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On the Operation of Non-Public Networks (NPNs)

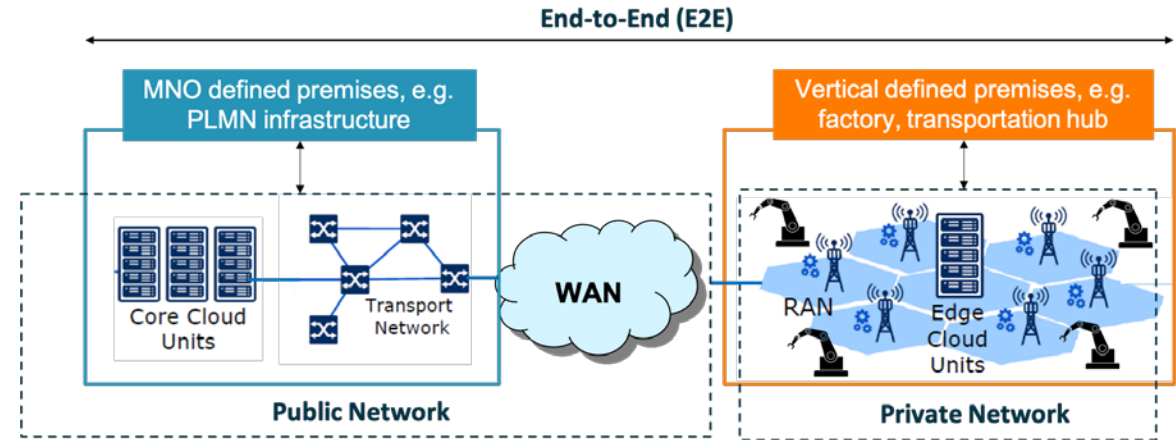
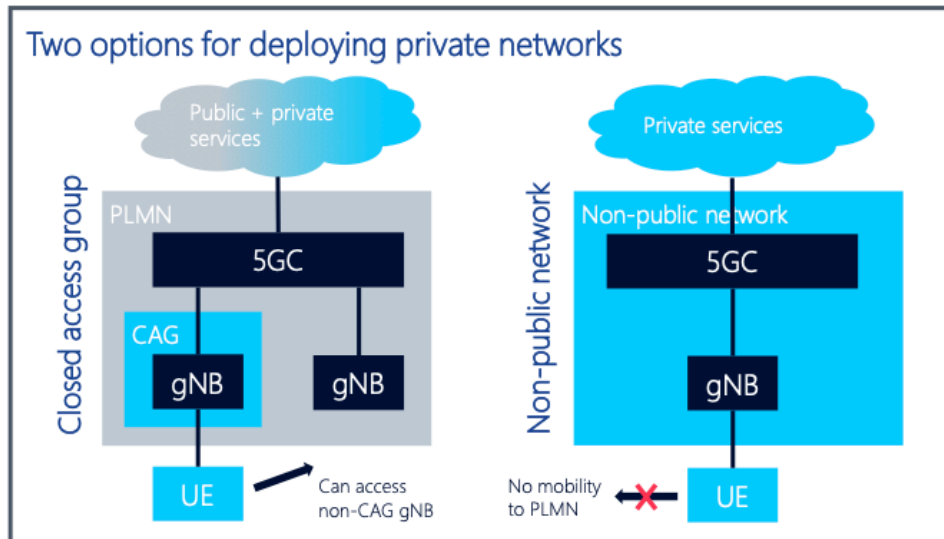
The operator's perspective

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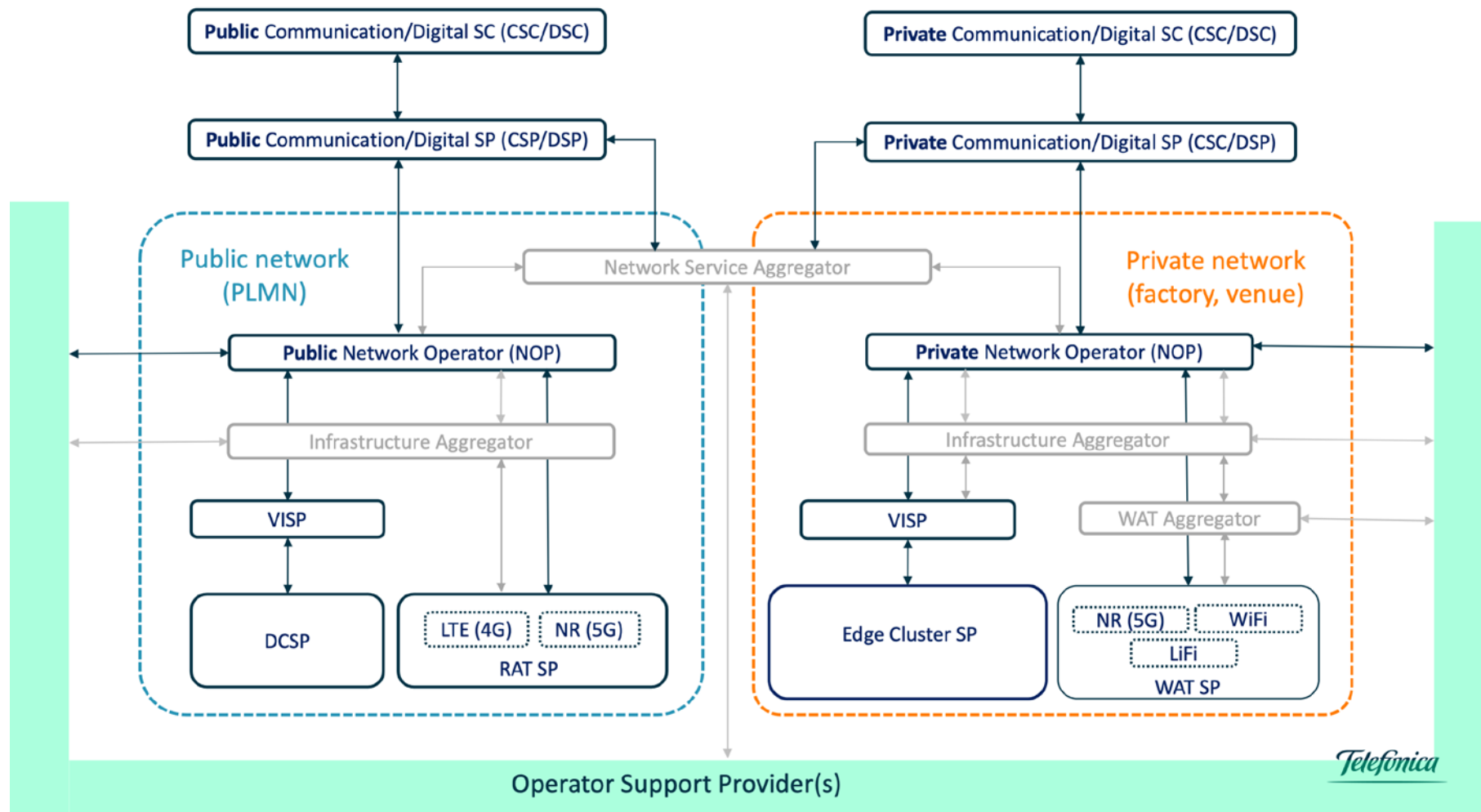
The (non-too-distant) future: public-private networks

- Vertical use cases may involve the combination of public and private networks
 - Public Network Integrated NPN (PNI-NPN)
 - Leveraging network slicing and Closed Access Group (CAG).

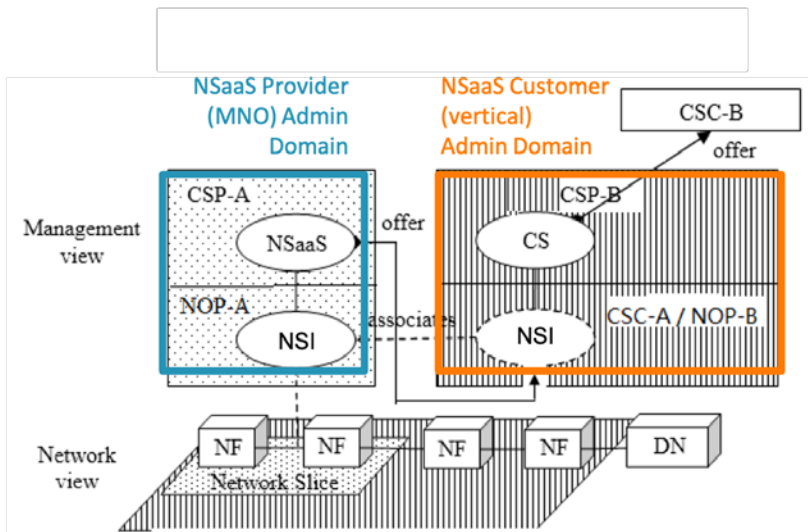


- Network Slicing allows for PNI-NPN provisioning
 - PNI-NPN is a PLMN defined slice for private use.
 - UEs configured with (PLMN ID, S-NSSAI)
- CAG allows for PNI-NPN access control at cell level
 - Slices are set on a per Tracking Area (TA) basis
 - Slicing does not prevent UEs from selecting and accessing specific cells within a TA.

Roles for NPN management

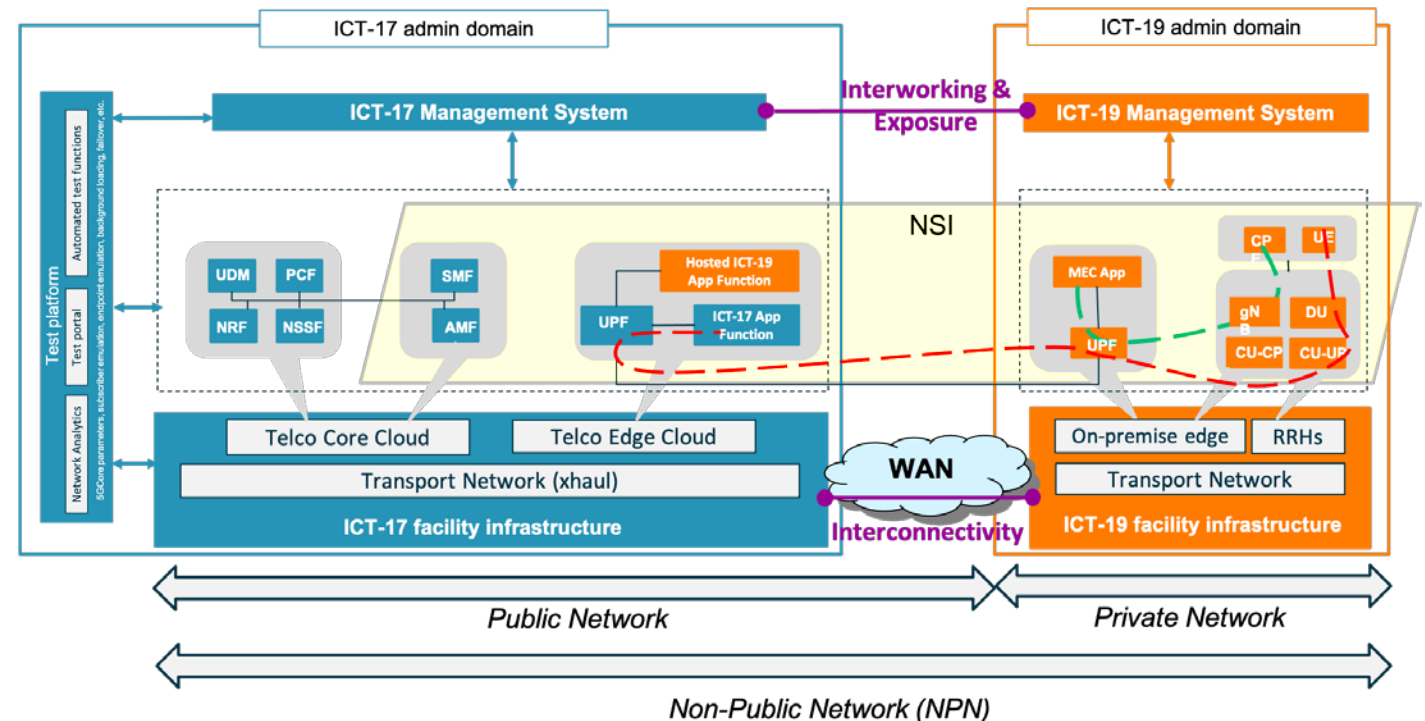


Network slicing for PNI-NPN provisioning

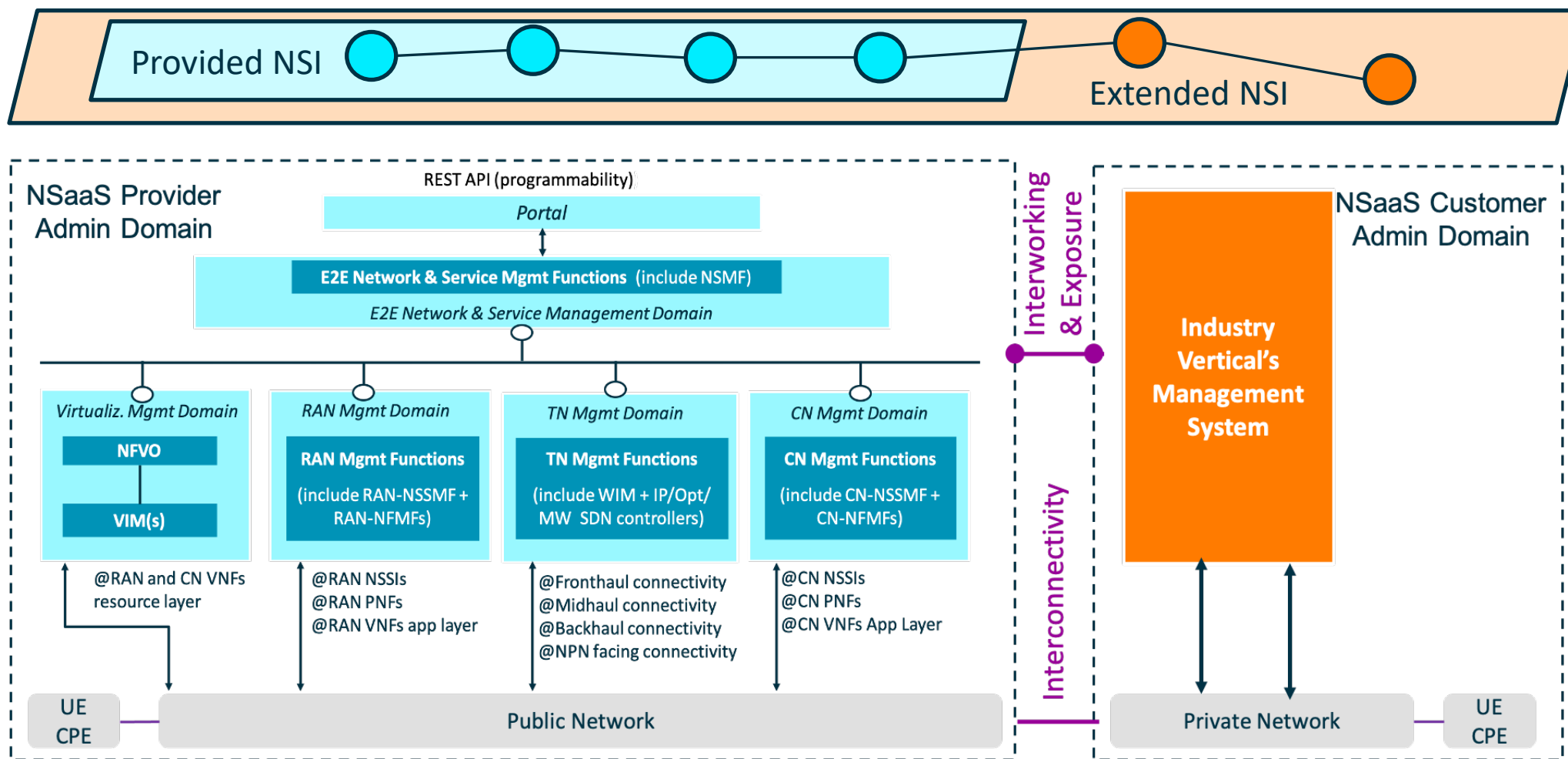


- Network Slice-as-a-Service (NSaaS) as a future-proof service delivery model
 - Provided by the MNO
 - VxFs suitable to be hosted by the MNO
 - Allowing management capability exposure to industry verticals

- Experimenting with 5G-PPP
 - ICT-17 as public NOP
 - ICT-19 as private NOP
- Network service aggregator role allowing for NSaaS



An operational outlook into NSaaS

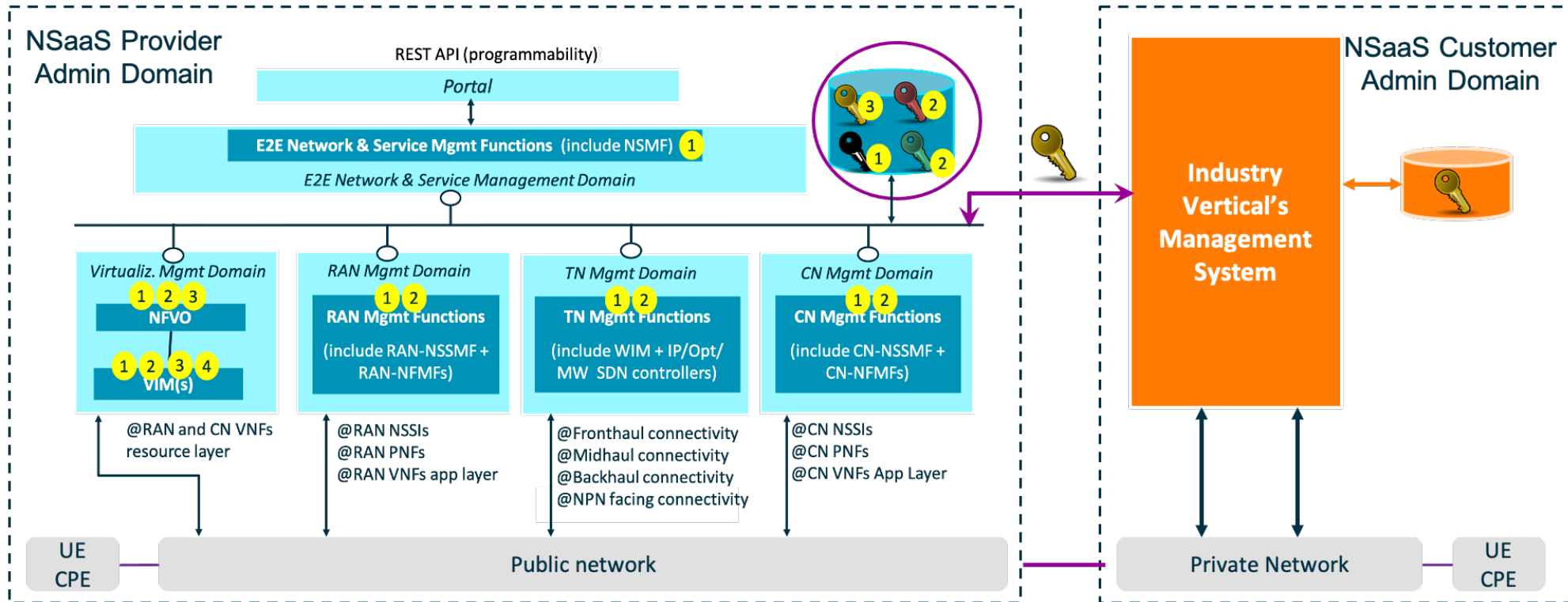


The guist of NSaaS: management capability exposure

- In NSaaS scenarios, different industry verticals may want to take a more or less proactive role in the operation of their slices
- Exposure levels -> levels of control the vertical can take over the provided slice
 - The deeper the level, the more control the vertical retains
 - In-built data aggregation and non-repudiation capabilities for the verification of SLA fulfilment

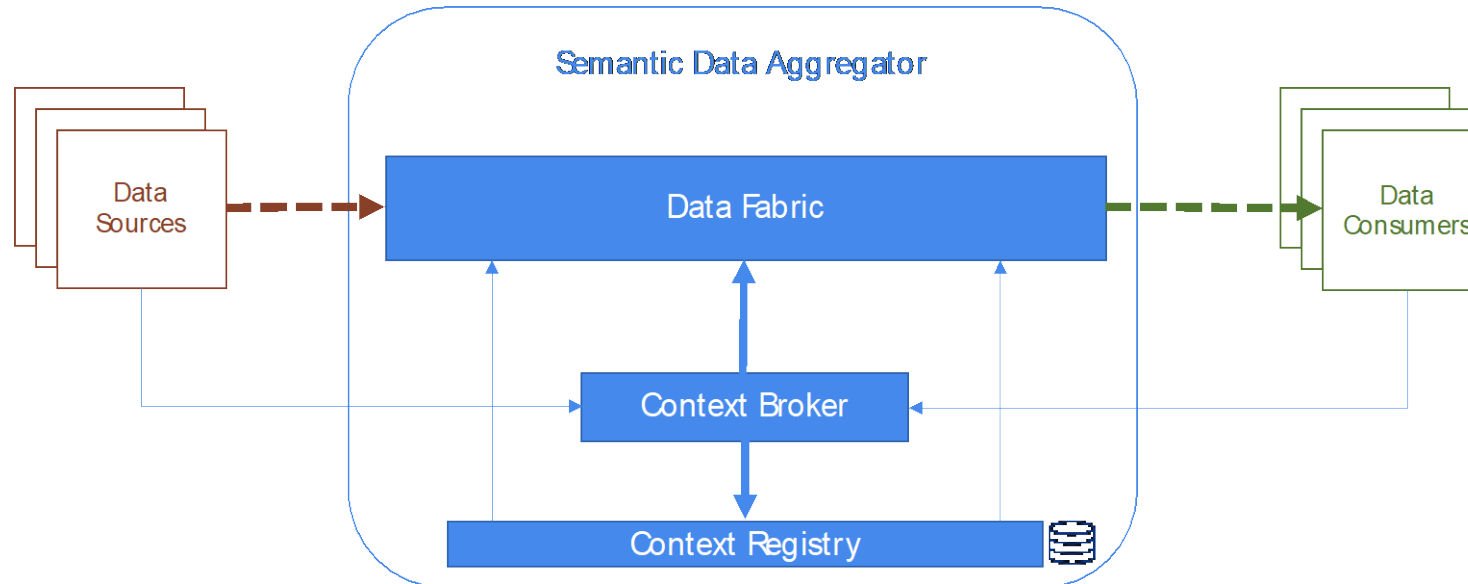
Vertical is able to consume operations related to...	Level 1	Level 2	Level 3	Level 4
E2E network slice <u>application layer</u> config & management	✓	✓	✓	✓
Network slice subnet (and NF) <u>application layer</u> config & management -> 3GPP scope for RAN and CN, IETF scope for TN.	✗	✓	✓	✓
Network slice subnet (and NF) <u>virtualized resource layer</u> config & management -> ETSI NFV network service (and VNF) orchestration	✗	✗	✓	✓
Resource control and management at the <u>virtual infrastructure layer</u> -> NFVI with optional EPA capabilities and infrastructural SDN control	✗	✗	✗	✓

The guist of NSaaS: management capability exposure



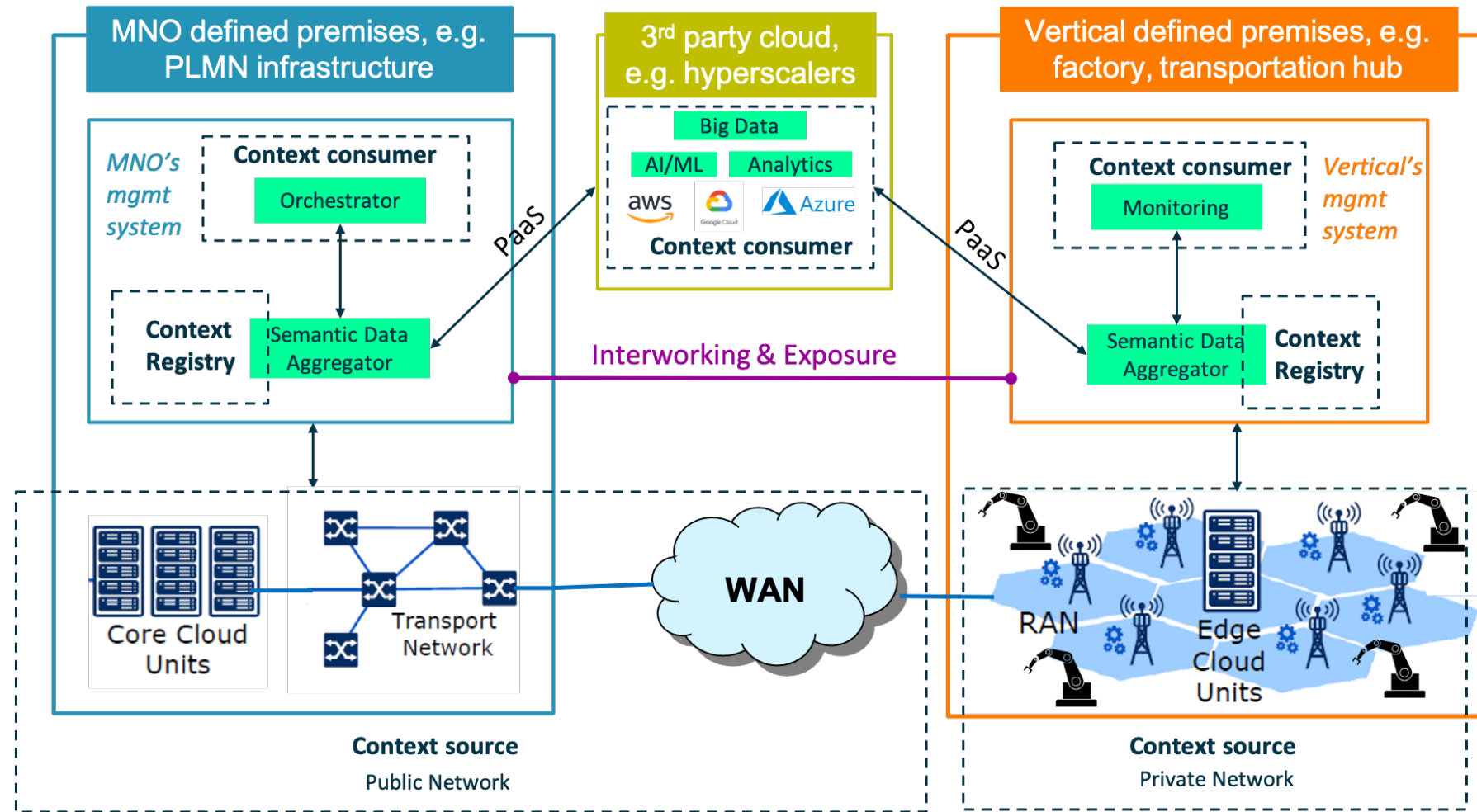
- Token-based authentication
 - To enforce selected exposure levels.
- Non-repudiation on request-response exchanges
 - Allowing for auditability – and further applications enabled by it

Data aggregation – and the “Context Game”



- Combine data flows
 - Not just data, but also metadata
- Model-based
 - Sources and consumers
 - Integrated with descriptors
- A semantic metadata framework for telemetry data
 - Founded on the current results in data model space
 - A fabric for data collection, processing and dispatching
 - Leveraging Context Information Management (CIM)

Data aggregation – applicability in NPN scenarios



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