

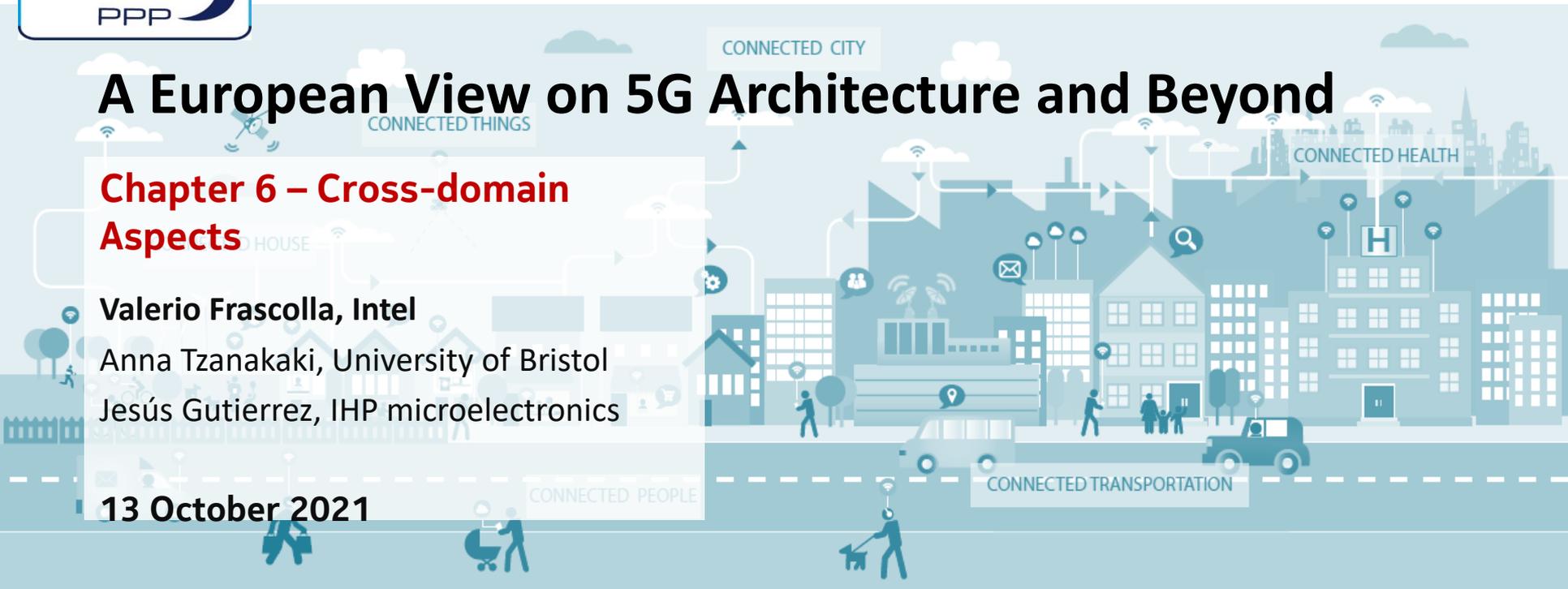


A European View on 5G Architecture and Beyond

Chapter 6 – Cross-domain Aspects

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Outline

- Rationale for Cross-domain aspects
- Orchestration
- Mobility Management
- Service Assurance
- Slice Management
- Decentralized Marketplace

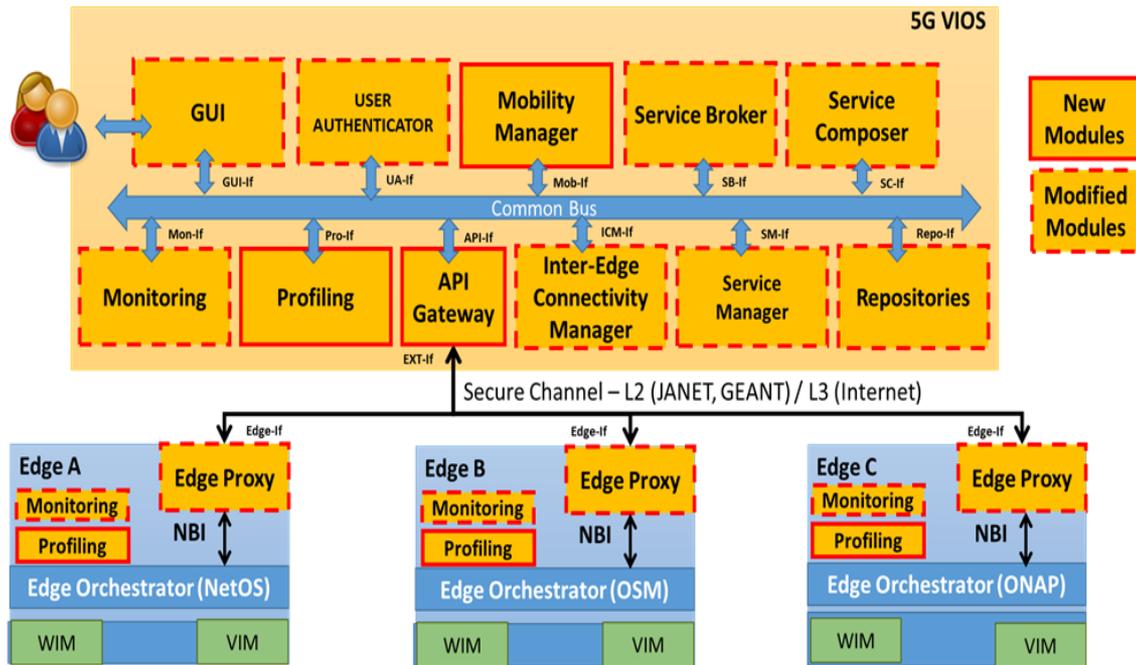
Rationale for Cross-domain aspects



- One challenge that 5G systems face is to deliver end-to-end (E2E) seamless management of services, applications and resources ***across technology domains*** (access, metro, core), as well as ***across administrative domains*** (e.g., countries).
- Another challenge in such cross-domain environments is to ensure E2E QoS considering ***different usage scenarios***, like High-speed mobility, Very densely populated areas, Industrial environments (IIoT).
- ***Open source communities*** (Open Source MANO, Open Baton) and ***standards bodies*** (IETF, ETSI/3GPP) provided ***guidelines***, never the less service-level requirements cannot be met, as ***5G systems still can deliver only best effort QoS***.
- Several ***EC-funded projects of the 5G-PPP family*** have provided promising solutions to tackle the above mentioned challenges, and in what follows ***some of those most interesting approaches*** are discussed.

Orchestration (5G-VICTORI)

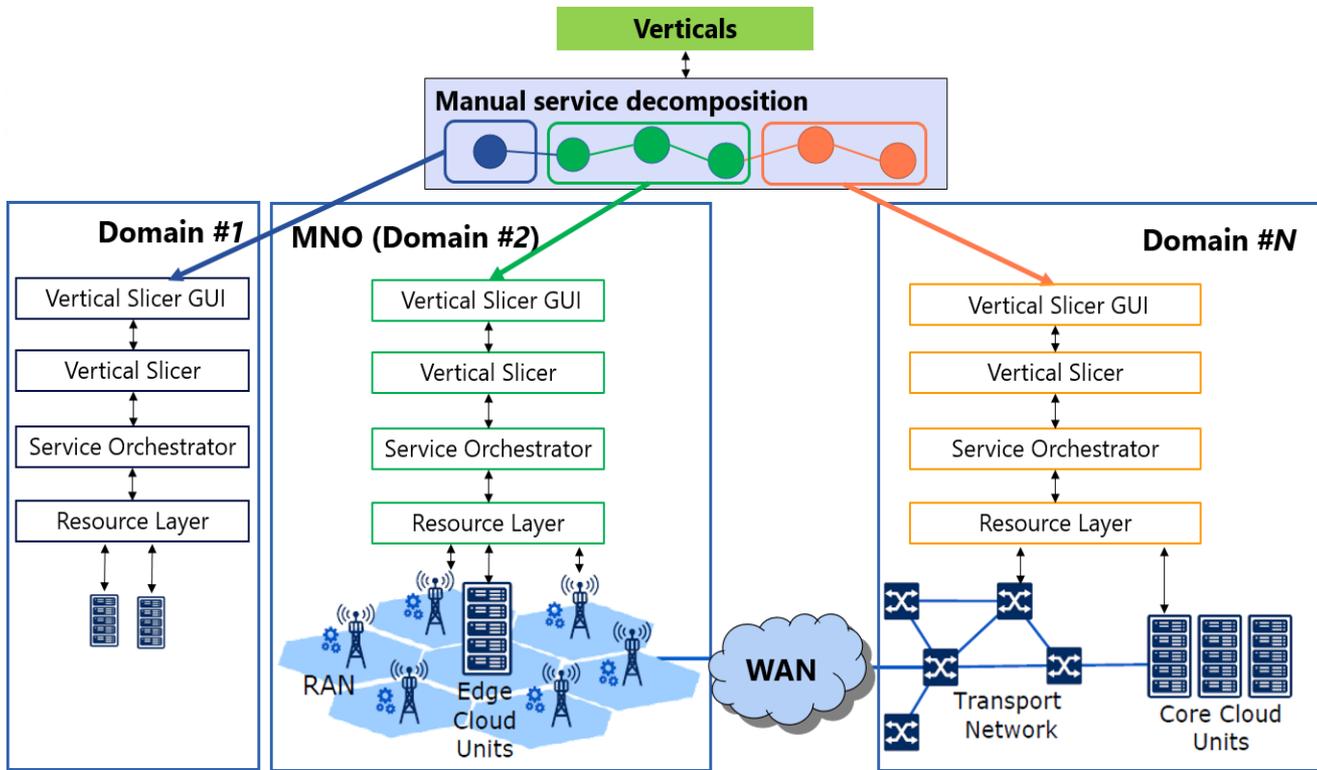
- The **5G-Victori** Infrastructure Operating System (5G-VIOS) can broker Network Services (NSs) across multiple domains, thus allowing Cross-facility Orchestration.



- Other projects have proposed similar but different approaches, for instance **5G-VINNI** and **5GROWTH**.

Inter-domain Management for Vertical Services (5GROWTH)

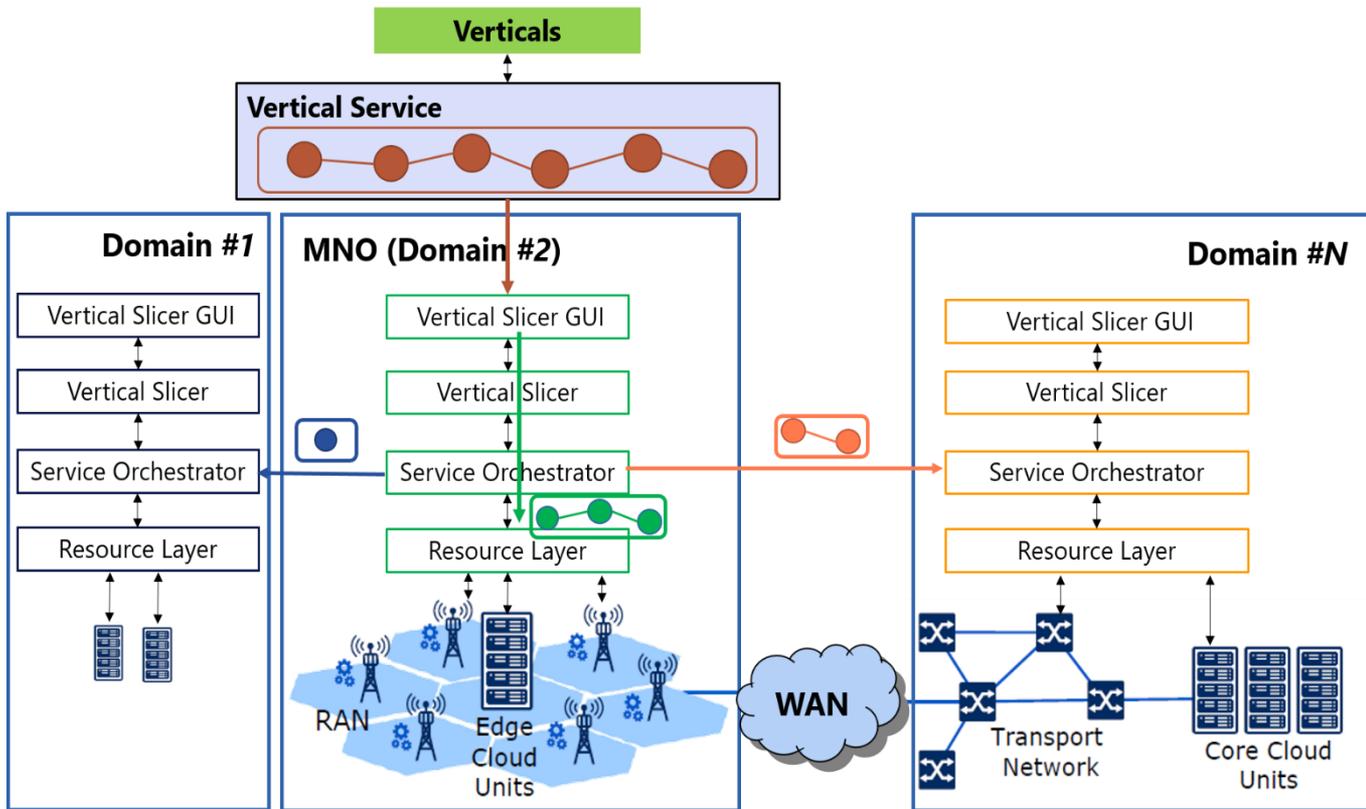
- From Manual Service Decomposition ...



Inter-domain Management for Vertical Services (5GROWTH)



... to Automated Service Decomposition via **Service Orchestrator**

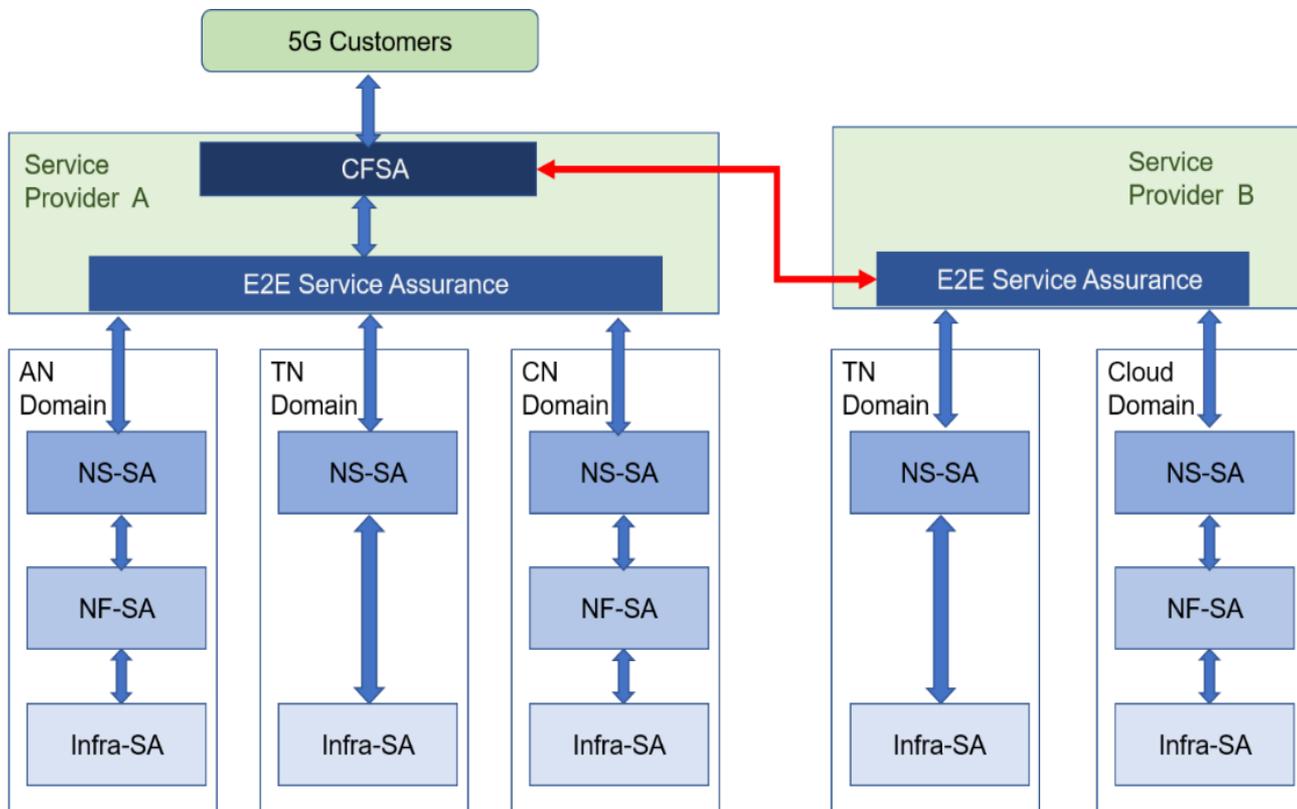


Mobility Management

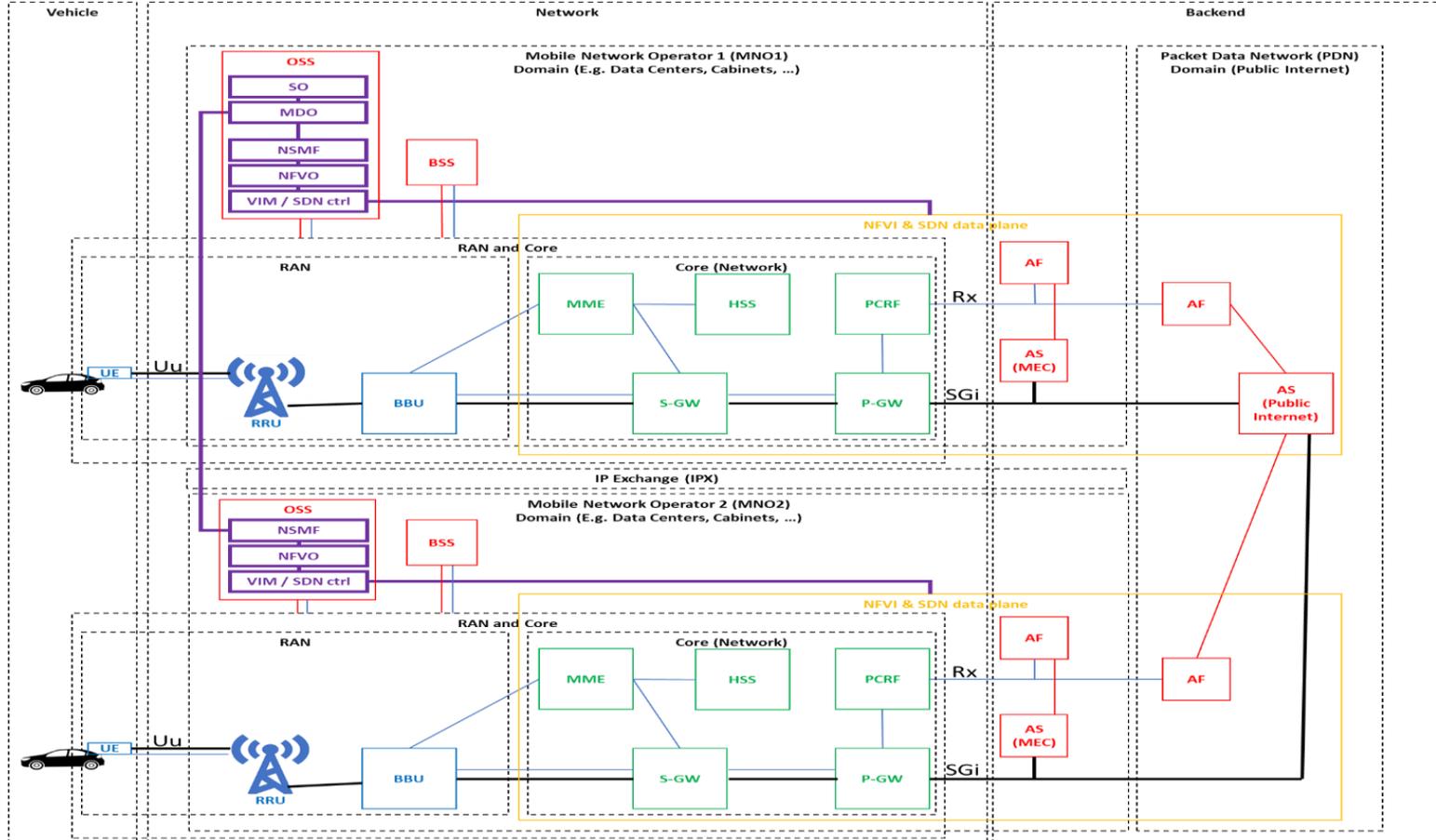
- **Cross-border service and Session continuity**
 - 5G-CARMEN
- **Cross-border Handover (Inter-PLMN Handover)**
 - 5GCroCo
- **Inter-PLMN Roaming Latency**
 - 5GMOBIX
- **Traffic Roaming**
 - 5GMOBIX

Service Assurance (5G-VINNI)

- Key mechanism to guarantee the success of network slicing

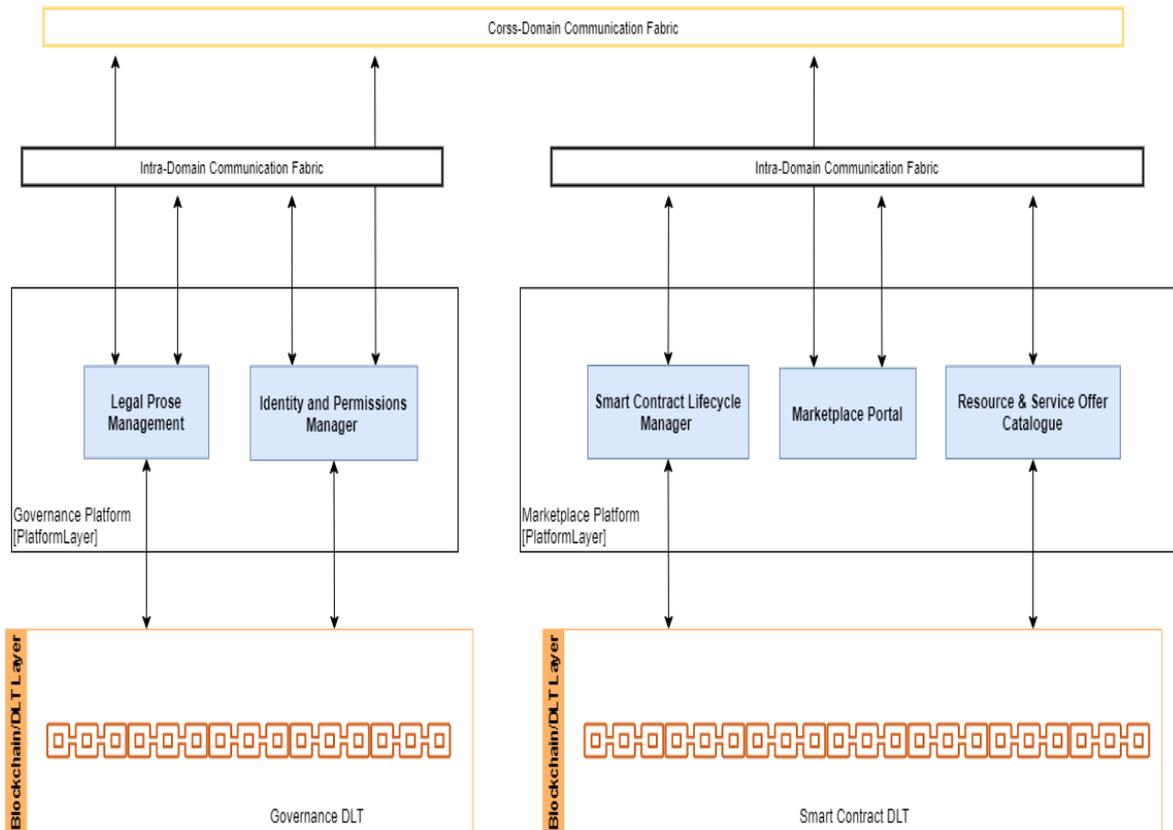


Multi-domain Slice Management (5GCroCo)



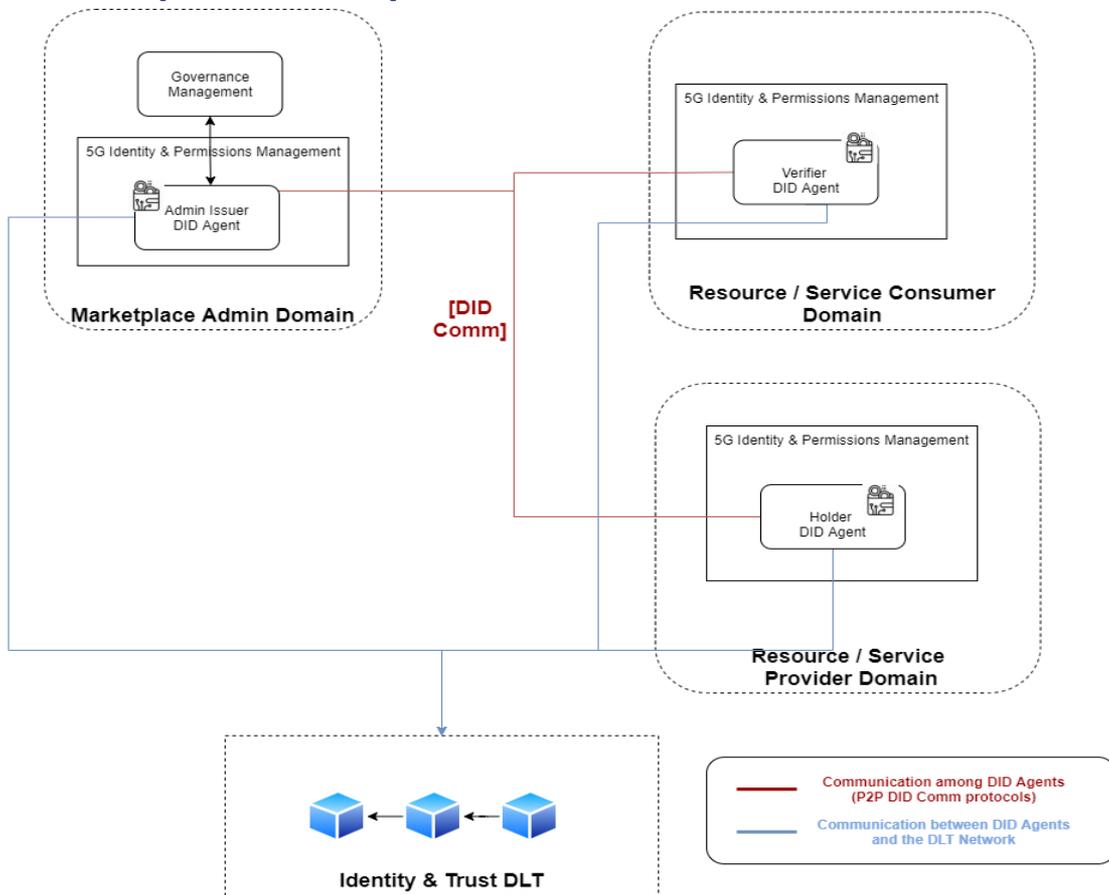
Decentralized Marketplace - Resource/Service Trading (5GZORRO)

- The 5G Marketplace enables the trading of 5G resources and services across different domains by using DLT Smart Contracts



Decentralized Marketplace - Identity & Permissions Management (5GZORRO)

- Key to the realisation of trust across domains is the use of decentralized identity management (DIdM), based on Decentralized Identifiers (DIDs), a novel type of identifiers proposed by W3C.



Conclusion and Outlook



- **Cross-domain aspects are tough to address** in 5G deployments as they imply a multi-fields competence, e.g., regulation & standards, and specific technical know-how.
- **Solutions exist** to properly address the most important hurdles.
- **5G-PPP projects provide significant contributions** in future seamless deployments of 5G system in cross-domains scenarios, both at the architectural and at the service level.
- **Further work and more collaborative research projects are needed to** increase the TRL level of proposed solutions and **make those proposals commercial realities.**





The 5G Infrastructure Public-Private Partnership



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

<https://5g-ppp.eu/wp-content/uploads/2021/11/Architecture-WP-V4.0-final.pdf>