Multi-Domain Orchestration for the Deployment and Management of Services on a Slice Enabled NFVI

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- Context
- Slicing Concepts
- Interworking of Management and Orchestration systems
- Concluding Remarks

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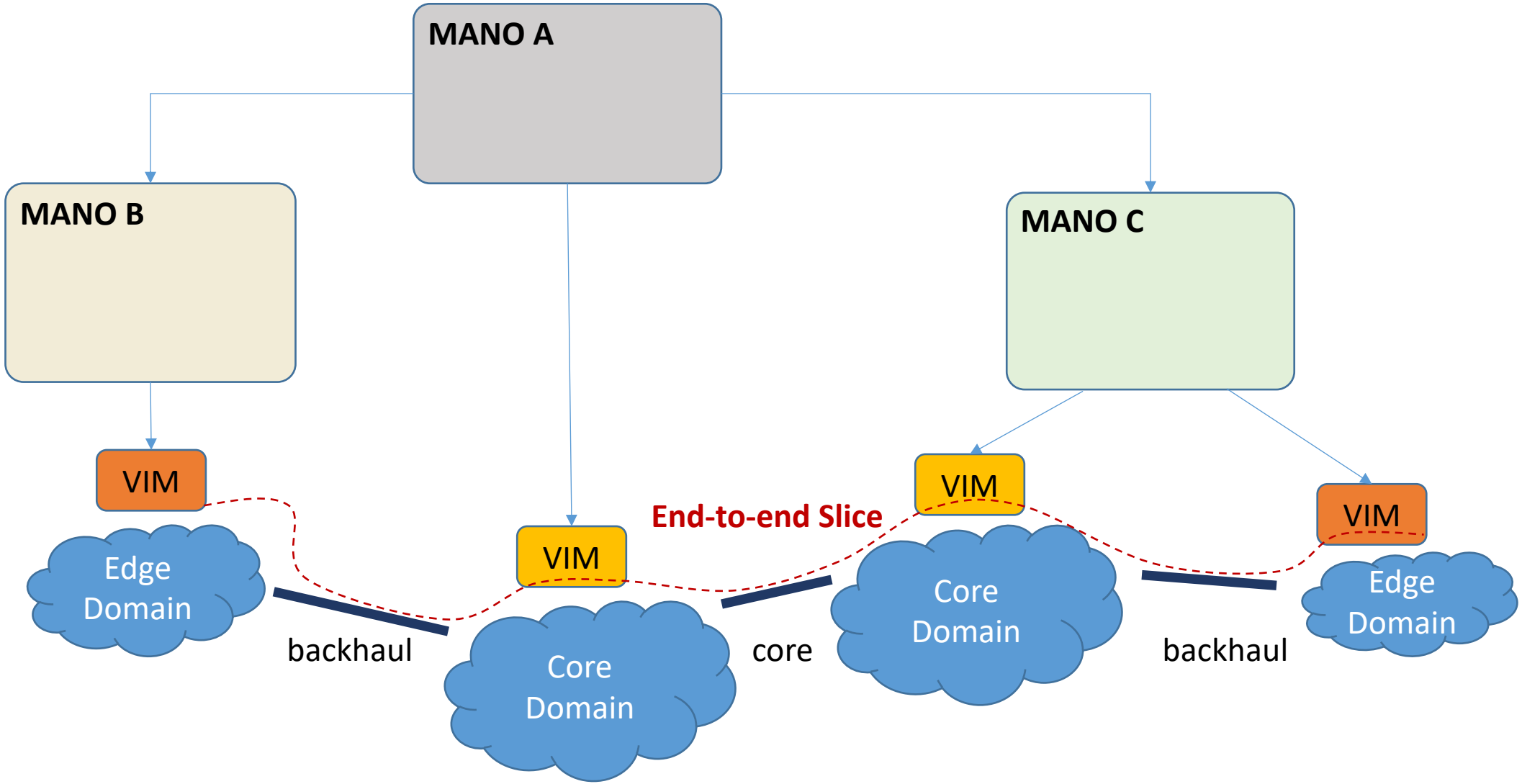
Context: 5G landscape

- Allocation of resources in a (multi-provider) **multi-domain** federated end-to-end infrastructure
- Dynamic, **software-based** allocation of resources via functions virtualization and software defined networks
- Different **Management and Orchestration** (MANO) systems in each segment of the end-to-end infrastructure should **interwork** to support this scenario
- **End-to-end slices** are used to create groups of resources *from the edge to the core* and to introduce **isolation** at the control and data planes (different service requirements)

Context: 5G landscape and considered scenario



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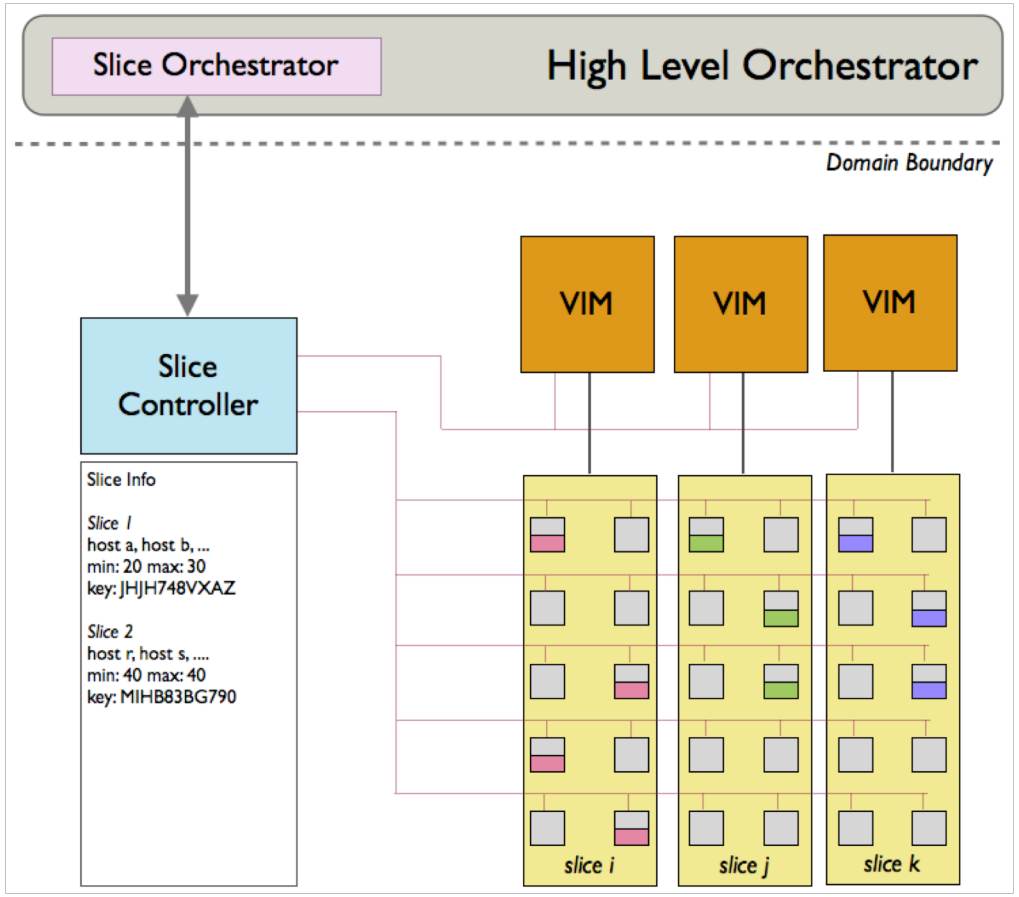
Slicing Concepts

- **Aggregated** set of resources that can be used in the context of end-to-end VNF-based networked services
- Basic unit of programmability based on **isolated** resources (between slices) that include *network*, *computation* and *storage*
- If we have **slicing everywhere** – including networks and DCs – then:
  - there is a separation of physical / logical resources
  - there is isolation of services as no customers share physical / logical resources
  - it is secure as only specified customer can access a host, no sharing or cross VM issues
  - different slices can support different features

Slicing Concepts: VIM on-demand

- Where Slicing should be implemented?
- We introduce a **DC Slice Controller** able to allocate a slice of a DC and create an on-demand per-slice VIM
- Each slice and its associated VIM are **independent** of the other slices and VIMs
- Best **type of VIM** deployed in each segment of the end-to-end infrastructure
- Each of these slices will be allocated and de-allocated in an **on-demand** fashion via interacting with the DC Slice Controller

Slicing Concepts: VIM on-demand



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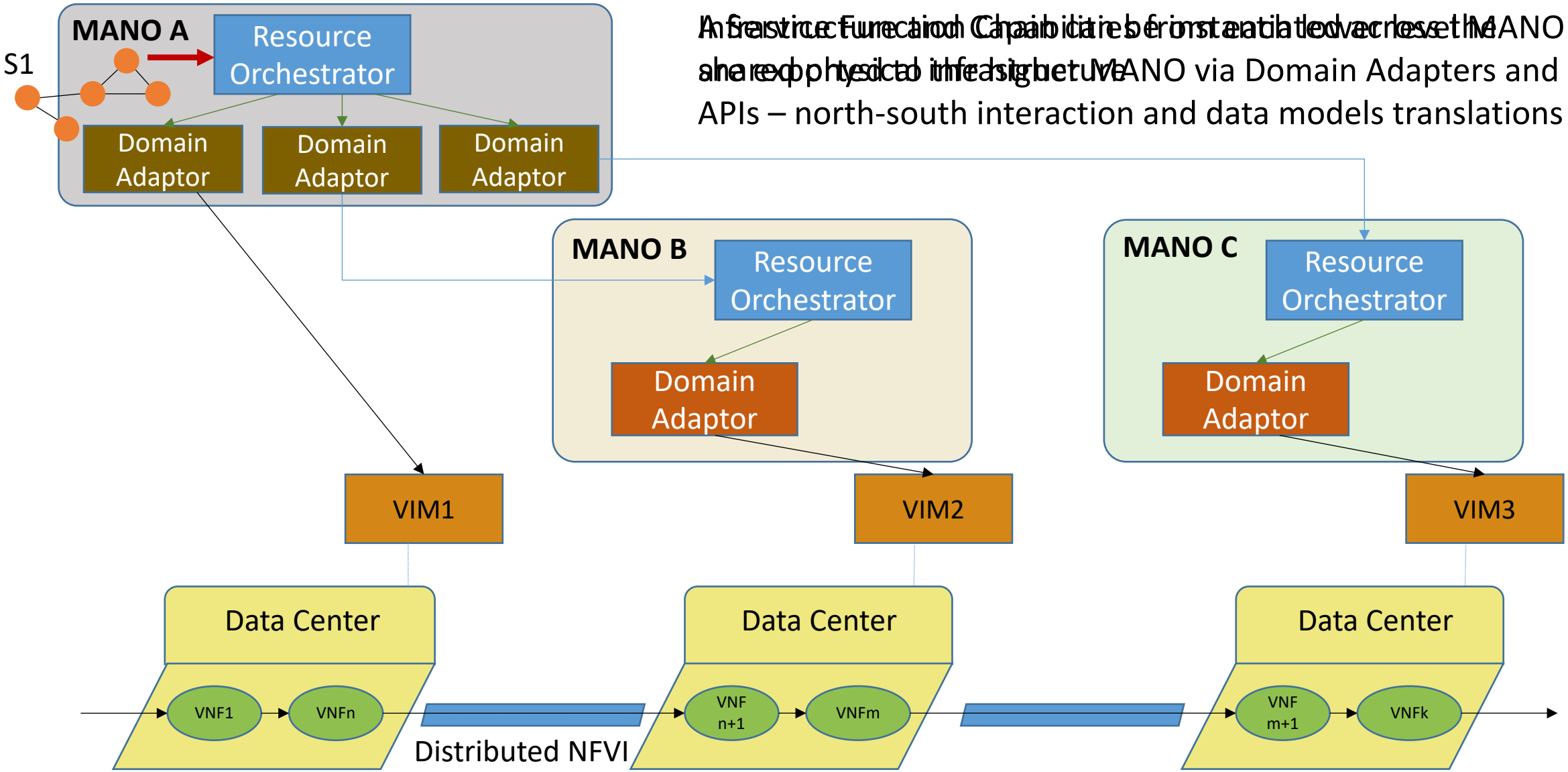
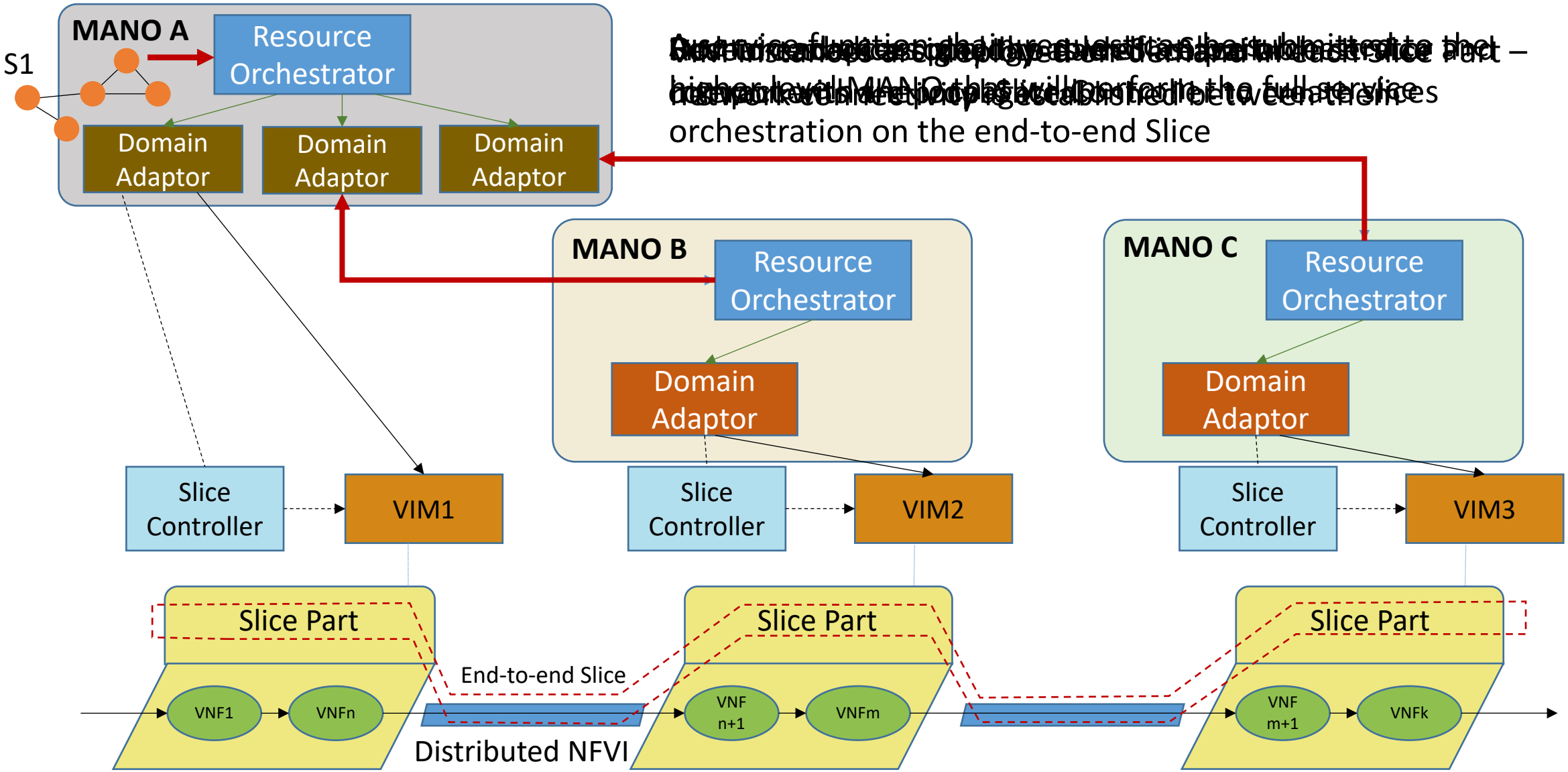
Interworking of MANO systems

Infrastructure and Capabilities of instantiated services in the MANO are exposed to the higher level MANO via Domain Adapters and APIs – north-south interaction and data models translations



Interworking of MANO systems on a sliced NFVI



orchestration on the end-to-end Slice

Interworking of MANO systems: proof of concept

- Higher-level MANO: **5GEx** orchestration system
- Lower-level MANO(s): **SONATA** Service Platform(s)
- On-demand instantiation of the **VLSP** (Very Lightweight Network & Service Platform for SDN Environments) **lightweight VIM**
- Newly implemented **DC Slice Controller**
- Simple Service function chain (forwarding) deployed on the created **end-to-end slice** (emulation in a single DC)

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Concluding Remarks

- **Different segments** of a 5G SP's infrastructure – from the edge cloud to the central DC – administered by **separate divisions**
- MANO systems configured in a **north-south** way – a **hierarchy** of service provisioning capabilities for the deployment of the end-to-end services
- Each domain can be managed **independently** of the others – but they need to be **combined** to form slices
- Slicing can provide a more **effective** resource management by *partitioning resources*, *instantiating different VIMs on-demand* and *isolating services with different requirements*

Questions?

Thank you!

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