



Novel Enablers for Cloud Slicing

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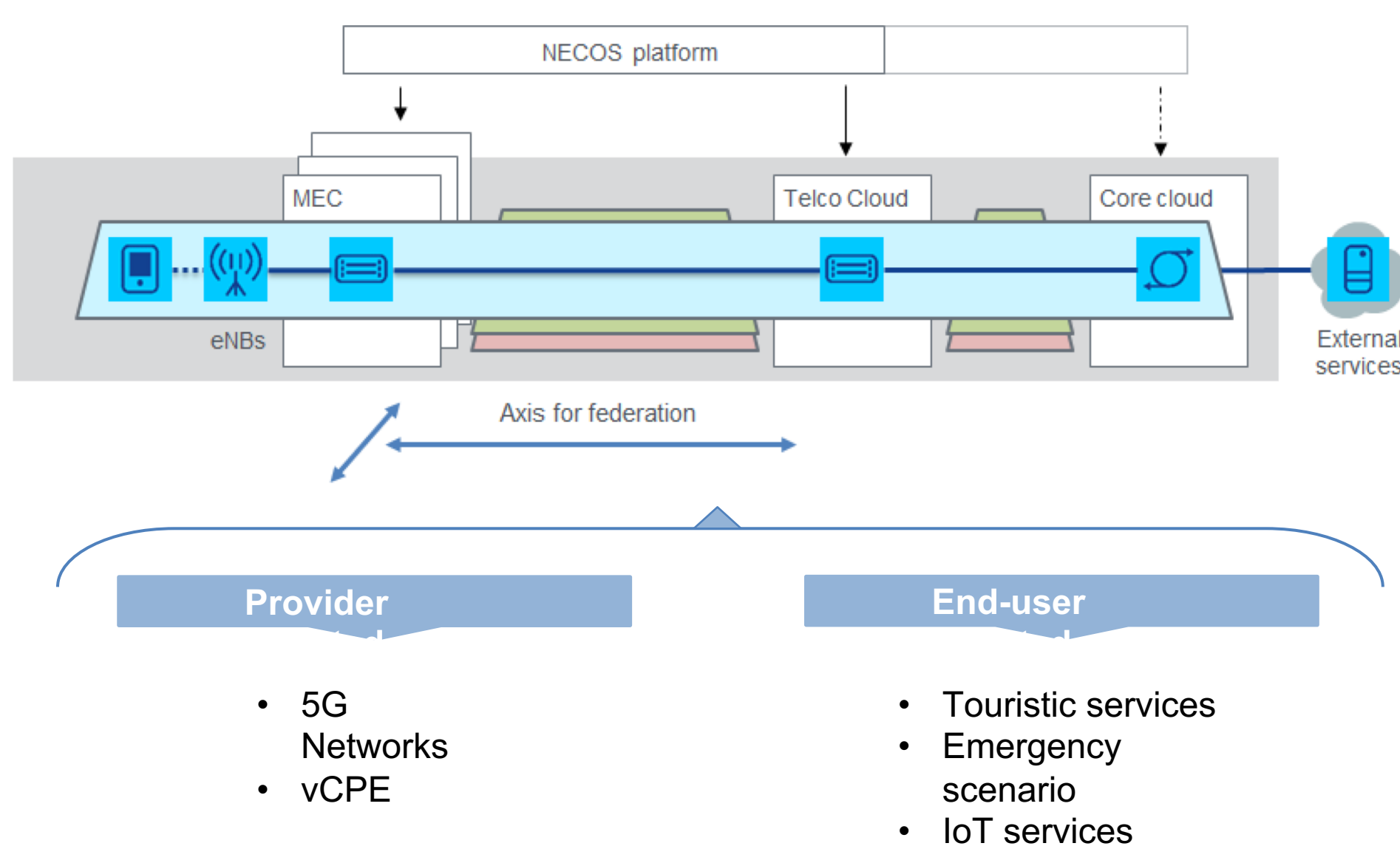
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DESCRIPTION

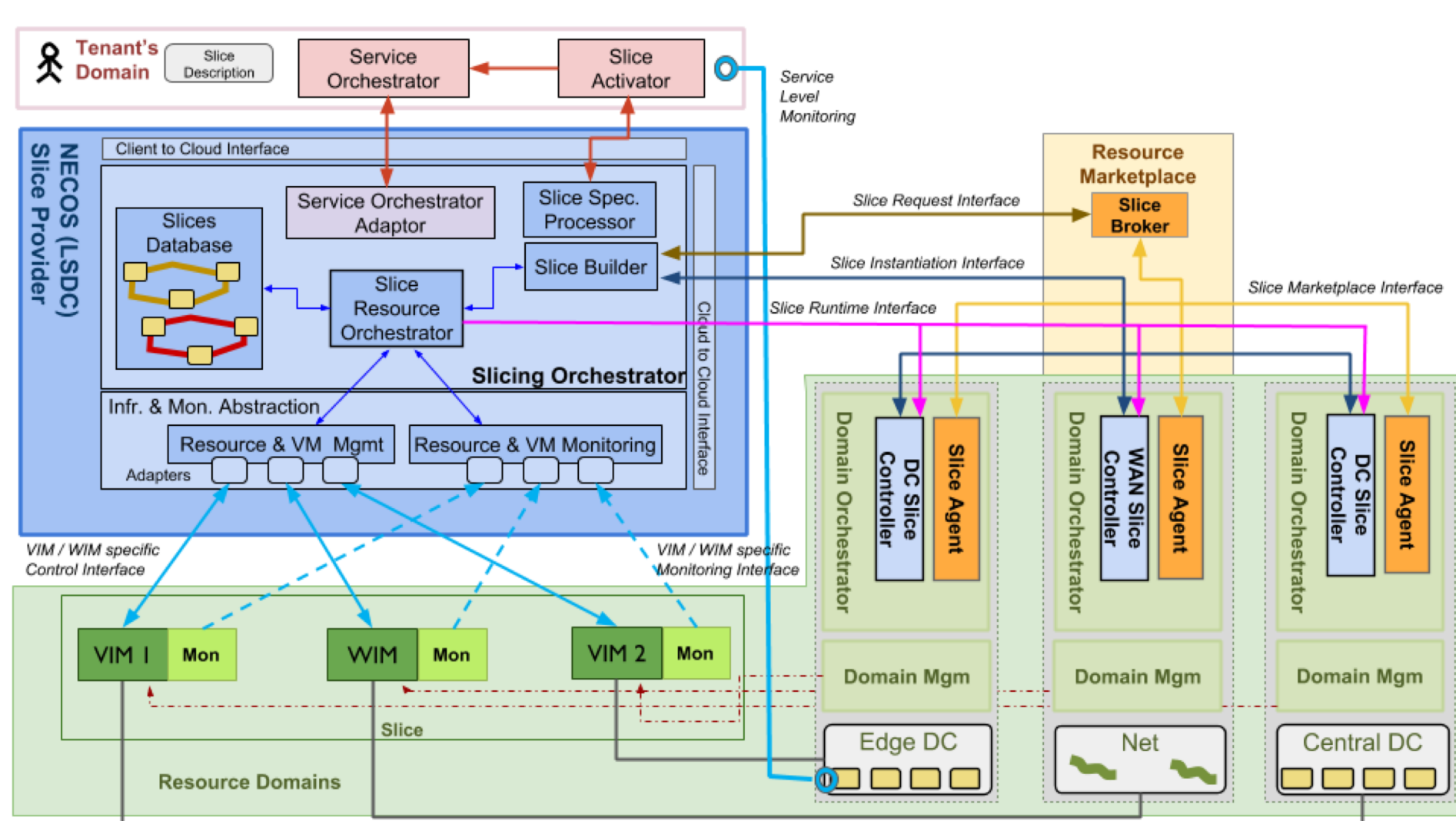
The NECOS project addresses the limitations of current cloud computing infrastructures to respond to the demand of new services, as presented in two use-cases. The first use-case is Telco service provider focussed and is oriented towards the adoption of cloud computing in their large networks. The second use-case is targeting the use of edge clouds to support devices with low computation and storage capacity.

Use Cases



A novel solution based on resource virtualization – **Lightweight Slice Defined Cloud (LSDC)** – as an approach for automating the process of optimal cloud configuration by extending the virtualization concept to all resources in a data centre and by providing a uniform management with a high-level of autonomy for the currently separated computing, connectivity, and storage resources.

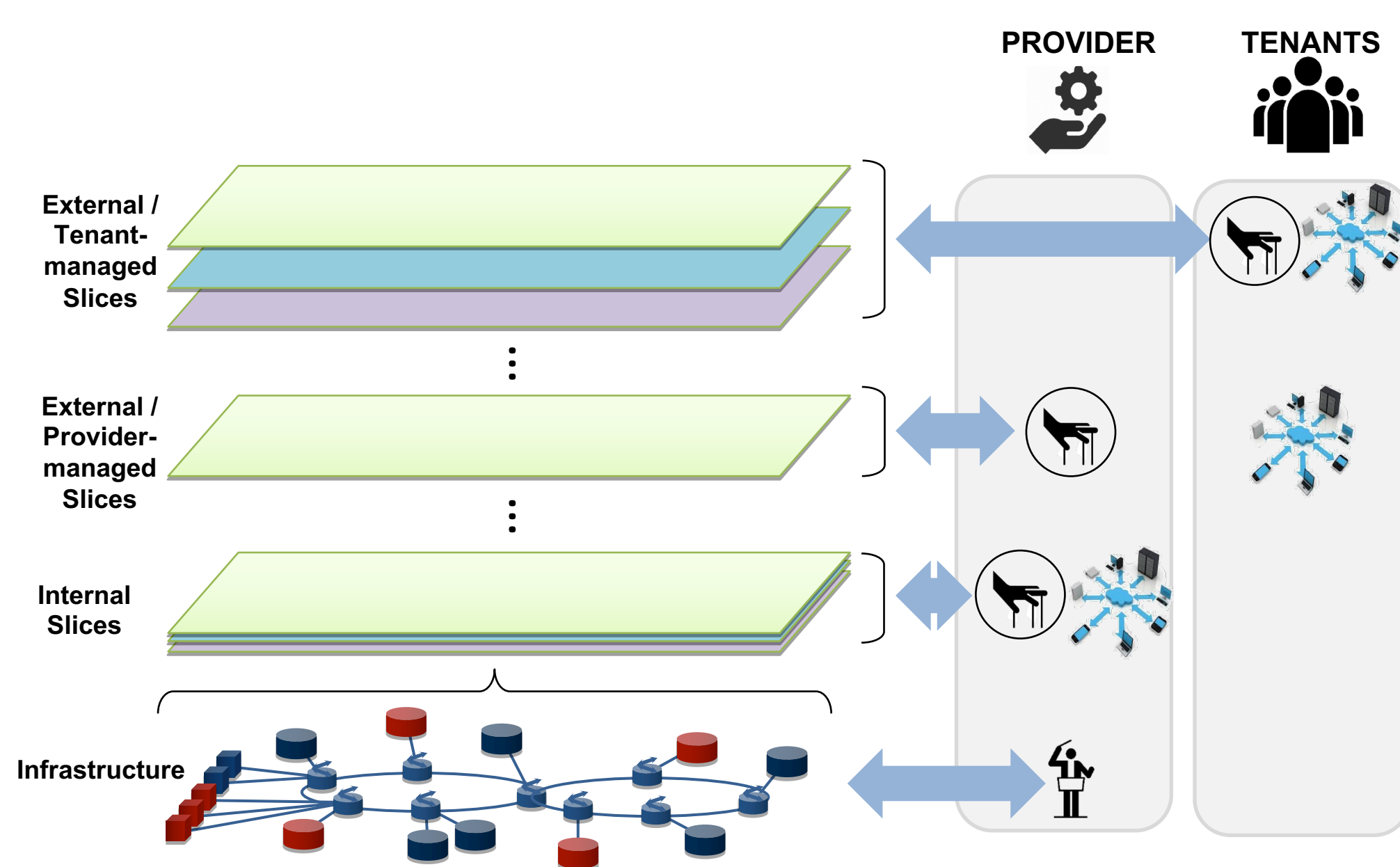
NECOS Architecture Overview



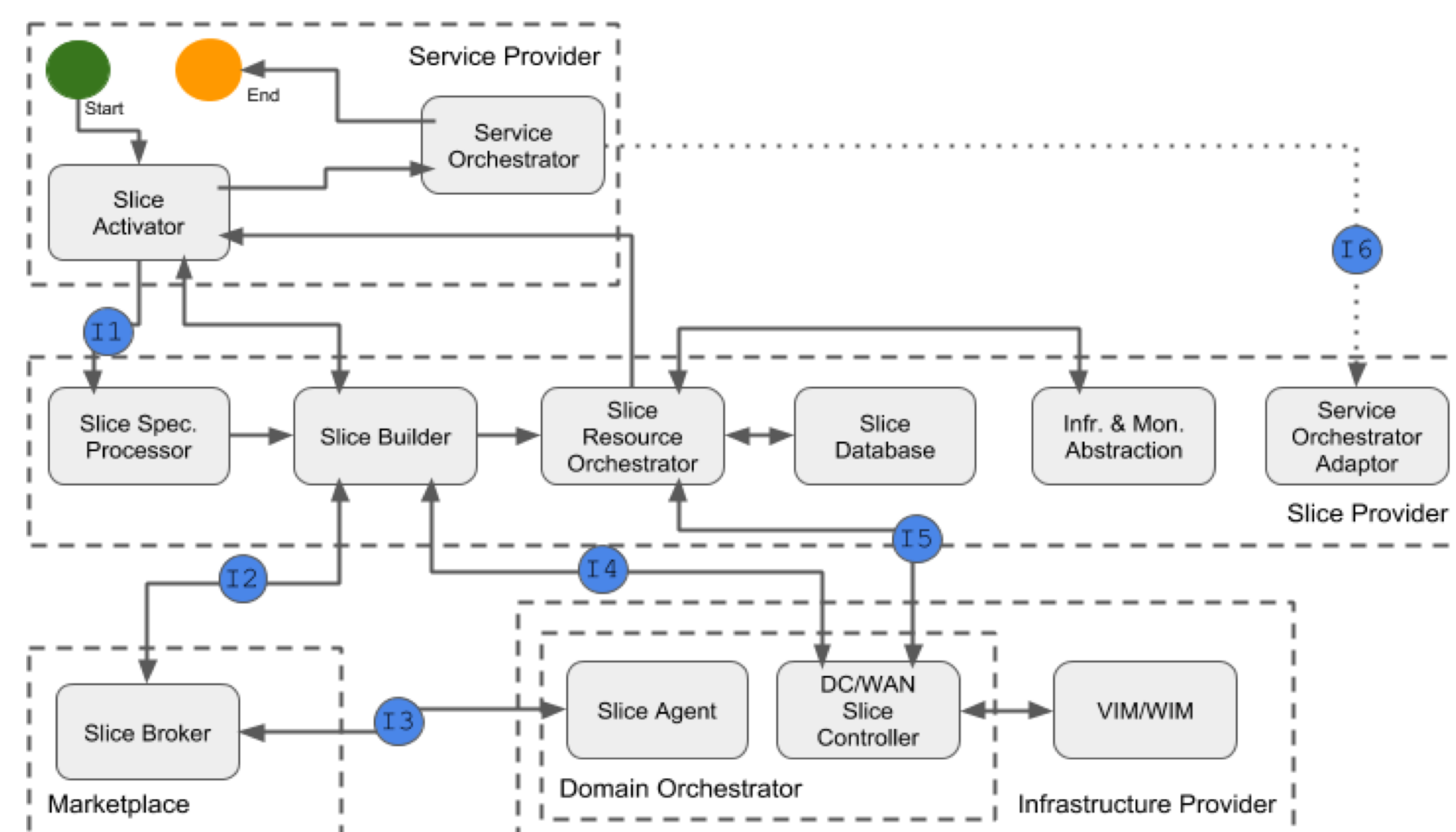
Key Characteristics

1. It presents a new service model – the **Slice-as-a-Service**.
2. It enables the configuration of slices **across the physical resources in the cloud** networking infrastructure.
3. It allows **each aspect** that comprises the cloud environment – from the networking between virtual machines, to the SLAs of the hosted applications – to be **managed via software**.
4. It utilises **lightweight** and **uniform** management and virtualisation systems, with **small footprint** components, deployable on large number of small servers and **clouds** at the network **core** and **edges**.

Slice-as-a-Service



Slice Creation Workflow



VÍDEO

Demo 1: DC Slice Controller, VIM-on-demand, dynamicness, lightweightness

This demo presents the DC Slice Controller for the VIM on-demand concept:

- The approach also needs to be dynamic and return values immediately at run-time. Slicing cannot rely on hand- signed paper contracts, followed up by documents which have IP addresses on them.
- To get end-to-end slicing in a lightweight way, we need a modular and scalable approach to combining the relevant components, for telco cloud and mobile edge services.
- For this demo we use VLSP: a lightweight, soft Data Center platform which supports virtual routers, links, and applications, with its own Virtual Infrastructure Manager (VIM) and a built-in monitoring system.
- The demo shows the new DC Slice Controller creating a new slice using the Slice as a Service paradigm.
- The new slice will be evaluated by showing an interaction with the newly created VIM and create new virtual routers and virtual links.
- The monitoring of the created slice, and collection of the measurements would be used by the IMA using adapters.

Demo 2: DC Controller, VIM-on-demand, VIM complexity, Slice isolation

This demo presents a core data center (DC) setting featuring:

- Creation of DC slice parts.
- Allocation of bare metal instances.
- On demand deployment of multiple type of VIMs.
- Slice part network setup.

NECOS can achieve:

- Isolation.
- Simplicity.
- Provisioning Efficiency.
- Flexibility.

Demo 3: Slice-as-a-service, Information model, Marketplace, Monitoring

This demo presents a geographically distributed setting where:

- Slice creation and service deployment following the tenant's specifications, aligned to the slice-as-a-service approach.
- Real-time discovery and allocation of DC/WAN resources through a marketplace implementation.
- Autonomous service deployment and monitoring in the allocated slice.

Demo 4: Slice elasticity, Slice compliance, Federation

This demo presents:

- A mathematical and visual approach for the development of complex control systems.
- Systematic use of models throughout the development process for design, analysis and simulation.
- Automatic code generation and verification.
- It is broadly used in motion control, industrial equipment, aerospace, and automotive applications.
- Hybrid discrete event and continuous time systems.
- Workflow inspection.
- Model analysis.

