
# Controlled Connectivity Services in the Edge-Cloud Continuum

Side Meeting on Telecom Cloud Services and Operations

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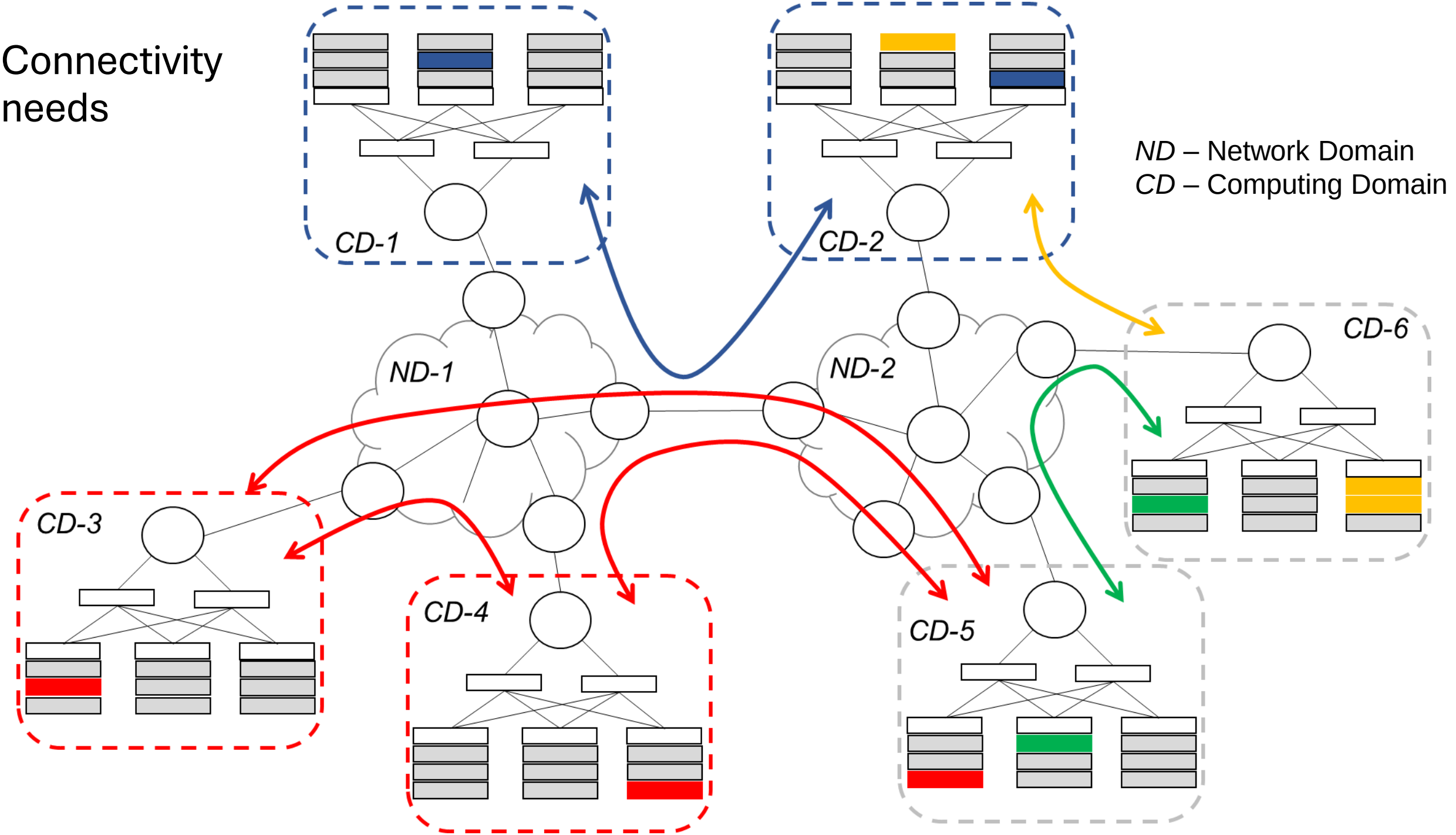
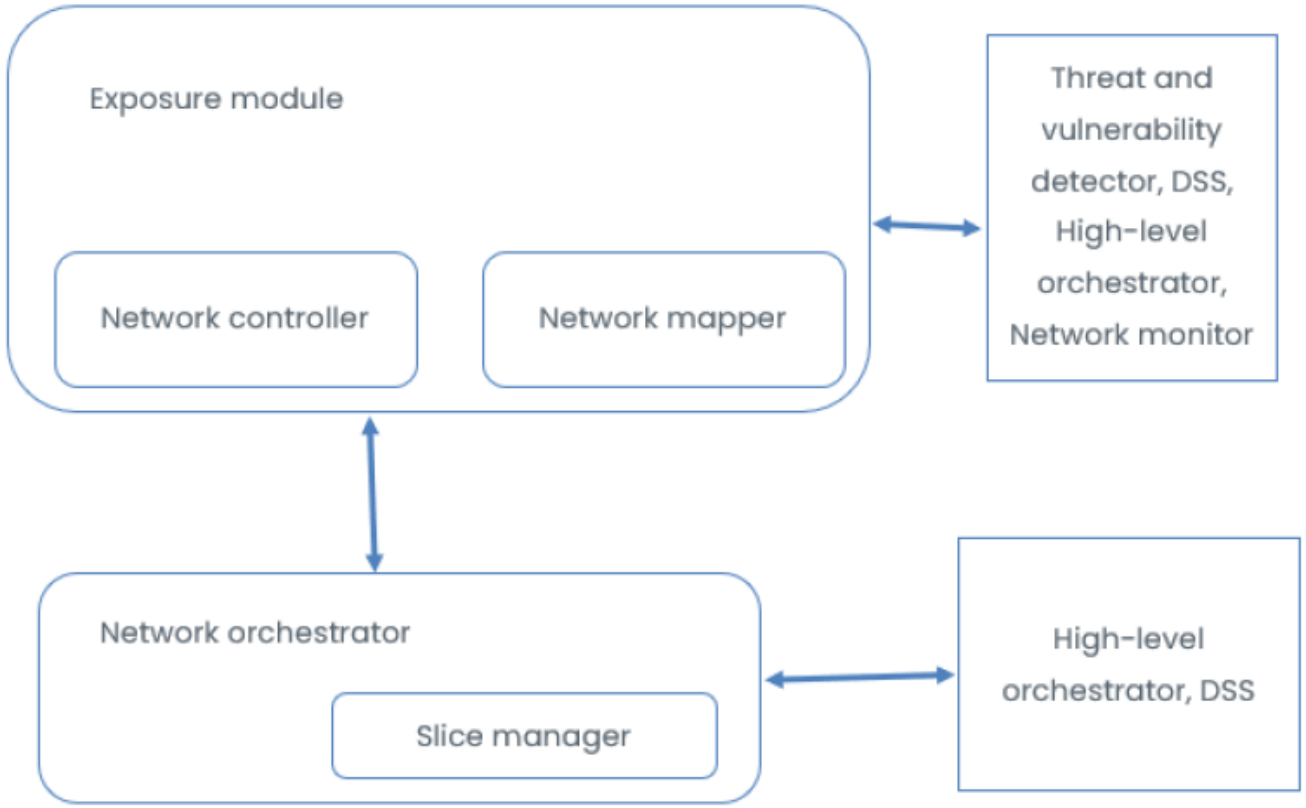
# Connectivity needs



# Problem Statement

- Trend to leverage more and more on cloud-native service approach
- Multiple compute and network domains could be involved, even from different administrative domains
- Currently, cloud connectivity services are loosely coupled with the capabilities of the network underneath, for
  - Taking decisions on the more convenient facility to instantiate the application services (i.e., workloads)
  - Enforcing the connectivity service of those workloads (i.e., meeting SLOs) guaranteeing isolation
- Connectivity managed by cloud managers through artifacts operated by Cloud Managers
  - See as reference draft-ietf-bmwg-containerized-infra-01

# EU Cloud Edge IoT Architecture
# Network building block

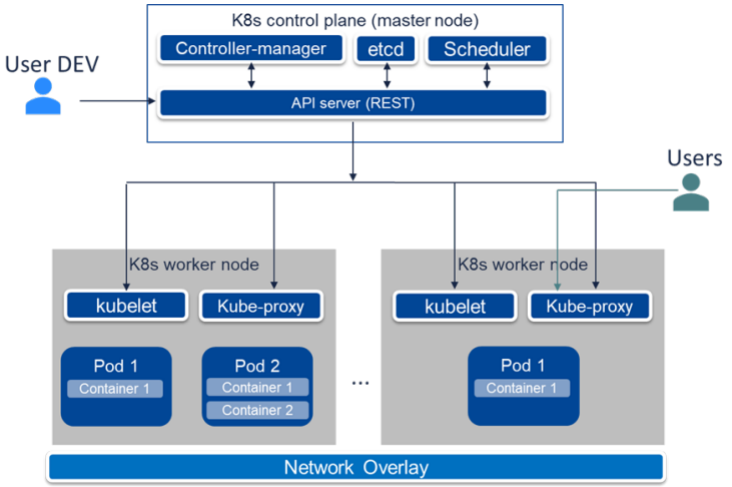



- Exposure module: for network topology (to share information with the Decision Support System for developing the deployment pattern)
- Network orchestrator: orchestrate network resources
- Others:
  - Monitoring network data
  - Intelligent control plane (AI/ML)

https://zenodo.org/records/11656784

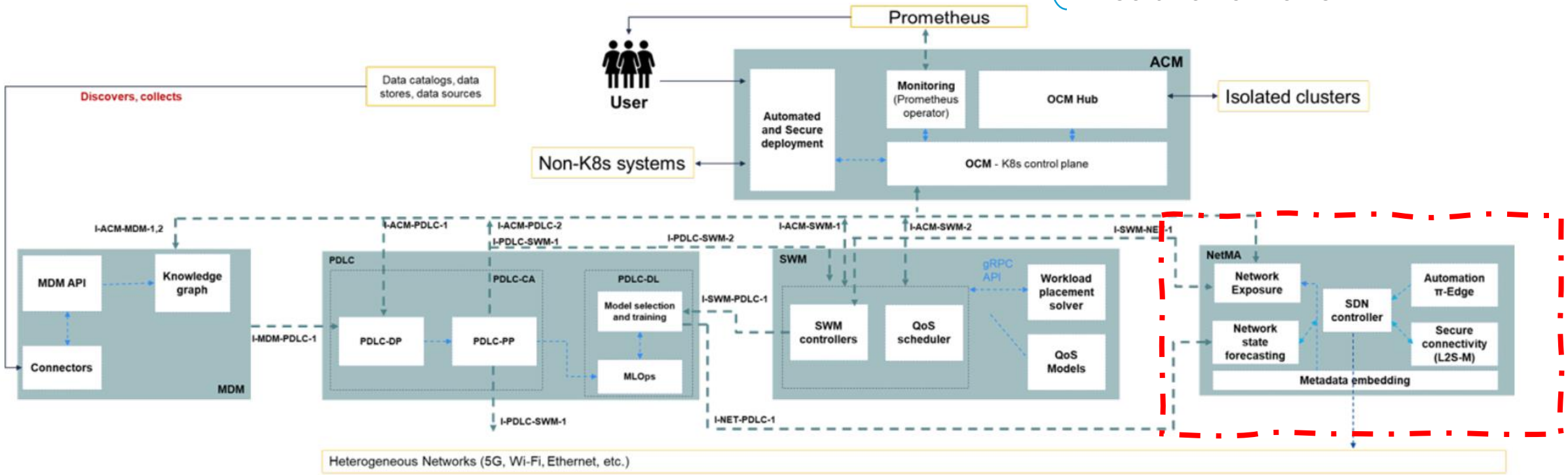
# Exemplary Case for Kubernetes Clusters

R. C. Sofia et al., "A Framework for Cognitive, Decentralized Container Orchestration," in IEEE Access, doi: 10.1109/ACCESS.2024.3406861, https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10540390



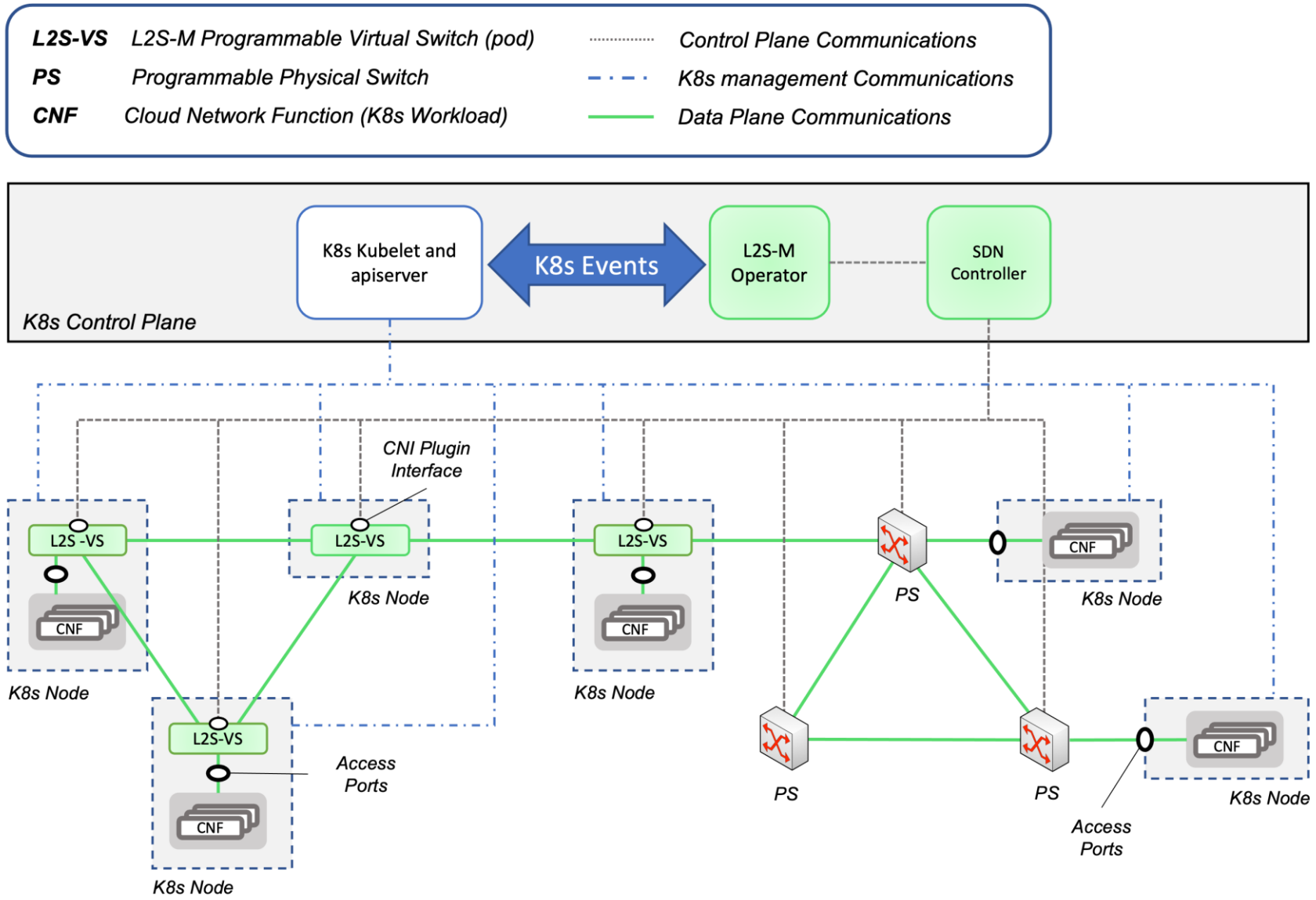

CODECO
Cognitive Decentralised Edge Cloud Orchestration

- Flexible deployment of microservices
- Smart scheduling of workloads
- Adaptability based on learning
- Monitoring and status of connectivity
- Isolation of flows



# Possible approach – L2S-M

L. F. Gonzalez, I. Vidal, F. Valera and D. R. Lopez, "Link Layer Connectivity as a Service for Ad-Hoc Microservice Platforms," in IEEE Network, vol. 36, no. 1, pp. 10-17, January/February 2022, doi: 10.1109/MNET.001.2100363.




- Overlay solution among cloud/edge facilities where services are dynamically stitched
- Secure, isolated connectivity, but yet decoupled from the underlay network

# What can be done at IETF?

- Enable mechanisms for
  - Expose capabilities, from the network to the cloud
  - Enforce connectivity service to provide guarantees, from cloud to network
- Ensure standard mechanisms for doing so
  - Do not reinvent the wheel, but cover the gaps
- Extend all these considerations to multi-domain
- All in a dynamic manner to allow full automation
- Reconciling the distinct approaches existing in both compute and network domains (e.g., CRD vs NETCONF/YANG)