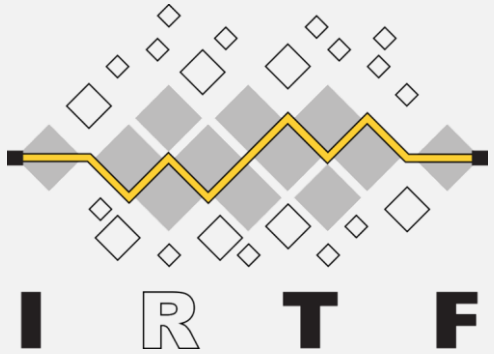


Reflections on CLAS evolution

draft-contreras-nmrg-clas-evolution

L.M. Contreras (*Telefonica*)

ACK: slides prepared based on -00 version of the draft together with the comments received by Med, Carlos and Diego

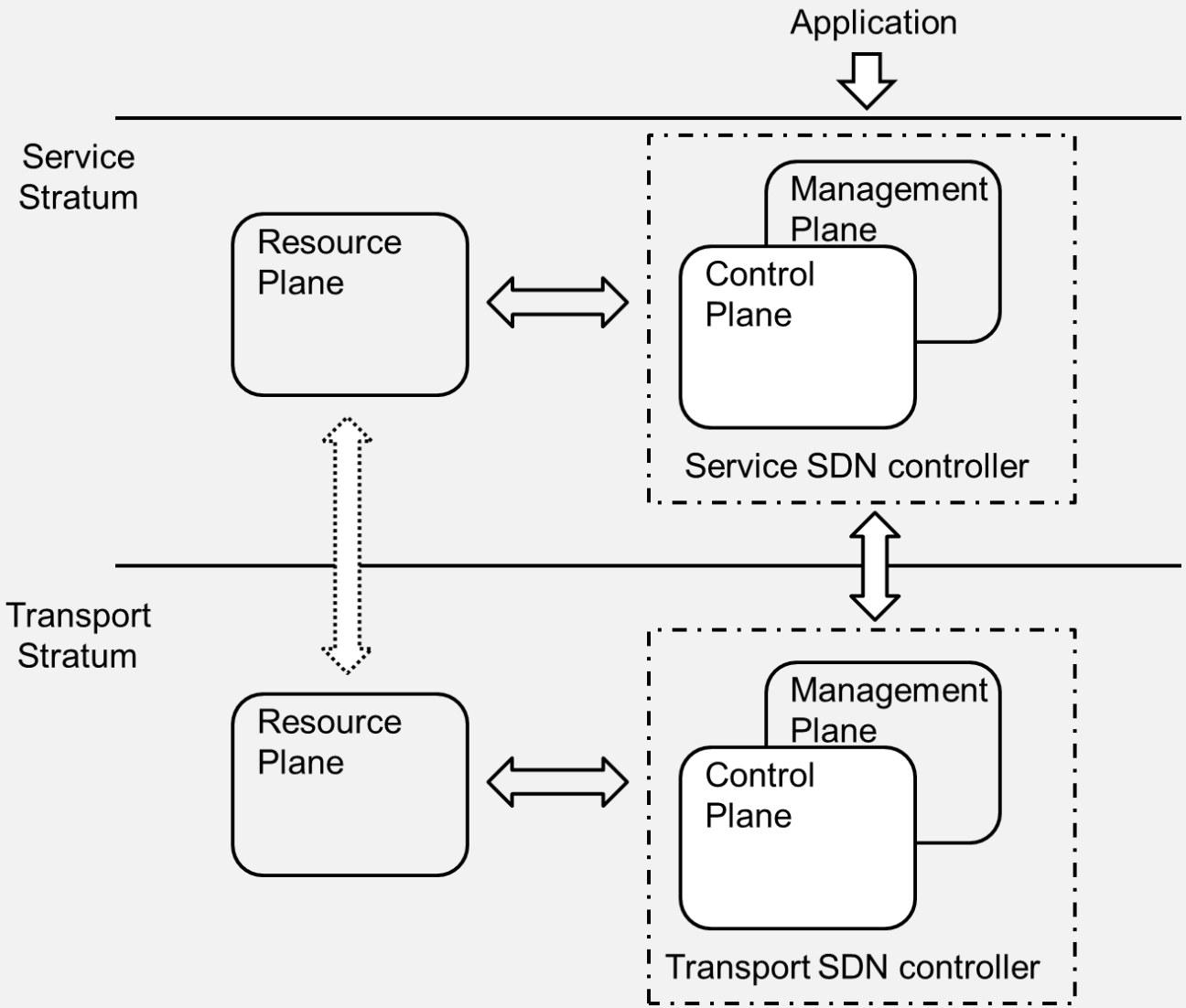
IETF#113, Viena (Austria), March 2022

Background

- Cooperating Layered Architecture for Software-Defined Networking (CLAS) was a work adopted inn SDNRG which was moved into ISE after RG closure
- It was finally released as RFC 8597
- It proposes a layered control architecture where control functions associated with transport are differentiated from those related to services in such a way that they can be provided and maintained independently and can follow their own evolution path.

Overview

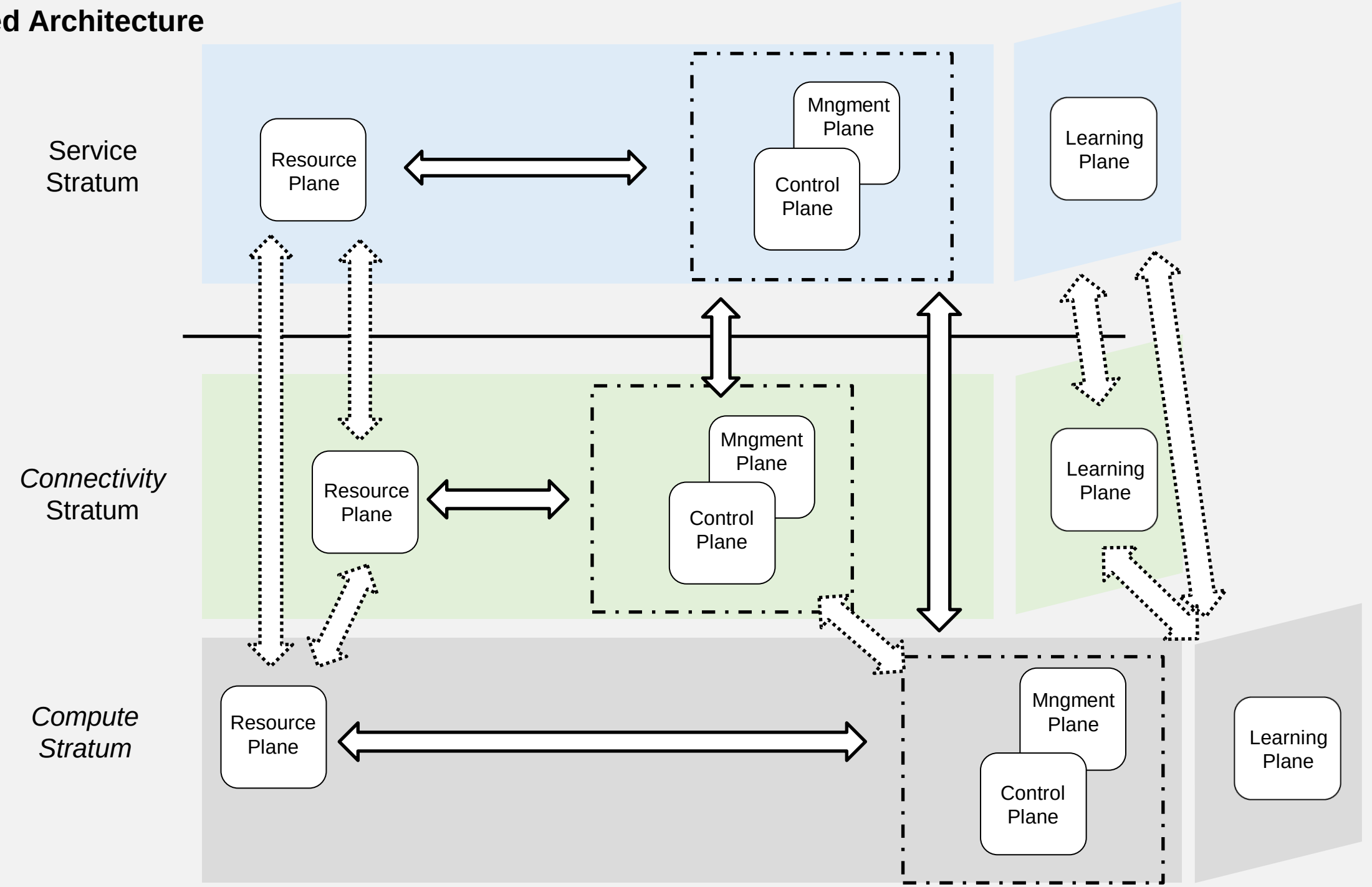
- Functional Strata
  - Service stratum: functions related to the provision of services (including capabilities exposed to external applications)
  - Transport stratum: functions related to the transfer of data between communication end-points
- Plane separation
  - Control plane: control of resources 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



Motivation for CLAS evolution

- Networks are evolving towards a tighter integration of interconnected compute environments
  - Interworking of virtualized and physical service functions
- Moreover, network operations are complementing the capabilities of automation and programmability with the introduction of Artificial Intelligence (AI) and Machine Learning (ML) techniques
  - Base for closed loop automation
- Focus on management and control, not in aspects such as service placement

Evolved Architecture



Augmentation of CLAS with Compute and Data Awareness

- Compute Stratum
  - Consideration of distributed computing capabilities attached to different points in the network, intended for hosting a variety of services and applications usually in a virtualized manner
    - e.g., availability of computing capabilities could be based on [I-D.contreras-alto-service-edge]
  - Contains the control, management and resource planes related to the computing part

- Learning Plane
  - Collection, processing and sharing of relevant data from each of the strata.
  - Introduction of Artificial Intelligence (AI) and Machine Learning (ML) techniques in order to improve operations by means of closed loop automation
    - e.g., learning plane could be based on [I-D.pedro-nmrg-ai-framework], being e.g. fed by [I-D.ietf-opsawg-service-assurance-yang]

Potential research directions

- Work on aspects such as:
  - Communication means/interfaces between strata (and planes)
  - Deployment scenarios (including legacy ones)
  - Potential use cases
  - Link with on-going activities in NMRG (IBN, AI, etc)
- Explore novel architectural approaches: e.g., bus architecture for interaction of planes in a single stratum
- Inter-domain APIs between different/same strata
  - e.g., further developing and updating ideas as described in draft-bernardos-nmrg-multidomain-01
- Explore intent-based APIs/approaches for learning plane
- Data models (and even ontologies) for the exchange and aggregation of information, knowledge and actions among the different planes and strata

Next steps

- Set the scope of the draft aligned with the scope of NMRG
- Collect feedback / interest from the RG on any of the aspects commented
  - Initial feedback expressed on mailing list by Med, Carlos and Diego
    - Yet pending to address the comments received in a new version of the draft
  - Feedback also received from Pedro and Qin off-line
- Prepare a new (more detailed version) for IETF 114