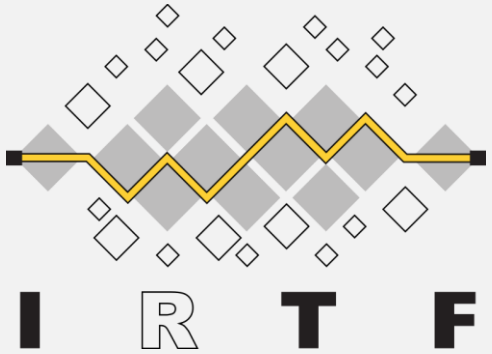

An Evolution of Cooperating Layered Architecture for SDN (CLAS) for Compute and Data Awareness

draft-contreras-coinrg-clas-evolution-03

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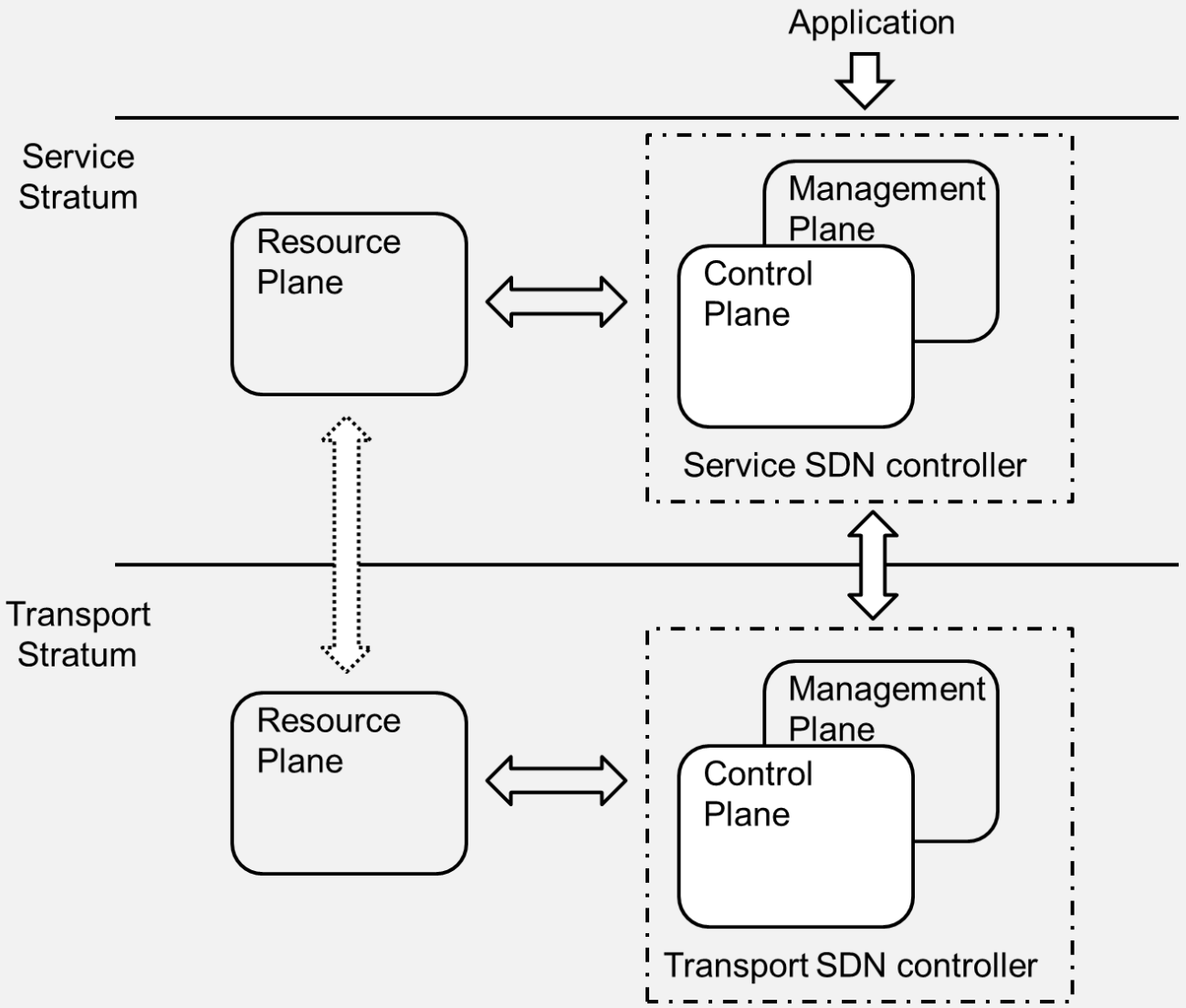
IETF#121, Dublin, November 2024

Background

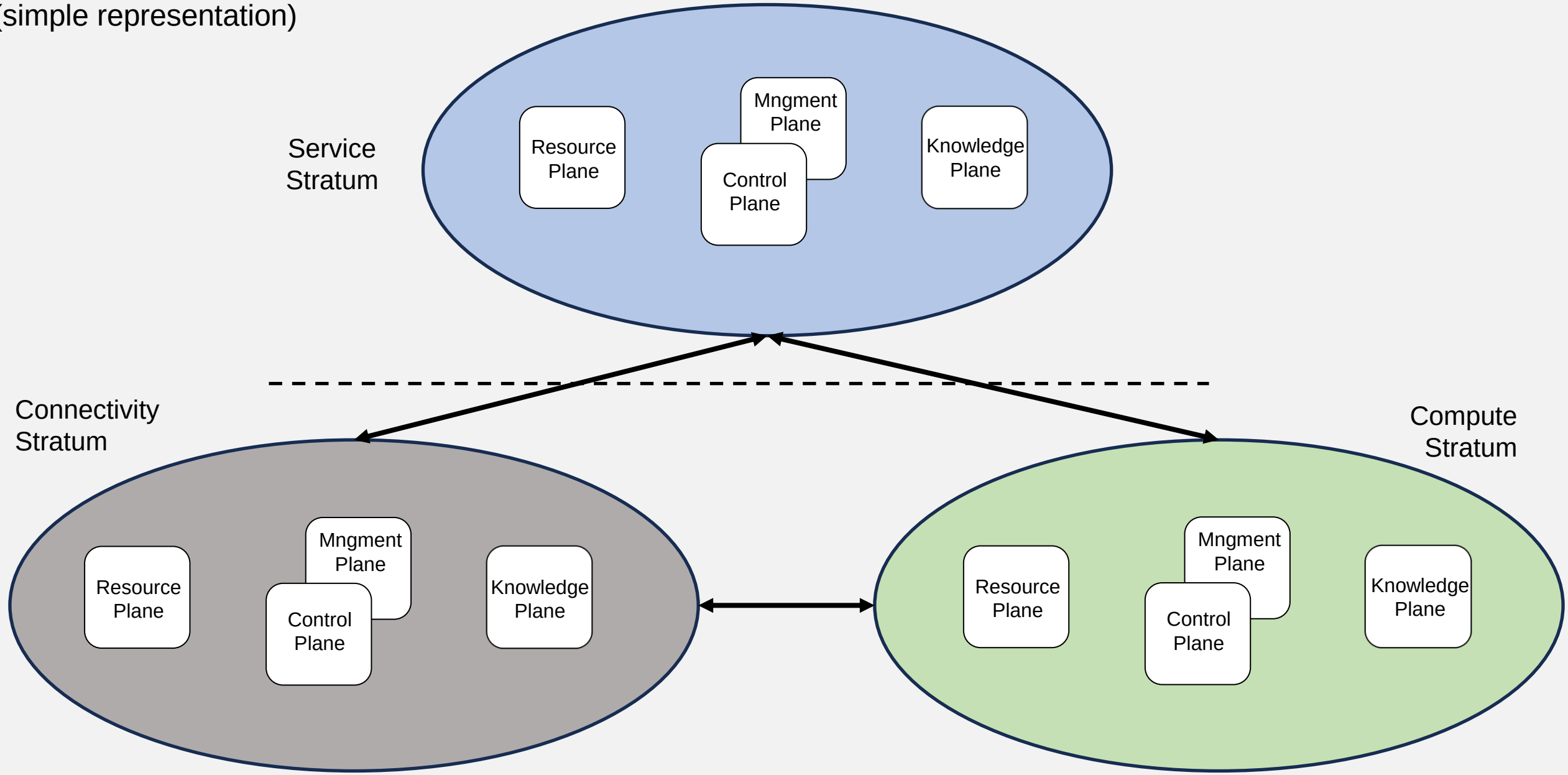
- Cooperating Layered Architecture for Software-Defined Networking (CLAS) [RFC8597] presents a layered control architecture where control functions associated with transport are differentiated from those related to services
- This draft proposes to augment CLAS by adding:
  - A **new stratum for Compute**, considering distributed computing capabilities attached to different points in the network
  - A **new plane** in all the strata, conceived **to deal with stratum-related data** that could permit the implementation of control-loop automation per stratum
- Draft initially presented in NMRG at IETF 113
- Draft moved to COINRG and presented at IETF 116, 117 & 118

Overview [RFC8597]

- Functional Strata
  - Service stratum: functions related to the provision of services (including capabilities exposed to external applications)
  - Transport stratum: functions related to the transfer of data between communication end-points
- Plane separation
  - Control plane: control of resources in each strata
  - Management plane: management of resources and control plane in each strata
  - Resource plane: resources required for a given service (can be or not the termination points of a transport function)
- Despite differentiation, tight cooperation is needed for an efficient service provision

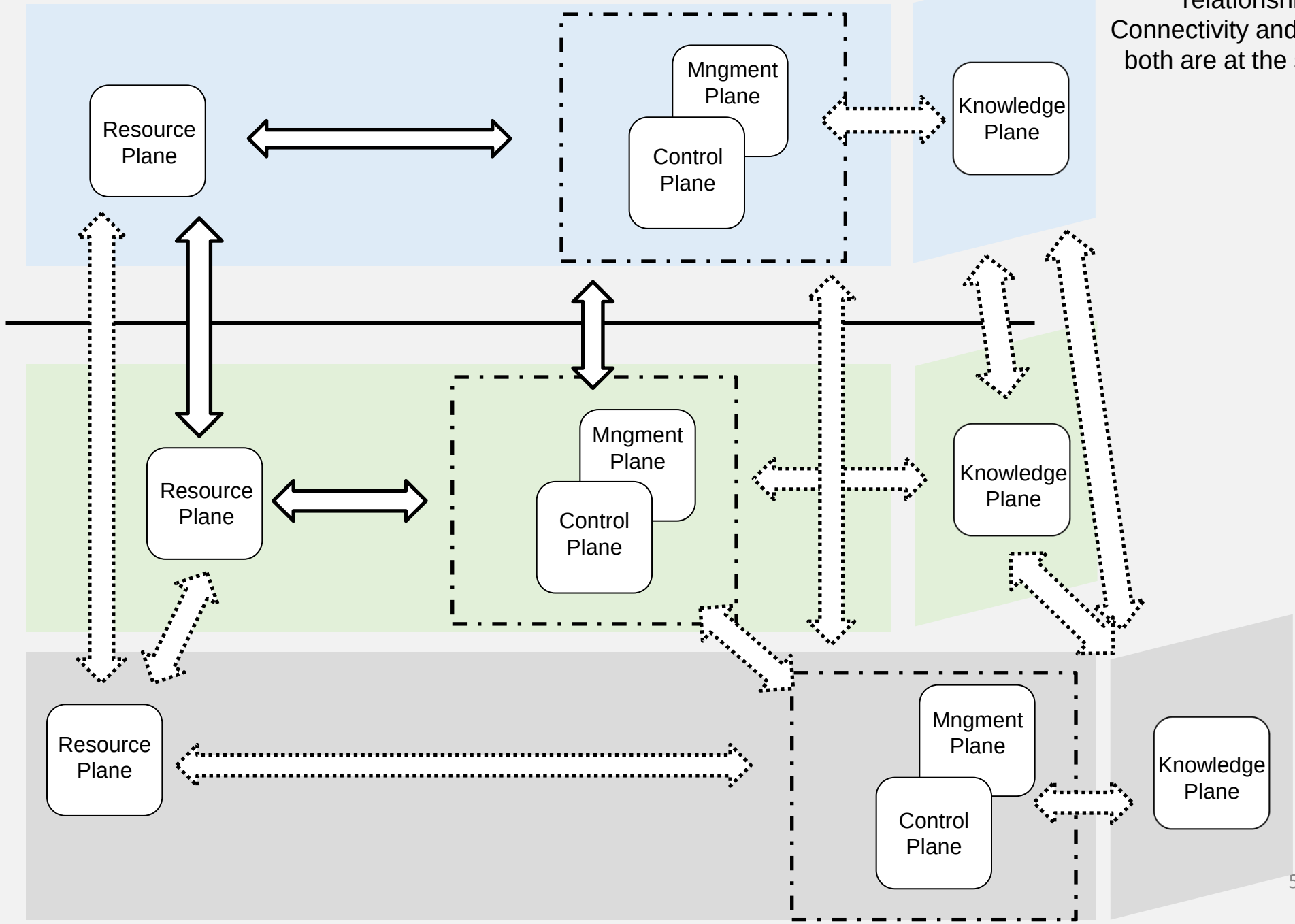


Evolved CLAS Architecture
(simple representation)



Evolved CLAS Architecture
(detailed view)

Note: Not hierarchical relationship between Connectivity and Compute, both are at the same level



Communication between strata (existing work)

- Communication between Applications and Service Stratum
  - Connectivity Provisioning Negotiation Protocol (CPNP) [RFC8921]
  - Interconnection Intents [I-D.contreras-nmrg-interconnection-intents]
  - Slice intent [I-D.contreras-nmrg-transport-slice-intent]
  - Selection of proper edge for service placement [I-D.contreras-alto-service-edge]
  - Composition of service function chains [I-D.lcsr-alto-service-functions]
- Communication between Service Stratum and Connectivity Stratum
  - Framework for Automating Service and Network Management [RFC8969], as well as the models referenced there
  - IETF Network Slice Service model [I-D.ietf-teas-ietf-network-slice-nbi-yang]
  - Service function aware TE topology model [I-D.ietf-teas-sf-aware-topo-model]
- Communication between Service stratum and Compute Stratum
  - Data Center aware TE topology model [I-D.llc-teas-dc-aware-topo-model]
  - Cloud-based solutions (e.g., Kubernetes)
- Communication between Connectivity stratum and Compute stratum
  - Traffic steering with service function awareness (work in progress in CATS WG)

Next steps

- Identify research topics in the communication between strata not covered in the present state-of-the-art

- Add more deployment/use cases aligned with RG focus (i.e., network management)
  - E.g., draft-lopez-qirg-qi-multiplane-arch explores the application of this extended architecture principle to quantum networks

- Check if NMRG can be a home for this work in line with the topic “new management architectures”