

A Framework for Enhanced Virtual Private Networks (VPN+)

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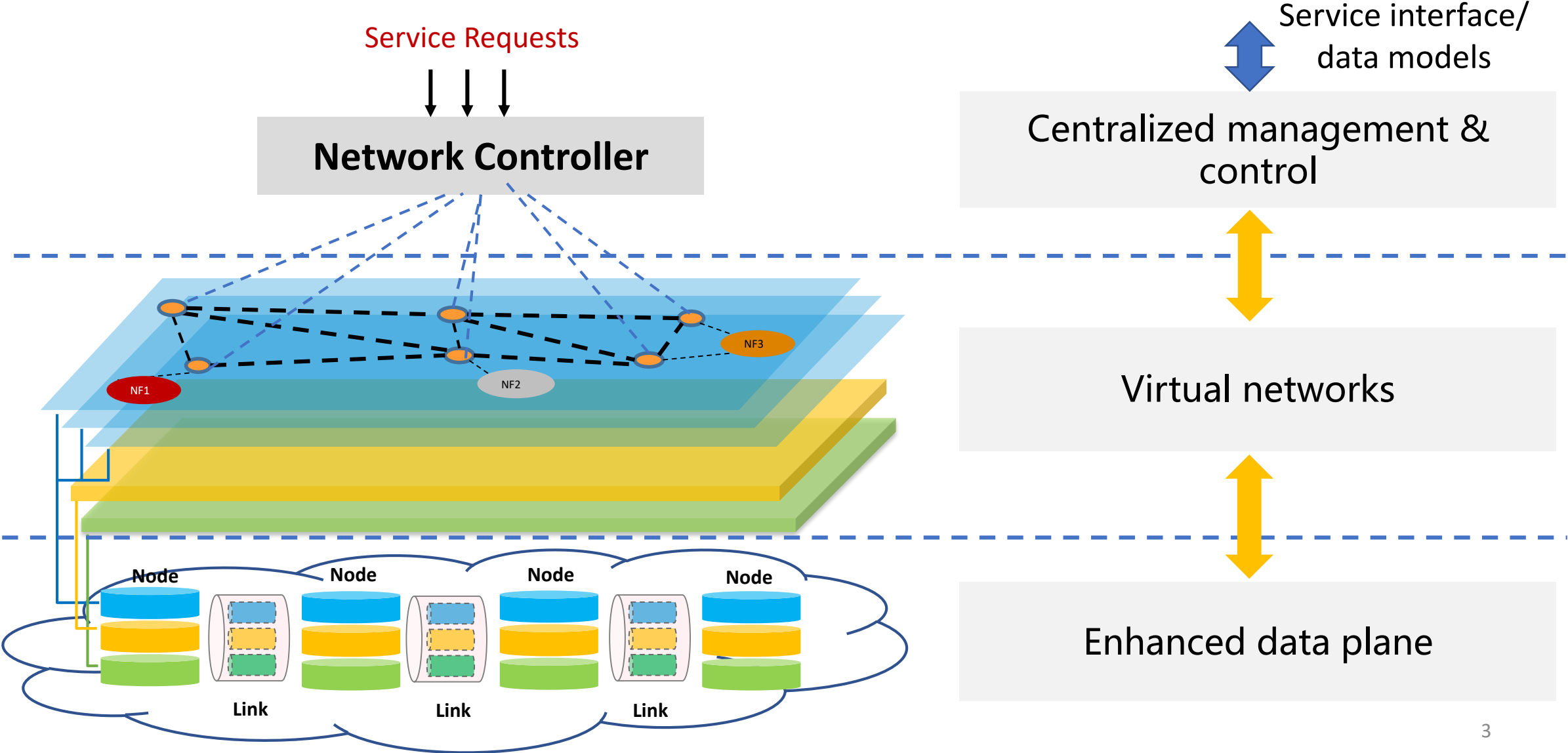
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Recap of this Document

- Describes a framework for enhanced VPN service (VPN+)
 - To meet the requirements of 5G network slicing and other generic scenarios
- Analyses candidate technologies in different planes/layers
 - Enhanced underlay data plane
 - Mechanisms to provide different levels of service SLA guarantee
 - Virtual network instantiation
 - Data plane
 - Control plane
 - Management plane
 - Dynamic creation, modification and deletion of virtual networks with required SLA
 - OAM, Resiliency, etc.

VPN+ Architecture



Updates after IETF 104 -- Definition

- Describes the role of transport network in 5G network slicing
 - 5G end-to-end network slice consists of three major network segments:
 - Radio Access Network (RAN), Transport Network (TN) and Core Network (CN).
 - Transport network provides the required connectivity within and between RAN and CN parts of a 5G network slice, with specific performance commitment.
- Provides a definition of transport network slice
 - A transport network slice is a **virtual (logical) network** with a particular **network topology** and a set of **shared or dedicated network resources**, which are used to provide the network slice consumer with the required **connectivity**, appropriate **isolation** and specific **Service Level Agreement (SLA)**.

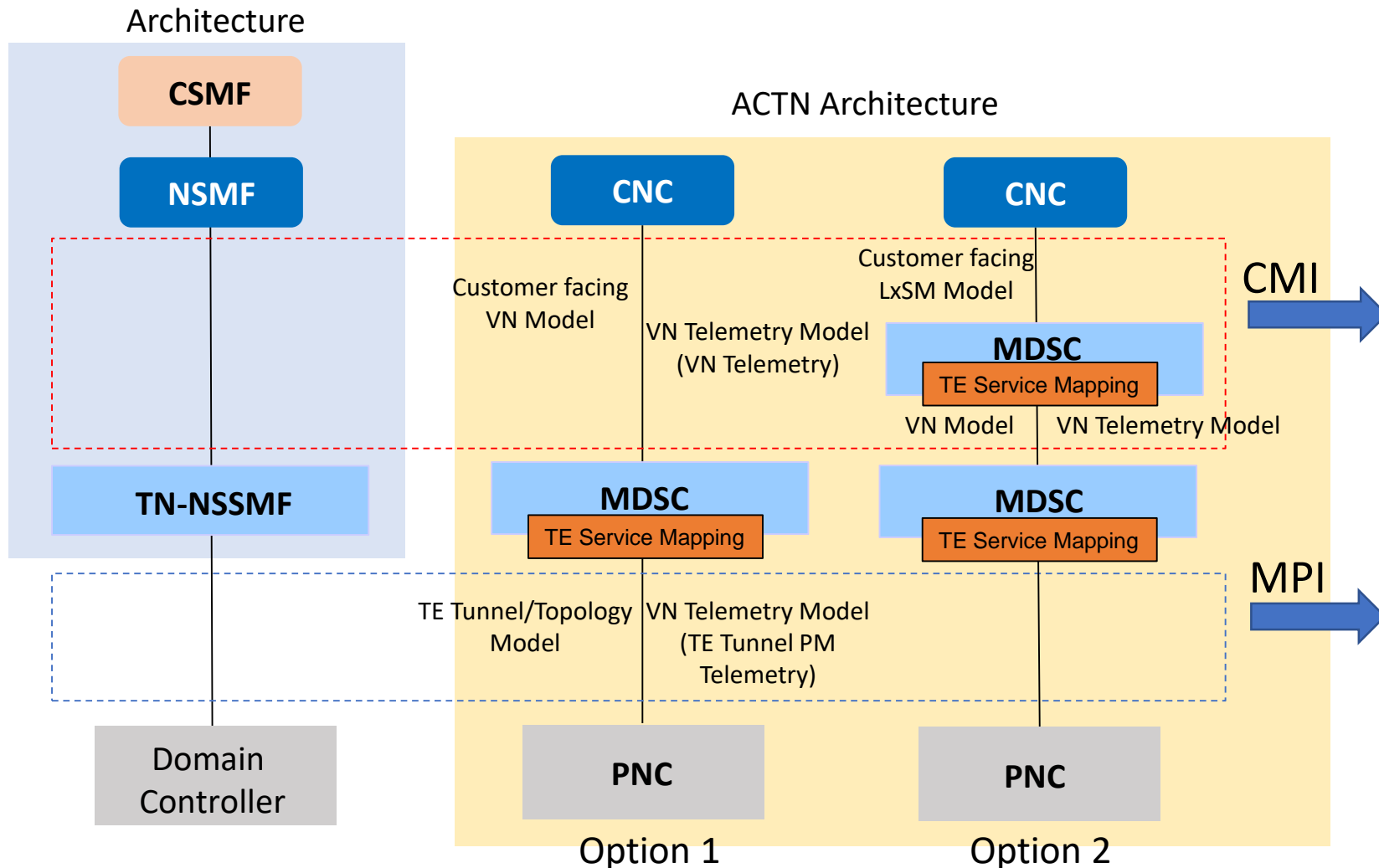
Updates after IETF 104 -- Data plane

- Reduce & refine the description of segment routing (SR)
 - SR is one of the candidate technologies for virtual network instantiation
 - Analyzes the gaps in current SR, and the direction for possible enhancement
 - Current SR SIDs as topological instructions, SR-TE steering at the link granularity
 - Fine-granular packet steering may be introduced in SR for enhanced characteristics

Updates after IETF 104 -- Management plane

- Applicability of existing data models in enhanced VPN management

3GPP Network Slice Management Architecture



Functions	Data Model
L2 VPN Service Delivery	[L2SM]
L3 VPN Service Delivery	[L3SM]
VN Service Delivery	[VN]
TE Service Mapping	[TE-Service-Mapping]
VN NBI PM Telemetry	[VN-Telemetry] [TE-Telemetry]
Topology Abstraction	[Network-Topo] [TE-Topology] [L3-Topology] [L2-Topology]

Functions	Data Model
Tunnel Provisioning	[TE-Tunnel]
SR-(TE) Topology Provisioning	[SR-Topology]
Topology Abstraction	[Network-Topo] [TE-Topology] [L3-Topology] [L2-Topology]

Other Updates

- Add descriptions of Telemetry
- Improve the scalability considerations
- Improve the security considerations
- Editorial changes

Relationship with NS Design Team

- NS design team reached some agreement on transport network slice definition
 - Aligns with the definition provided in this document
- The current scope of NS design team will focus on northbound interface and data models
 - This document describes a complete architecture
- Suggestions about reusing existing work
 - Use VPN+ framework as the base for transport network slice definition and architecture
 - New drafts on use cases and data models as design team deliverables

Next Steps

- Solve received comments
- Work together with design team to polish the definition and architecture in this document
- Make this document ready for WG last call
 - Finish operational considerations
 - Go through and refine the whole document