- Addressing complexity from
  increased number of contexts and use cases

- Understanding and mitigating key barriers

- In the midst of ecosystem evolution

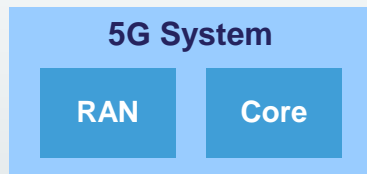# 6G: Richer 5G use cases and more

Several types of networks (example illustration)

Public Network for General purpose

Public Network for Special purpose

Public Network Integrated Non-Public Network

Standalone Non-Public Network

Telecom General Application Services

Smart City

Automotive

Rail

Public Safety

Agriculture

Aquaculture

Event & Arena

Port

Factory

Industry Park

Indoor

Campus

Wide Area (Land & Sea)

6G Radio Networks

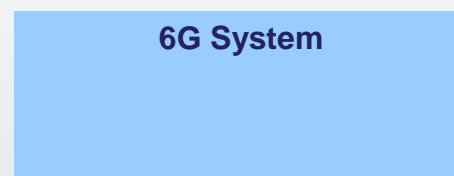**5G System**
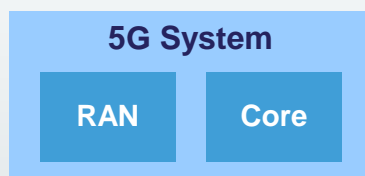
RAN | Core

➡️

RAN

6G Radio Networks for multiple purposes:

- **Access connectivity**
- **Content distribution**
- **Positioning**
- **Integrated Communication and Sensing**
- **Non-Terrestrial Network**

6G System – What services are delivered?

5G System

RAN   Core

6G System

Regarding 6G Architecture. See e.g.
The 6G Architecture Landscape,
5G PPP Architecture Working Group
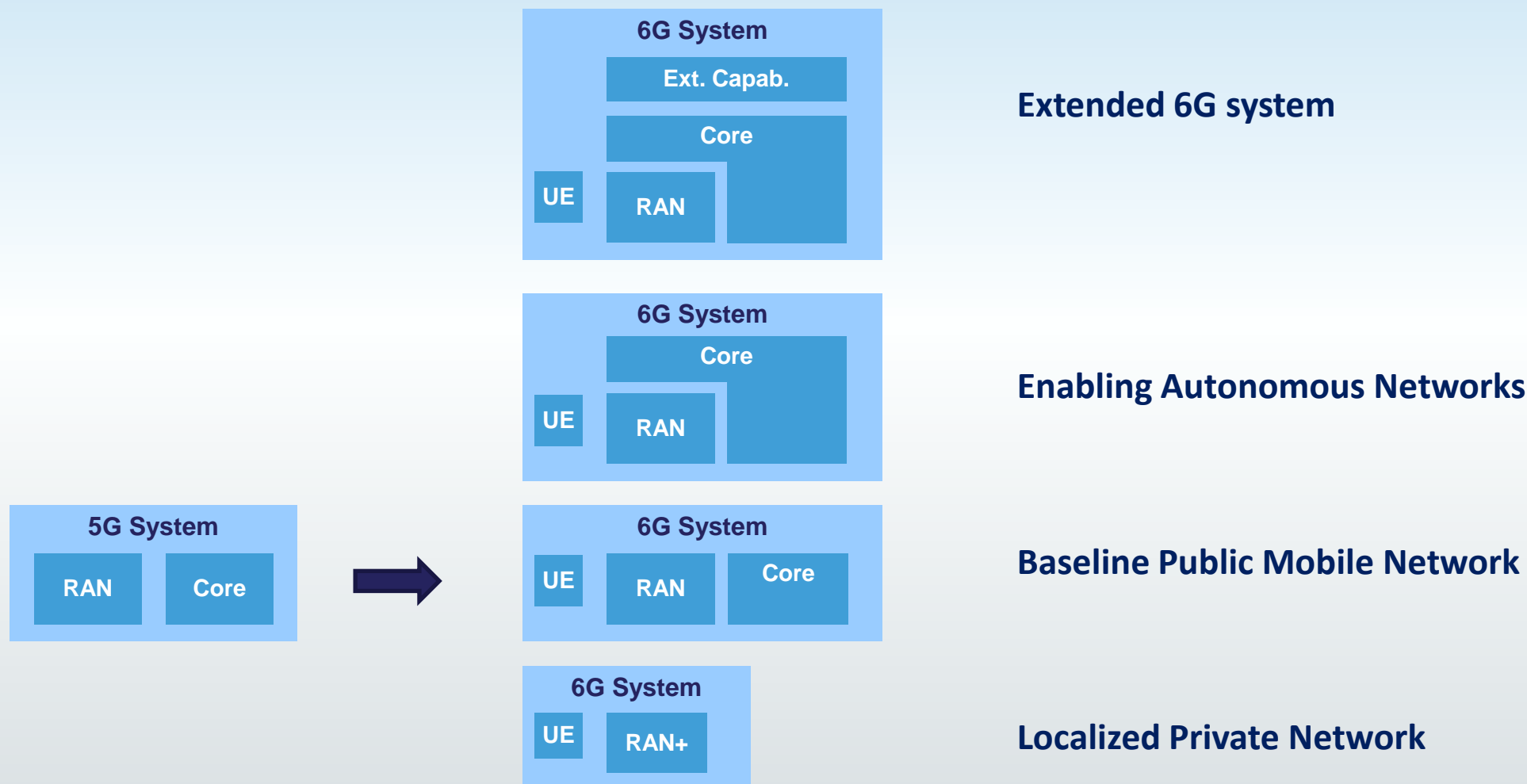**https://5g-ppp.eu/white-papers/**

6G System and Services:
- **Beyond point-2-point connectivity**
- **+ mesh of connections**
- **+ In-Network Compute (INC)**
- **+ Positioning**
- **+ Sensing**

Regarding INC, See e.g.
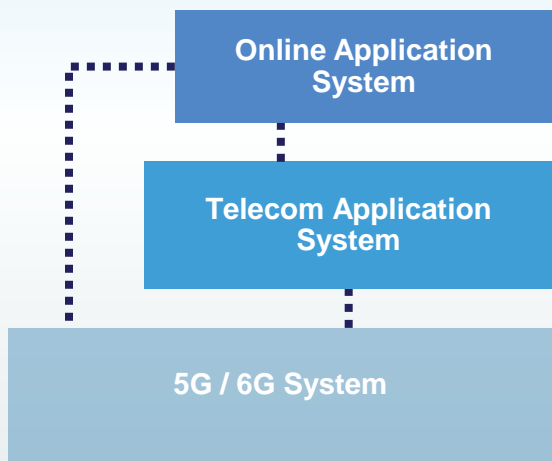**https://datatracker.ietf.org/rg/coinrg/documents/**
Mahmoodi, T. (2023). An Intelligent User Plane to
Support In-Network Computing in 6G Networks. In
IEEE ICC

Towards 6G System Archetypes

6G System – Several variants

6G System

Ext. Capab.

Core

UE

RAN

Extended 6G system

6G System

Core

UE

RAN

Enabling Autonomous Networks

5G System

RAN

Core

6G System

UE

RAN

Core

Baseline Public Mobile Network

6G System

UE

RAN+

Localized Private Network

Enabling new application systems

Enabling new application systems ...

... and services

Online Application Services

Public Telecom Application Services

5G / 6G Services (Network Services)

Sensing and positioning services
Robotics communication services

...
Holographic, AR / VR / XR communication services (education, gaming, remote worker, ...)

...
Telco Voice Service, SMS, ...

Interconnection and interworking

Pending mitigation of barriers

- QoE driven User-Application Interaction
- QoE driven Application-Network Interaction
- Specialized connectivity
- Bootstrapping new business models
- ... and more

Online Application Services

Public Telecom Application Services

Public Telecom Application Services

5G / 6G Services (Network Services)

5G / 6G Basic Services (Network Services)

······· **Interworking**

── **Interconnection**

See e.g.
https://www.understandinglatency.com/
Lønsethagen et.al. (2022): Towards Smart Public Interconnected Networks and Services
– Approaching the Stumbling Blocks. TechRxiv. Preprint. https://doi.org/10.36227/techrxiv.19690570.v2
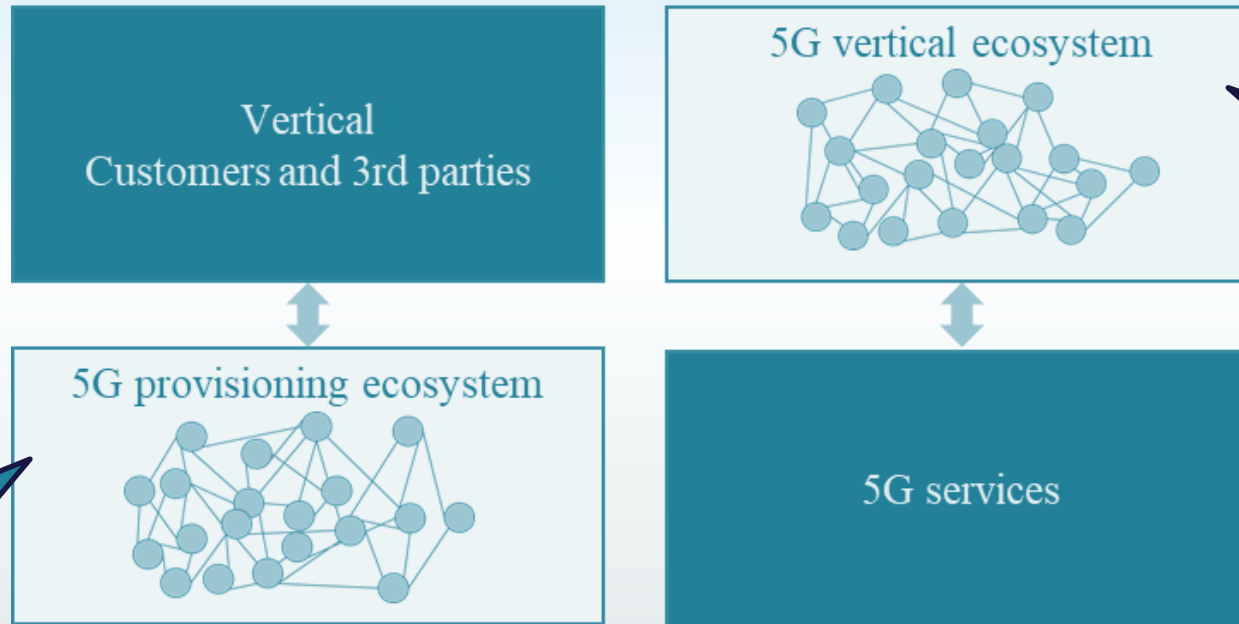**And, https://www.networldeurope.eu/wp-content/uploads/2016/07/NetWorld2020_WP_Service-Level-Awareness_Final_June-16.pdf?x91399**
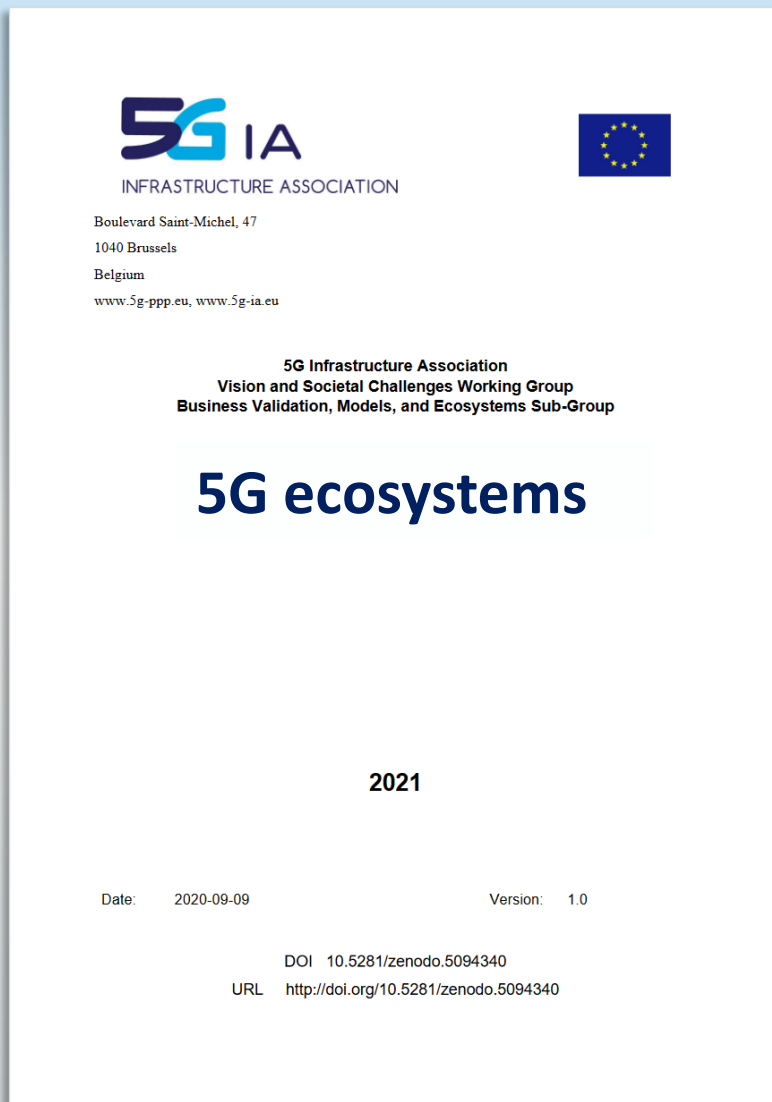
https://5g-ppp.eu/white-papers/
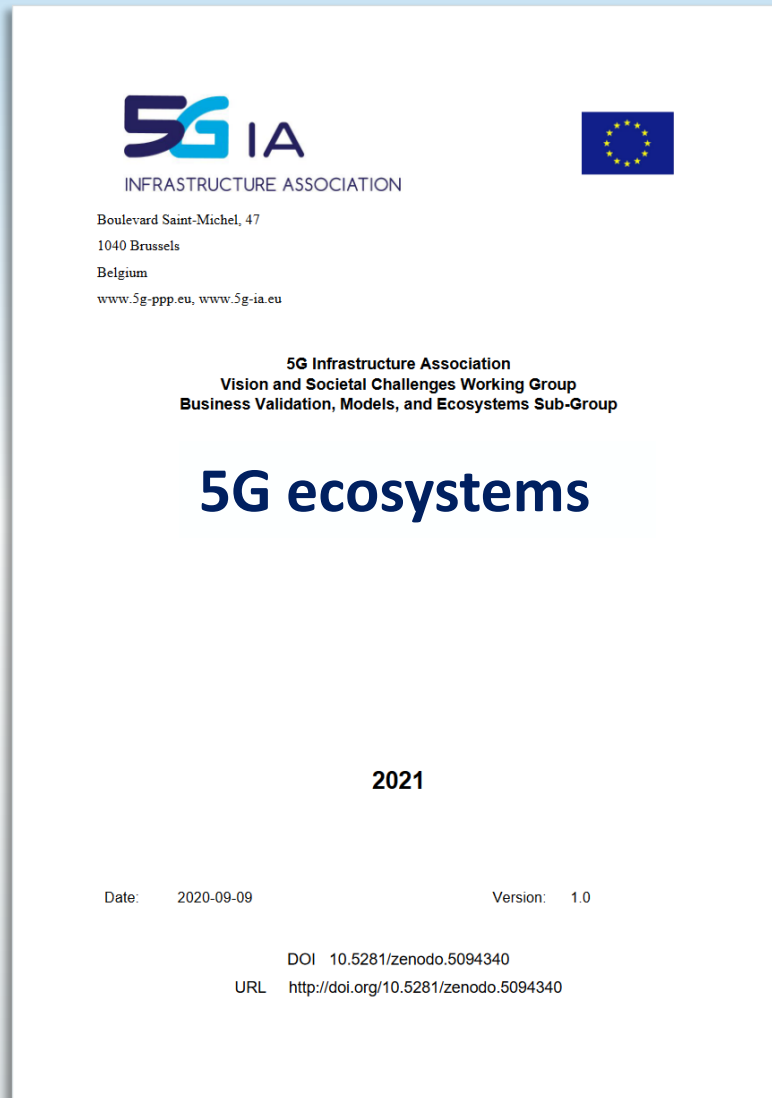
At least two Understandings of a 5G Ecosystem

"those roles and actors who take part in **developing, delivering, and providing** 5G services"

"roles which **apply 5G services in their value creation** and can be domain specific"

6G-IA Whitepaper Work in progress:
5G and Beyond 5G
Ecosystem Business Modelling

6G-IA Whitepaper:
What societal values will 6G address?

https://5g-ppp.eu/white-papers/

Concluding remarks

- Identifying 6G archetypes to address complexity and improve on simplification

- Understanding and mitigating key barriers also for advancing the use of 5G

- 6G-IA & SNS JU play an instrumental role towards a strong and healthy 6G ecosystems

Thank you!