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MATILDA: A VALUE PROPOSITION TO TELECOM SERVICE OPERATORS FOR THE DEPLOYMENT OF 5G-READY APPLICATIONS AND NETWORK SERVICES

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MATILDA AT A GLANCE

MATILDA

- Period: 1st May 2018 - 30th October 2020
- Coordinator: CNIT - Consorzio Nazionale Interuniversitario per le Telecomunicazioni
- Partners: 18
- Universities & Research Centers (5x)
- Industry Partners (11x)
- Mobile Network Operators (2x)

DEFINITION OF THE PROBLEM

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A 5G-ready application is **a distributed-by-nature application** consisting of **cloud native components** that rely on **a service mesh** as a means of **network abstraction.**

- **The 5G-ready apps' Cloud-native components:**
  - ❑ Expose their **initial deployment & runtime configuration parameters, chainable interfaces** (to cloud-native components for the creation of a service graph), and **quantitative metrics** wrt required QoS.
  - ❑ Are **stateless** in order to be **horizontally and vertically scalable.**
  - ❑ Are **agnostic to physical storage, network and general purpose resources.**
- 5G-ready apps **present several challenges wrt to the network layer and their orchestration**, to be addressed by **service meshes.**
- **Currently, there is no standard framework to abstract the network and compute resource requirements of cloud native components in common.**

GOAL OF MATILDA

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- MATILDA aims to provide a **next-generation design, development and operational environment** for **5G-ready applications addressing the afore-mentioned challenges.**

MATILDA Innovation Aspects

- Based on the 5G-ready application definition, will deliver **normative** models for **expressing deployment and execution requirements** for Service Meshes.
- Based on the models, will offer sophisticated mechanisms to infer and manage the **best possible Slice** based on the requirements of the Vertical App.
- Will provide an **interplay** between Vertical Orchestrator and Telco Provider's orchestration mechanisms.
- Will combine **NFV and Edge resource management** in order to facilitate the operation of Service Meshes.

MATILDA UNDERLYING 5G INFRASTRUCTURE

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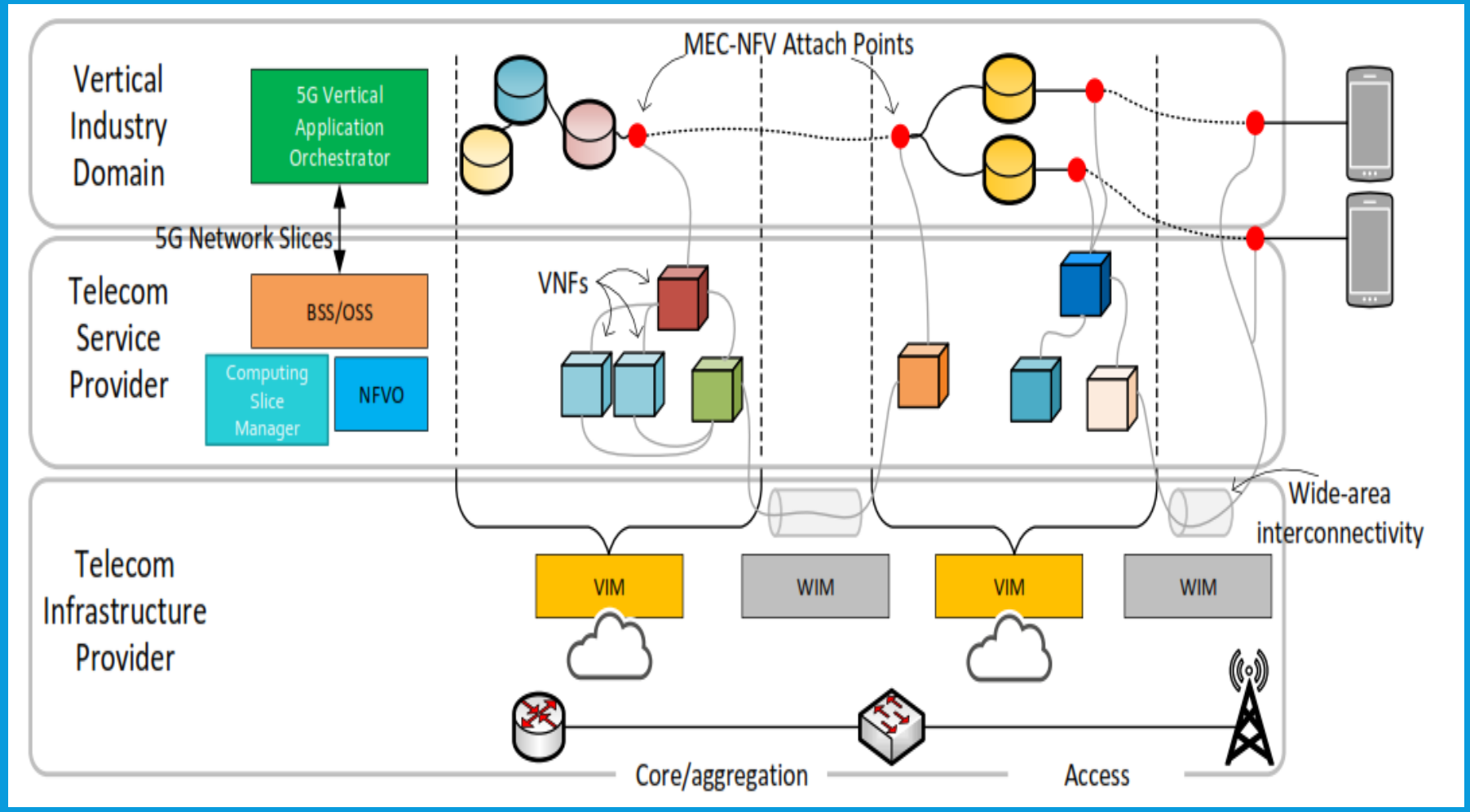
- MATILDA considers an underlying 5G infrastructure comprising distributed network and compute resources.



MATILDA CONCEPTS & WORKFLOW

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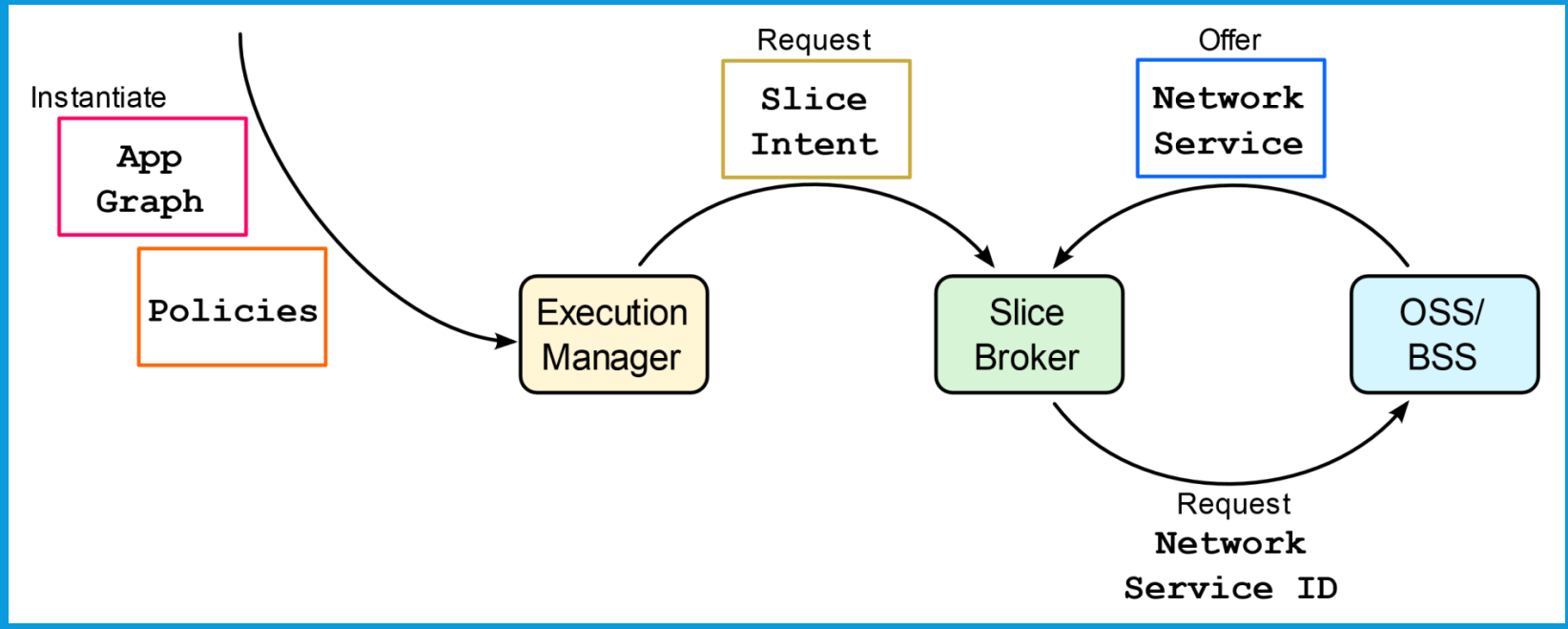
- **Application Graph:** chain of app components
- **Service Mesh:** dedicated infra layer for handling service-to-service communication
- **Slice Intent:** structure defining network reqs for each communication interface
- **Network Service:** provisioning of a communication channel with specific QoS & auxillary services between two end points
- **VNF/PNF**
- **VNF-Forward Graph:** chain of VNFs enabling Layer 2… 4 network service functions



MATILDA EXTENDED VALUE CHAIN

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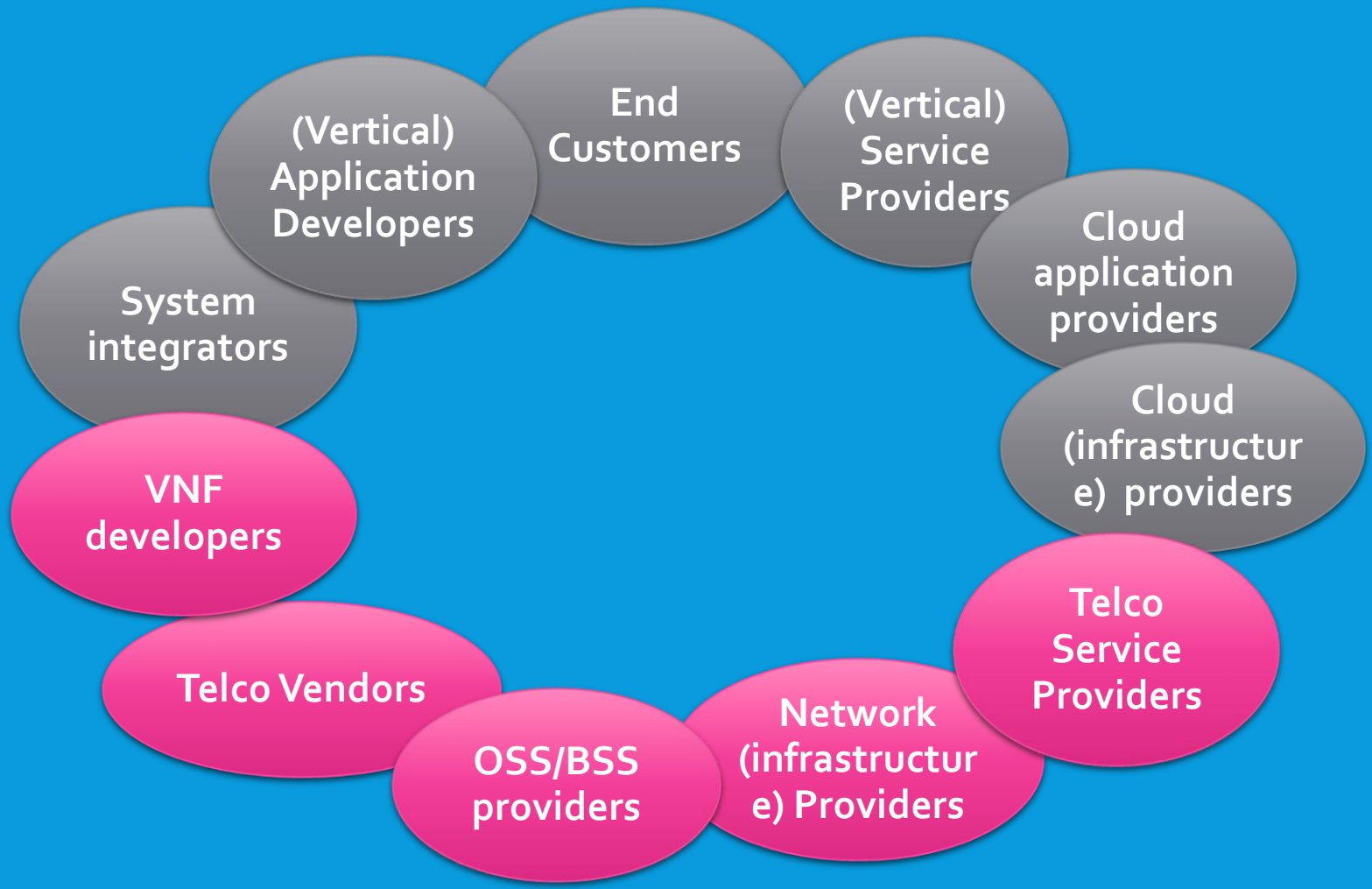

MATILDA FRAMEWORK & MAIN USERS

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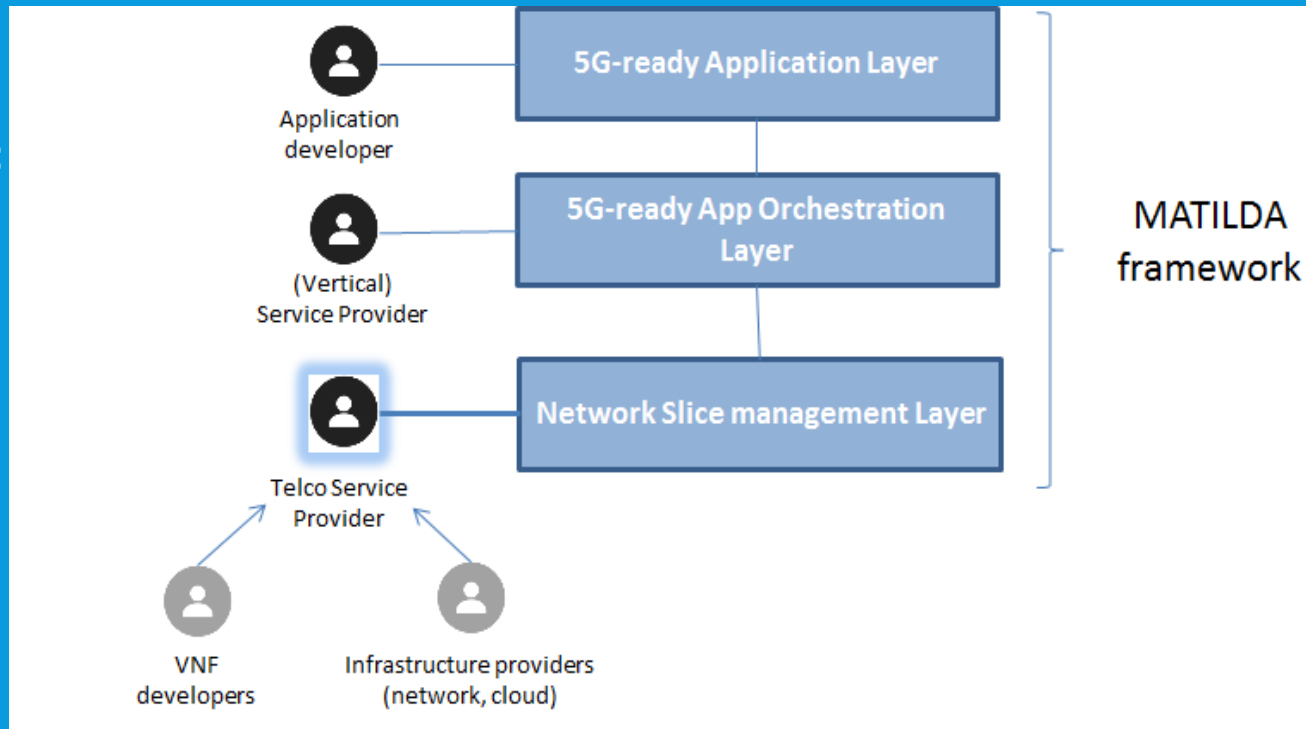
- **The 5G-ready Applications Layer** (**oriented to SW developers**) allows the design and development of 5G-ready apps, specifying also the associated networking requirements.
- **The Applications' Orchestration Layer** (**oriented to apps/service (vertical) providers**) supports the dynamic deployment and adaptation of the 5G-ready apps, while optimizing the resources allocation across the multi-site programmable infrastructure.
- **The Network and Computing Slice Management Layer** (**oriented to telecom service providers**) allows:

(1) Deployment/operation application-aware network slice

(2) Network slice instantiation & mngmt, network services activation & orchestration, and monitoring streams mngmt.



MATILDA VALUE PROPOSITION

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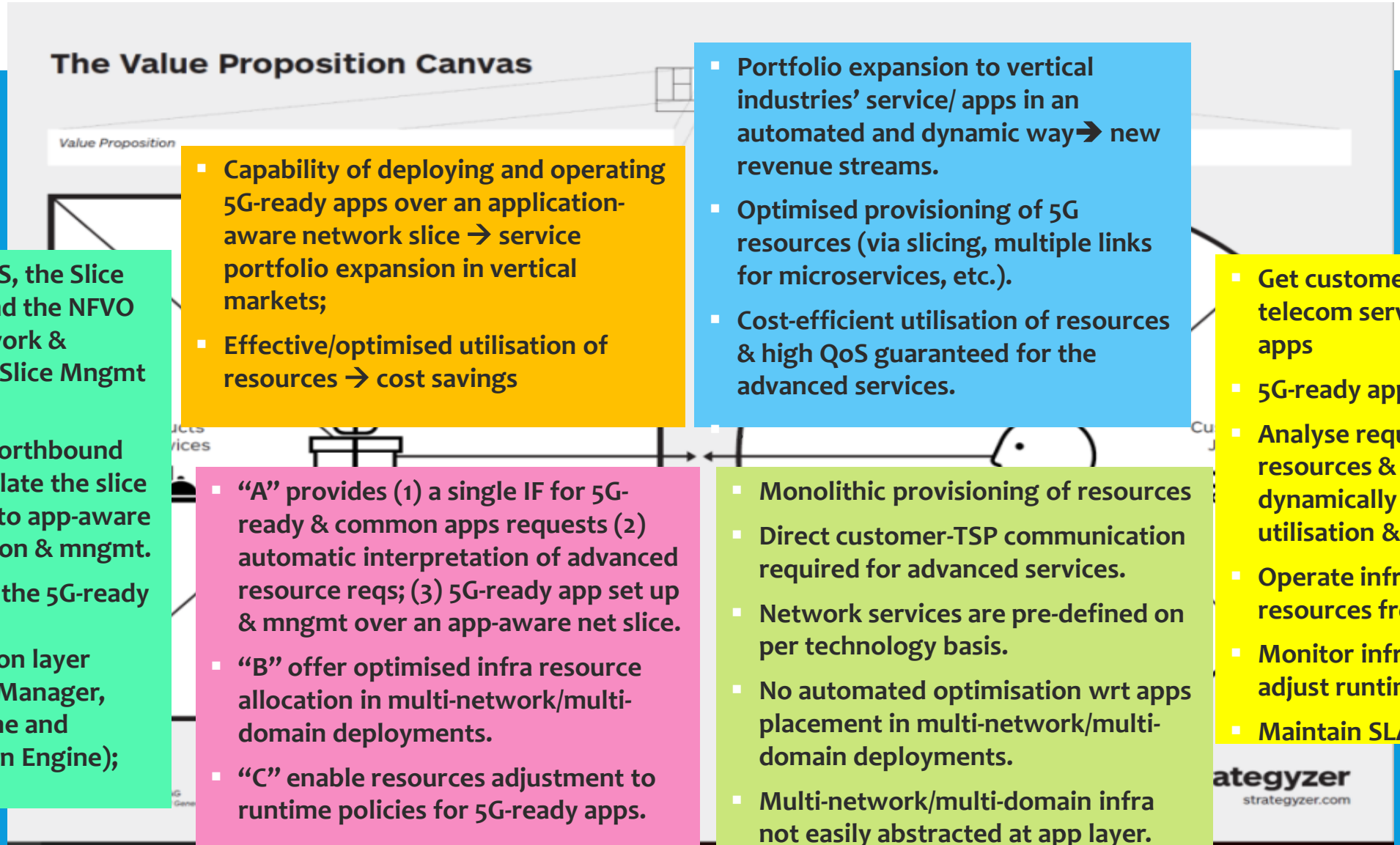
- **The Value Proposition of MATILDA for the TSP is "bridging the existing gap in end-to-end orchestration solutions and delivering an easy and flexible environment for integration of vertical applications into a 5G ecosystem".**

MATILDA VALUE PROPOSITION



- Capability of deploying and operating 5G-ready apps over an application-aware network slice → service portfolio expansion in vertical markets;
- Effective/optimised utilisation of resources → cost savings

- Portfolio expansion to vertical industries' service/ apps in an automated and dynamic way→ new revenue streams.
- Optimised provisioning of 5G resources (via slicing, multiple links for microservices, etc.).
- Cost-efficient utilisation of resources & high QoS guaranteed for the advanced services.

A. The OSS/BSS, the Slice Manager and the NFVO of the Network & Computing Slice Mngmt Layer.
B. The Telco Northbound API to translate the slice intent reqs to app-aware slices creation & mngmt.
C. Modules of the 5G-ready Application Orchestration layer (Execution Manager, Policy Engine and Optimisation Engine);

- "A" provides (1) a single IF for 5G-ready & common apps requests (2) automatic interpretation of advanced resource reqs; (3) 5G-ready app set up & mngmt over an app-aware net slice.
- "B" offer optimised infra resource allocation in multi-network/multi-domain deployments.
- "C" enable resources adjustment to runtime policies for 5G-ready apps.

- Monolithic provisioning of resources
- Direct customer-TSP communication required for advanced services.
- Network services are pre-defined on per technology basis.
- No automated optimisation wrt apps placement in multi-network/multi-domain deployments.
- Multi-network/multi-domain infra not easily abstracted at app layer.

- Get customer requests for telecom services for 5G-ready apps
- 5G-ready apps Lifecycle mngmt
- Analyse request: allocate resources & Network Functions dynamically to optimise utilisation & QoS
- Operate infra and/or lease infra resources from 3rd parties
- Monitor infra/resources/QoS & adjust runtime policies
- Maintain SLAs

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THANK YOU FOR YOUR ATTENTION!