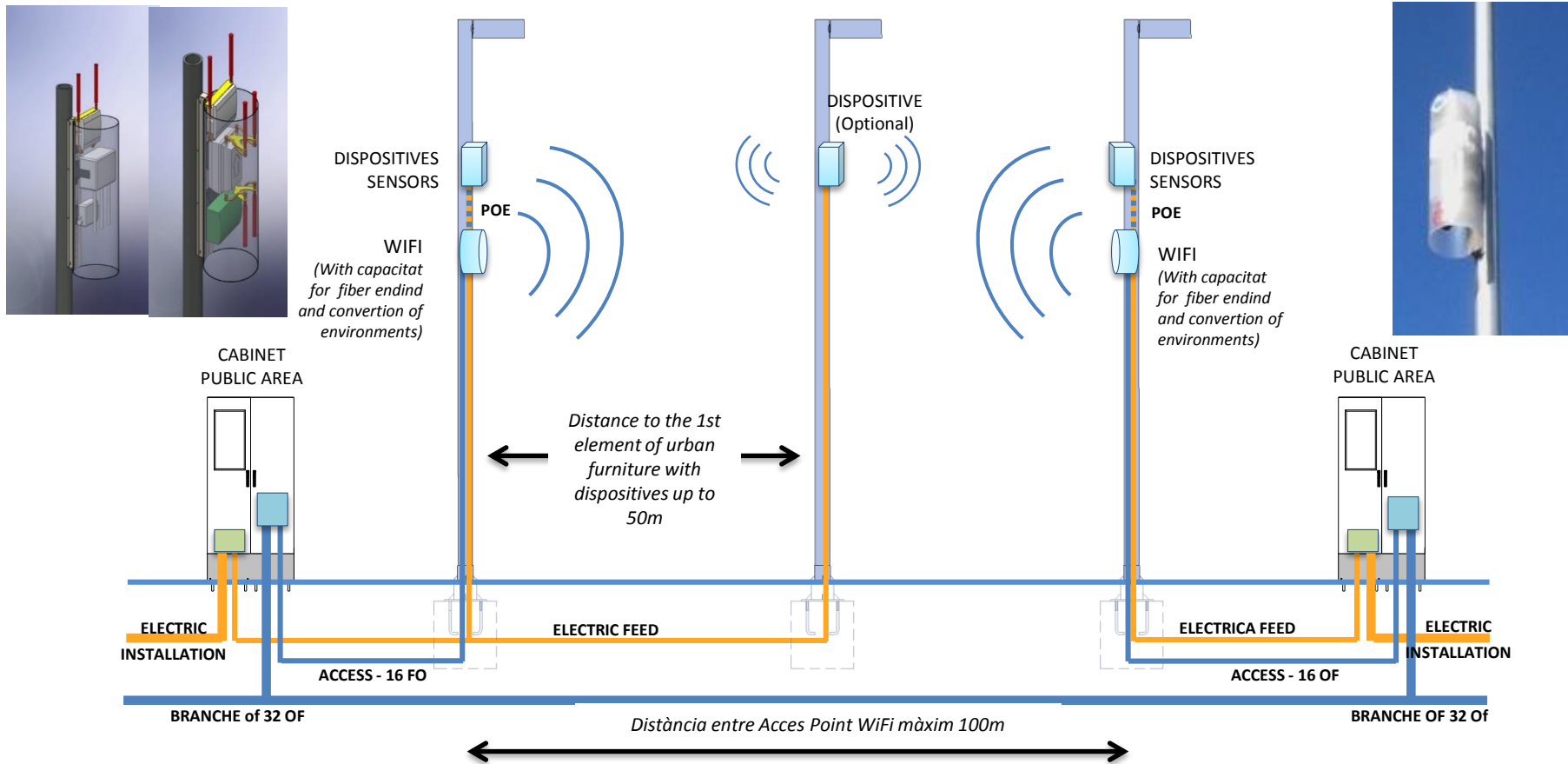
Example of Combine Urban Lab Concepts, usual City renovations, enterprises testbeds and EU Projects



- Close of testbed Area (in red), City is deploying a Macroblock project included in Urbanism City Plans. Several projects will be deployed in this area with additional Funds from different programs:
 - **Refurbishment and Adaptation of Pere IV Street and St.Marti Macroblock funded by City.**
 - **Growsmarter (H2020 Topic SCC-01-2014/Grant Agreement 646456) provides multifunctional pole**
 - **FLAME (H2020 Topic ICT-08-2017/Grant Agreement 731677) :** Develop advanced IT city infrastructures to validate future internet media services. City Perspective: MEC Servers Hierarchy (Pole, Cabinet,...)
 - **5G-CITY (H2020 Topic ICT-2016-2/Grant Agreement 761508):** Develop the concept of 5G small cell neutral operator, from a city centric perspective. City Perspective: Urban Furniture Antena Integration for Small Cells and Neutral Operator as driver to fight Digital Divide
- We study to incorporate to this area more “active” poles, cabinets as infrastructure and more use cases based on providers (fog computing, Lora, sigfox,...)

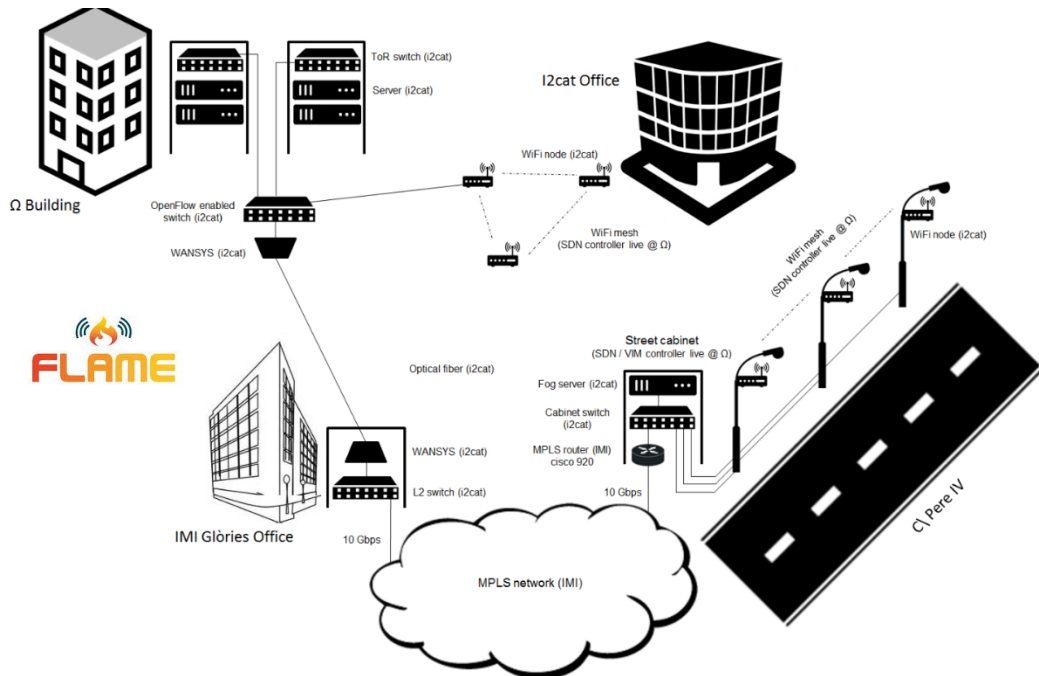


Normalize and its integration with ITC at public space

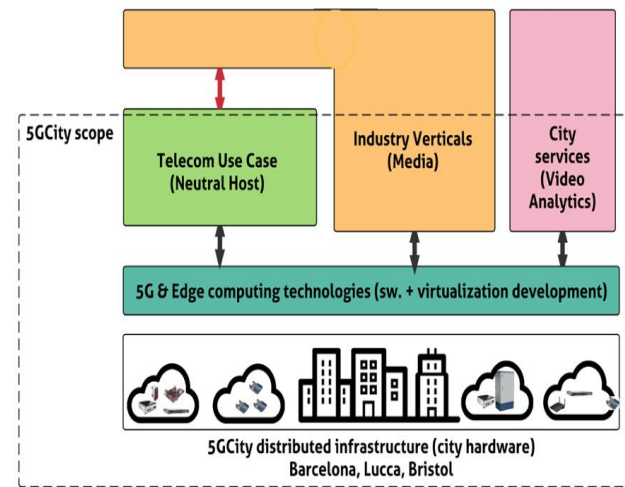




Overview of FLAME testbed



5GCITY: A DISTRIBUTED CLOUD & RADIO PLATFORM FOR 5G NEUTRAL HOSTS



Challenge: Develop the concept of neutral operator, from a city centric perspective.

That means: Urban Furniture Antena WiFi for Small Cells and Neutral Operator as driver to fight Digital Divide



Vision: 5G is a new technology with expected impact in services and infrastructure. So it is key for cities participate in its definition and Deployment under a PPP and citizen friendly perspective.

Mision: Drive 5G deployments to enforce Barcelona challenges: equity, circular economy, open and sustainable. That means several action points:

1. Promoting 5G technologies in its Deployment,
2. Regulating use of públic space and urban furniture integration,
3. Testing Neutral Operator Concept from infrastructure and host perspective as tool to fight against digital divide caused by coverage.
4. Early Adopter of 5G technologies in City Services, preventing application digital divide
5. As a consequence improve Operation and Maintenance of new implementations
6. And finally ...Normalize and Standarize



And Finally providing info to standardization bodies via direct report and/or UNE CTN 178 WGs



ISO/TC268
"Sustainable Development in Communities"

ISO 37120: Indicators for City Services and Quality of Life (PUBLICADA)
ISO/TR 37150: Smart Community Infrastructures. Review of existing activities relevant to metrics(PUBLICADA).



International Electrotechnical Commission
SEG
"Strategic Evaluation Group on Smart Cities"

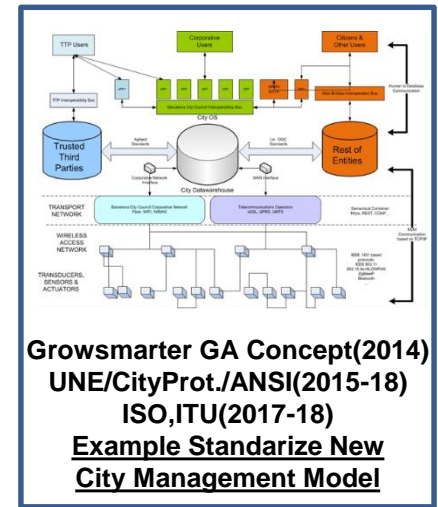


International Telecommunication Union
FG-SSC
ITU-Focus Group on Smart Cities SG20

Y.SC-platform "Platform Interoperability for Smart Cities & Communities"



SSCC-CG
"Smart Cities Coordination Group on Smart and Sustainable Cities and Communities"



We expect participate in 5G as we participated in Y.4000,4100&4200 family Rec



ITU & Hellenic Republic: "Towards 5G Enabled Gigabit Society"

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