

Testing Infrastructure for the Next Generation of Services and Applications

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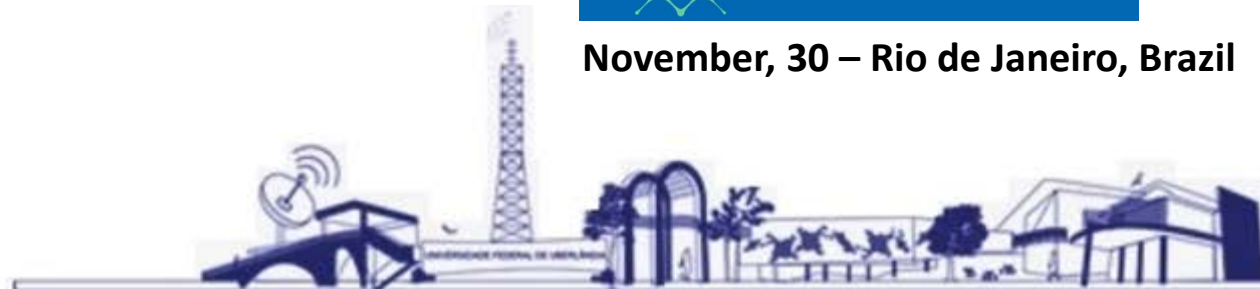
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<https://5ginfire.eu>



November, 30 – Rio de Janeiro, Brazil



- How the next generation of services and applications will be?
 - Based on Converged Technologies
 - Use of different knowledge domains of human and technological skills that enable the society to answer questions and solve problems in an integrated fashion
- Technological pillars
 - FIApps will rely on cyber-physical systems
 - Sensors and Actuators in the field with massive data productions
 - Internet of Things (IoT), Internet of Vehicles (IoV), Tactile Internet
 - Cloud-based back end (analytics, IA, etc.)
 - Cloud-base Edge (analytics, IA, etc.)
 - Distributed over a network



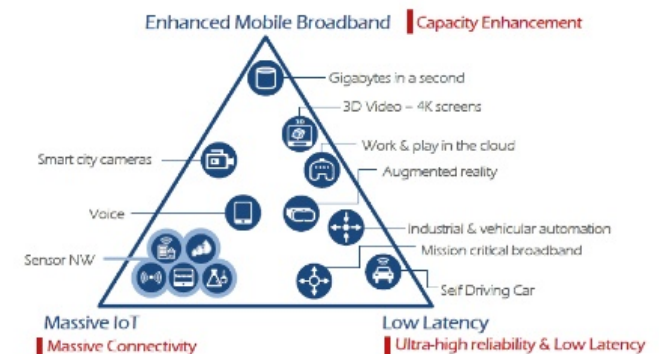
IoT use by FIApps

- IoT is one enabler for a completely new set of services, applications, and business models
- IoT create a fusion between the real and the digital worlds
- Vertical industries have particular needs and require specialized solutions
 - Agriculture, Automotive, Ehealth, Entertainment, Energy, etc.
- Next application will create a fusion between the physical, biological and digital worlds
- How will be the network that will support FIApps?



5G Networks

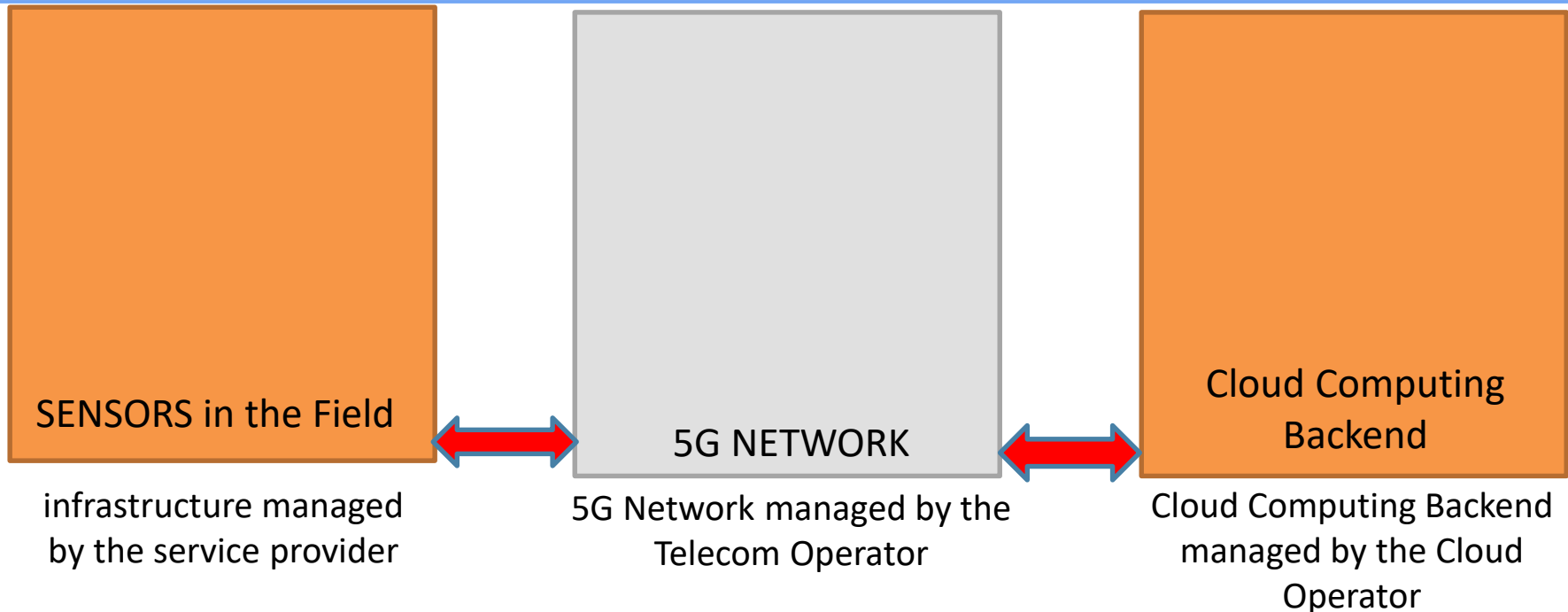
- At this time the world is engaged in the development of the next generation of International Mobile Telecommunications (IMT-2020), a.k.a, 5G
 - Focus to provide a network capable to support specific requirements of different uses cases
 - Not only enhanced Mobile Broadband (eMMB)
 - Ultra-Reliable Low-Latency Communication (URLLC)
 - Massive Machine Type Communication (mMTC)
- Software Defined Networking (SDN), Network Function Virtualization (NFV), Cloud Radio Access Network (C-RAN)



Source: ETRI et al. '16, from ITU RIMT 2020 requirements



A Generic IoT Based System

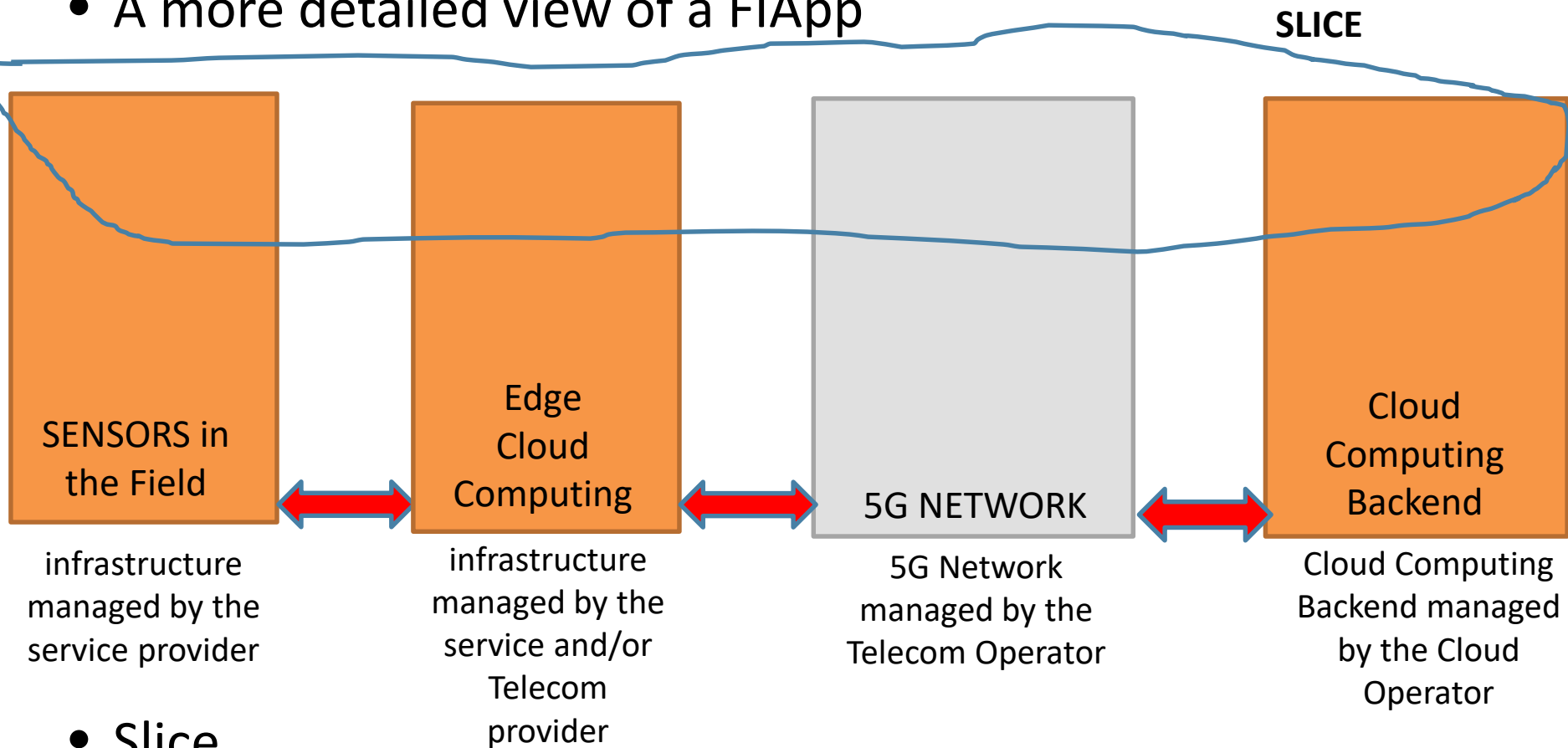


- Can one facility support the end-to-end experimentation of such System?
- The experimentation of such system poses several challenges
- Necessary to create new experimental facilities that are aligned with this vision



A Generic FIApp

- A more detailed view of a FIApp



- **Slice**

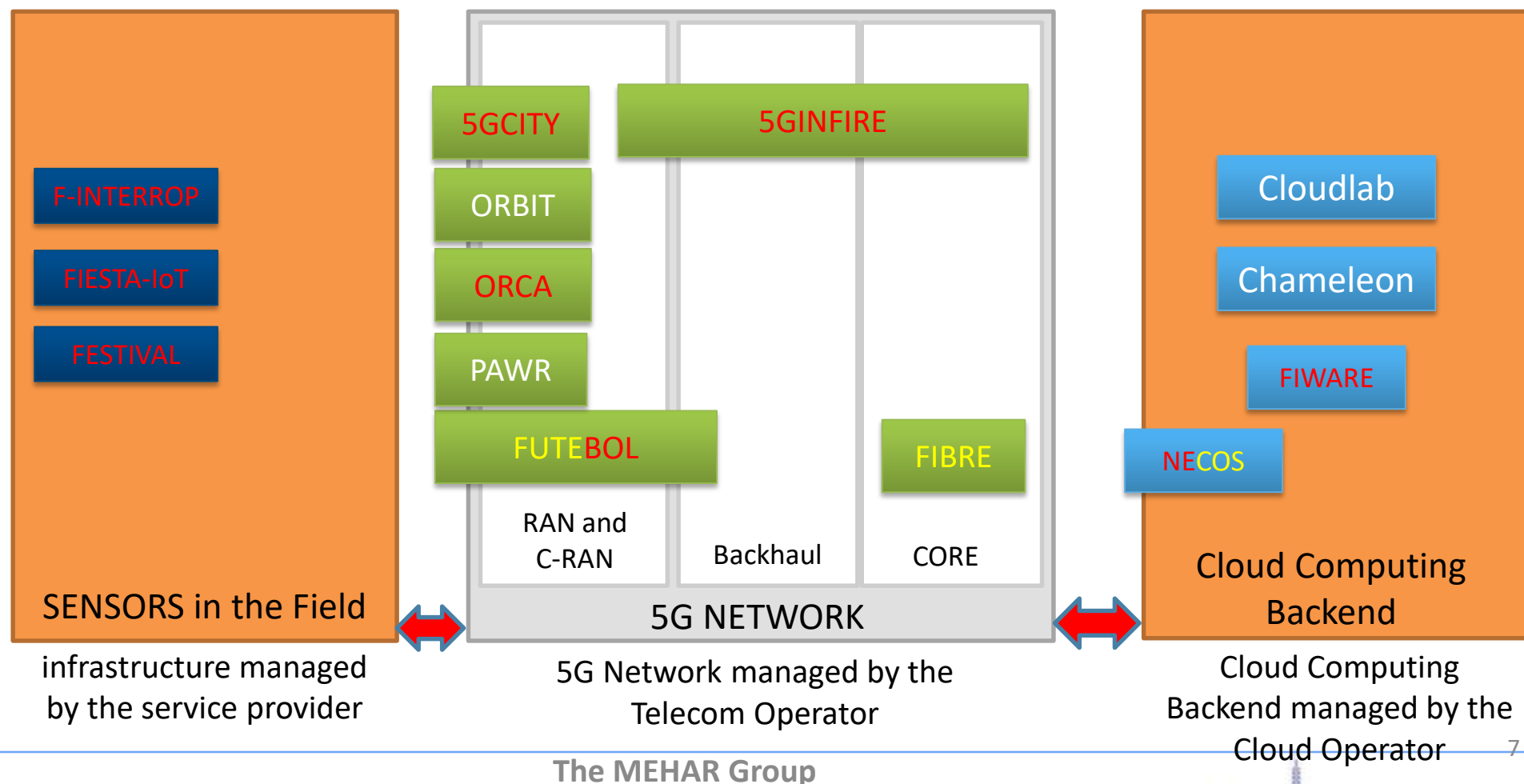
- Fully Programmable and Reconfigurable Slice

- Capable to fulfill applications requirements



A Generic IoT Based System

- Some examples of several efforts on different areas



- Main Goals
 - Aims to establish a 5G NFV-enabled experimental facility in order to instantiate and support vertical industries
 - Create a experimental facility where different actors of the 5G ecosystem (startups, industry, SDOs, operators, academia, research institutes) can experimentally contribute to 5G development and deployment
- Approach
 - The facility contains an open source MANO infrastructure based on industry standards in order to instantiate an NFV based 5G architecture enabling the creation of several network slices according to the requirements of a given vertical.
 - Integrate with FIRE based Testbeds to reuse resources

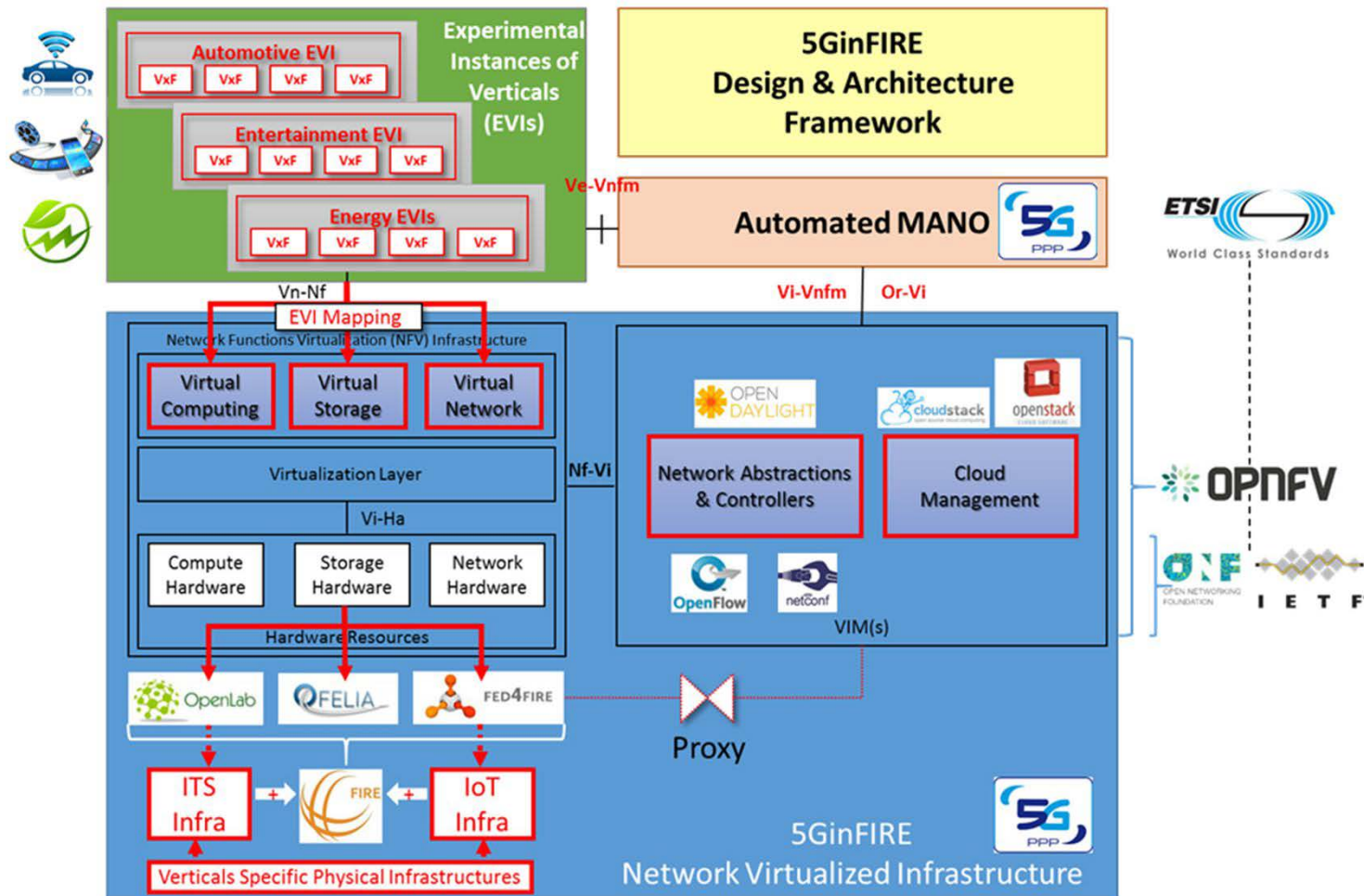


5GinFIRE Consortium

- Eurescom (Germany)
- B-COM (France)
- UNIVBRIS (UK)
- ITAv (Portugal)
- EGM (France)
- UC3M (Spain)
- UoP (Greece)
- TID (Spain)
- UFU (Brazil)
- USP (Brazil)

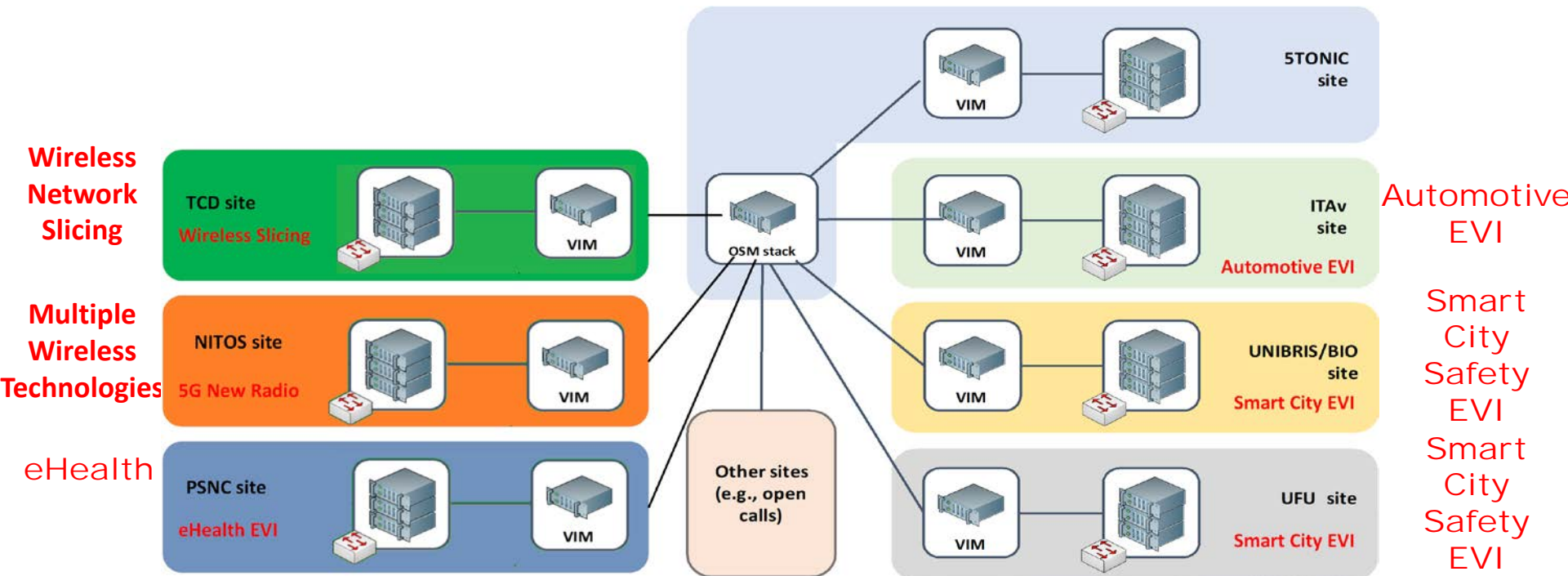


- Experimental Vertical Instances (EVIs)
- Virtual Functions of Verticals (VxF)
- Network Function Virtualization Infrastructure (NFVI)
- FIRE Testbeds
 - [FIESTA IoT](#), NITOS and FUTEBOL



5GINFIRE Platform

- NFV based Platform with support to different verticals



5G Testing

- 5G is under design and it is not ready
- 5GINFIRE is one infrastructure where you can test some aspects of a 5G
 - There are several aspects other aspects and specialized testing infrastructures
- 5GINFIRE focus is NFV in using an open standardized MANO
- 5GINFIRE Testing environment is open to different actors of the 5G ecosystem
 - Startups, industry, SDOs, operators, academia and research institutes
- New
 - VNFs, Services, Architectures



Concluding Remarks

- FIAPPs has hard requirements to infrastructure
 - Vertical industries have specific requirements and use particular solutions
- 5G is oriented to fulfil applications requirements
 - IoT, 5G, Cloud Computing are enabling technologies for a new set of services, applications, and business models
- 5GINFIRE aims to establish a 5G NFV-enabled experimental facility in order to instantiate and support vertical industries
 - Open to startups, industry, SDOs, operators, academia and research institutes
- An entirely new way to develop, test and experiment with this new set of services and applications will impact their life cycle
- There is long road to created an end-to-end fully programmable slices
 - International joint effort (Asia, Africa, Americas, Europe, Oceania)



Thanks for the opportunity

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