6G STANDARDISATION REQUIREMENTS – INT5GENT VIEW

Luis M. Contreras
Telefónica Innovación Digital

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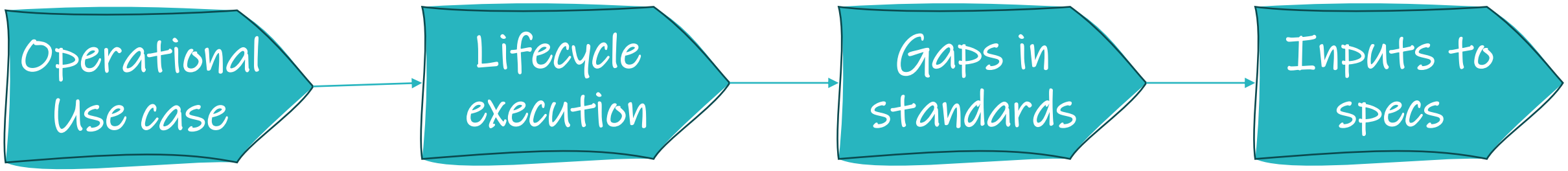
KEY PURPOSE OF STANDARDIZATION

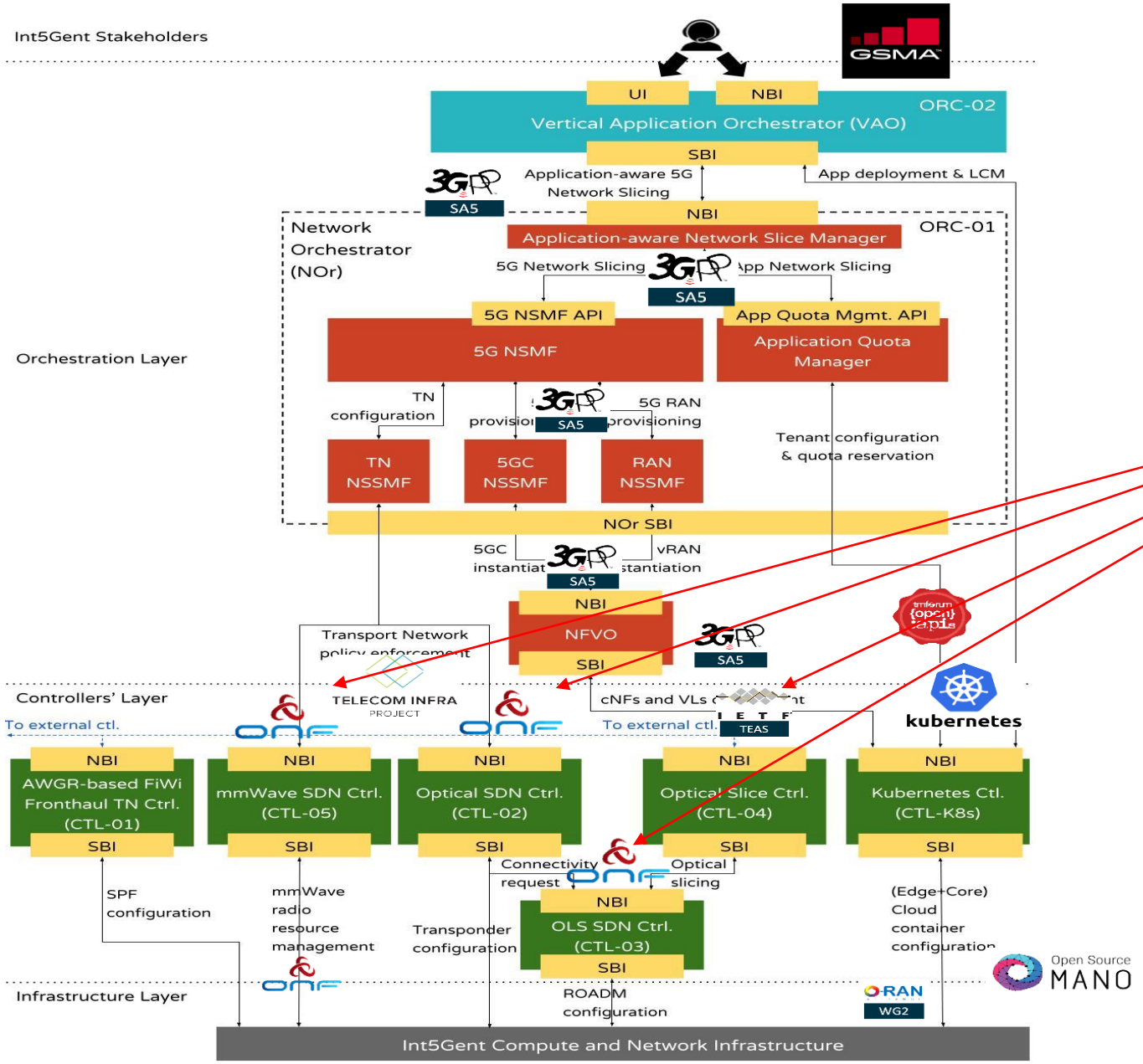
- Facilitate interoperability among different implementations on essential functionality and system behavior
- Ensure feasibility of technical alternative outcomes
- Identify common procedures, and similar inputs and outputs in complex systems
- Allow the coexistence of different implementations conformant to the standard specifications
- Reduce entropy by focusing on well-adopted solutions

INT5GENT APPROACH

- Put emphasis on operational aspects end-to-end, difficult to tackle on typically isolated SDOs
- Exercise the standard propositions against use cases, identifying gaps and potential solutions for providing feedback to SDOs
- Leverage on industry-driven fora to close the loop in terms of product requirements and specifications



ALIGNMENT WITH MAIN STANDARDS

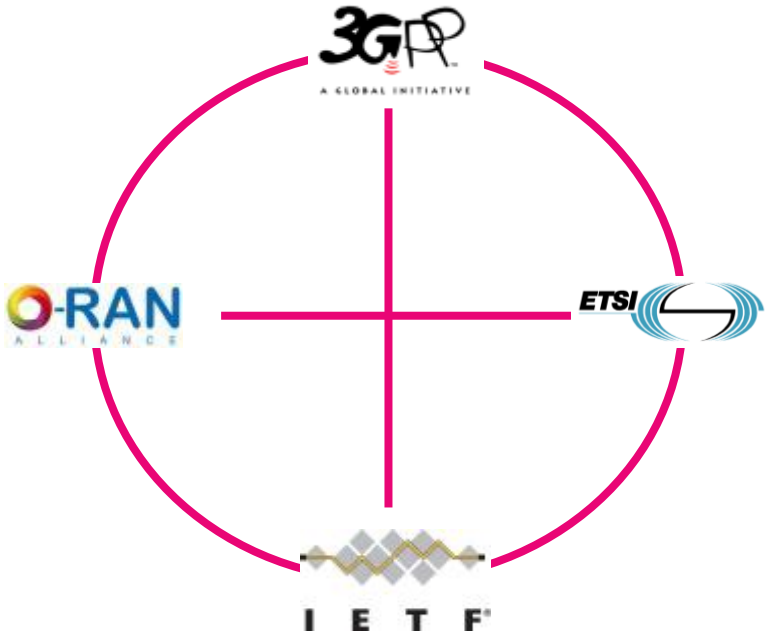


Int5Gent standardization contributions are focused on **IETF Network Slice NBI** and **ONF TAPI**

THE CASE OF SLICING

3rd Generation Partnership Project (3GPP) is a collaboration between groups of telecommunications standards associations, known as the Organizational Partners.
The scope of standardization of 3GPP:
1.Radio Access Network (RAN)
2.Core Network (CN)
3.Terminals (UE)
4.Operations, Administration, Maintenance and Provisioning (OAM&P)
5.Interoperability and Roaming

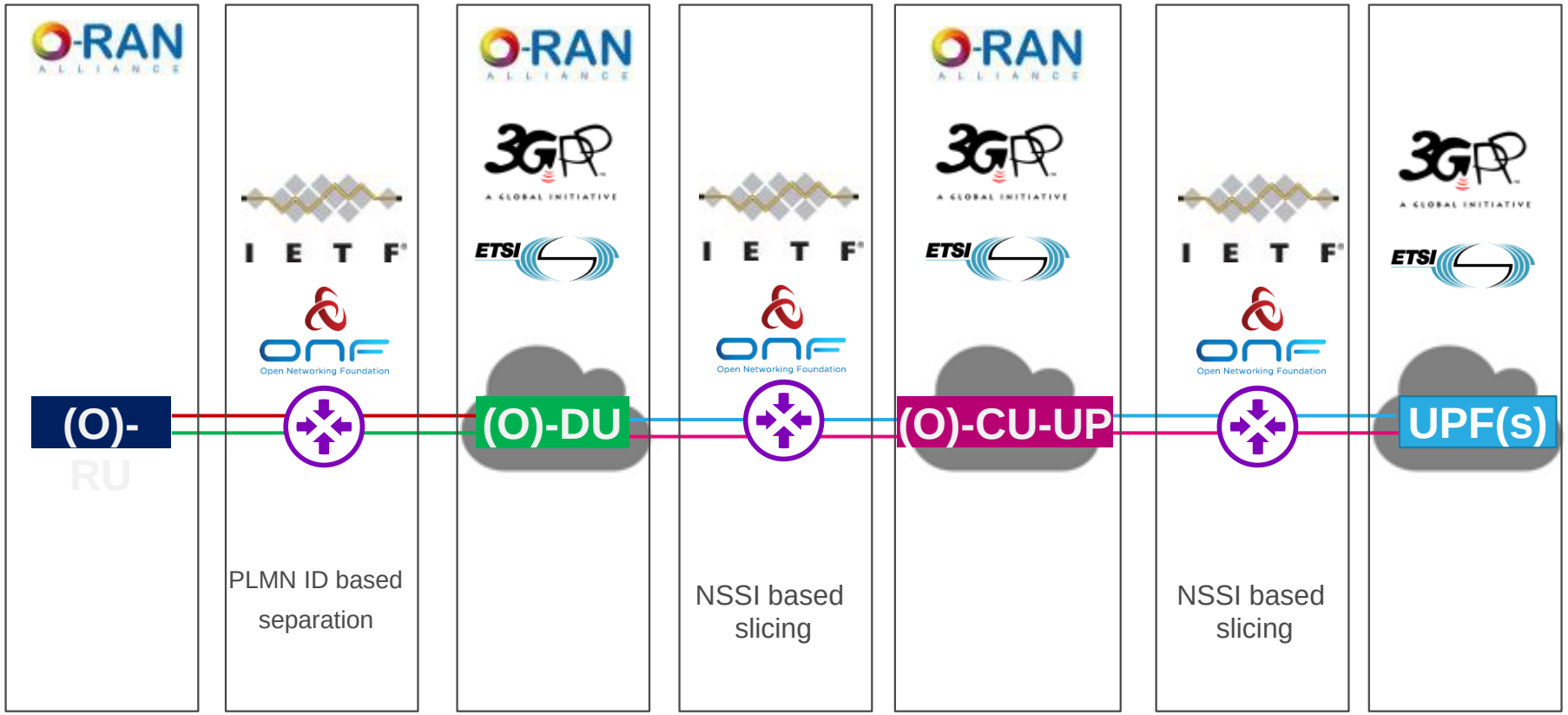
The O-RAN (Open Radio Access Network) Alliance is a group of telecommunications and technology companies that have come together to redefine the architecture of radio access networks (RAN).
The scope of standardization by the O-RAN Alliance:
1.Open Interfaces in RAN elements
2.RAN Intelligent Controller (RIC)
3.Virtualization and White Box Hardware
4.Open Software
5.Interoperability



ETSI ISG on Network Functions Virtualization (NFV) has defined a Management and Orchestration (MANO) framework for the operations and lifecycle management of virtual network functions and network services.
The scope of standardization
1.NFV Orchestrator (NFVO)
2.VNF Manager (VNFM):
3.Virtualized Infrastructure Manager (VIM):
4.Interfaces and information models

The Internet Engineering Task Force (IETF) is an open standards organization, which develops and promotes voluntary Internet standards.
The scope of standardization of the IETF includes:
1.Internet Protocols
2.Internet Architecture
3.Internet Security
4.Transport and Routing
5.Applications and Services
6.Operations and Management
7.Emerging Technologies

MOBILE NETWORK SLICING ARCHITECTURE AND SDOS



STANDARDIZATION CONTRIBUTIONS

SDO	Group	Partner	Int5Gent Related Activity
TIP	CANDI	CTTC TID	Elaboration of TIP /CANDI White Paper on the “Integration with GNPy” Optical PoC.
TIP	MUST/TIP	TID	TAPI 2.1.3 as reference implementation for technical validation and 2024 production in TIP. TAPI 2.5 as target implementation for 2025.
ONF/Linux Foundation	OTCC/T-API	CTTC TID	Definition of photonic media extensions and use cases. Editor of TAPI TR-547 Reference Implementation Agreement. Elaboration of Use Cases for the (constrained) provisioning of services, OAM and Notifications. Contributor to TAPI TR-548 on Streaming Initial discussions on TAPI extensions in support of GNpy TAPI standardization is moved from ONF to Linux Foundation.
IETF	TEAS	TID	Connecting 3GPP slices through IETF Network Slice services. working on translation and adaptation mechanisms between 3GPP and IETF (Int5Gent ack: IETF Network Slice Application in 3GPP 5G End-to-End Network Slice). Document adopted by TEAS WG, last version here: https://www.ietf.org/archive/id/draft-ietf-teas-5g-network-slice-application-02.txt. The document will progress in the TEAS WG, with expectation of becoming informational RFC.
ETSI	TFS	TID	Topology modules used in the transport slice controller are implemented with ETSI TFS opensource group.
3GPP	TN	TID	Telefonica and other companies requested a “Change Request” in 3GPP to improve Transport Network (TN) integration. This CR was finally adopted in 3GPP TS-28.541, Clause 6.3.41, as ConnectionPointInfo attribute. Applicable to Rel. 18.
ORAN	XHAUL	TID	Participating on the E2E ORAN definition (Xhaul Packet Switched Architectures and Solutions 5.0, Management interfaces for Transport Network Elements 6.0). Contributions on slicing topic for the lates version of the document to be released in March 2024 (new informational Annex).

SUMMARY

- Standardization is key for rapid progress and adoption of technology advancements
- Natural fragmentation in standardization activities requires joint work and experimentation to fill the gaps
- Industrial fora can speed up adoption by fast transfer of requirements to the industry
- Standard specifications permit different implementations to coexist and enrich the market
- A comprehensive approach, as in Int5Gent, can facilitate the overall cycle from technical inception up to production

BACKUP

IETF CONTRIBUTIONS

What	Why	Int5Gent contribution	References
IETF Network Slices	3GPP does not specify slicing capabilities in the Transport Network. In order to cover such gap, IETF is working on the definition of what is called IETF Network Slices, that essentially describes how to request and realized network slices requested by 3GPP systems with IETF-based technologies.	Connecting 3GPP slices through IETF Network Slice services. Mapping process between 3GPP and IETF network slices	IETF TEAS GROUP draft-contreras-teas-3gpp-ietf-slice-mapping draft-wd-teas-ietf-network-slice-nbi-yang draft-ietf-teas-ietf-network-slices-08 draft-ietf-teas-5g-network-slice-application-02.

ONF CONTRBUTIONS

What	Why	Int5Gent contribution	References
ONF TAPI	i)The adoption of ONF T-API as NBI for Optical SDN Controller and OLS SDN Controller ii) the increasing relevance that such interface adopted by key major projects such as Telecom Infra Project and iii) the continuous presence CTTC and TID personnel in the group that performs TAPI standardization.	Framework for the usage of **TAPI v2.1.3** to become the basis for **interoperability** events. Use cases that address **operators' requirements** (e.g topology discovery ,DSR and photonic media provisioning and path computation. The **refinement of data models** to better support such use cases	ONF Technical Report (TR-547) https://opennetworking.org/wp-content/uploads/2021/12/TR-547-TAPI_ReferenceImplementationAgreement_v1.1.pdf Reference Implementation Agreement TR-548 https://opennetworking.org/wp-content/uploads/2021/12/TR-548-TAPI_ReferenceImplementationAgreement-Streaming_v1.1.pdf