

Enhanced Virtual Private Networks (VPN+)

draft-dong-teas-enhanced-vpn-02

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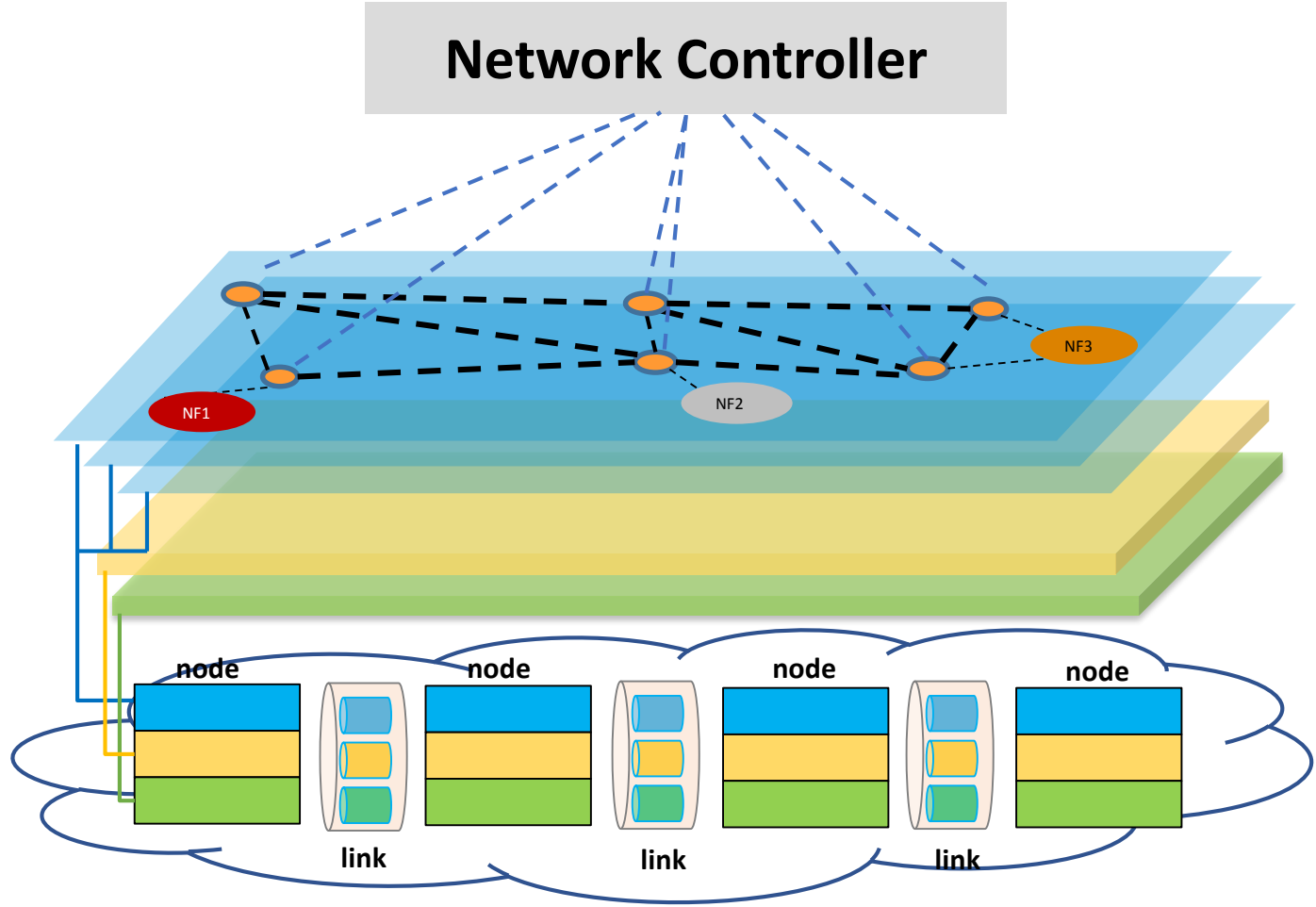
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Purpose and Scope of This Draft

- Describe the enhancements needed to VPNs to support the requirements of emerging services, particularly in 5G scenario such as network slicing.
 - Enhanced data-plane
 - Hard and Soft isolation
 - Determinism of packet loss and packet delay
 - Control protocols
 - Both in the underlay and the overlay
 - Integration of physical network, virtual network & services
 - Management plane
 - Dynamic creation, modification and deletion
 - OAM, protection, etc.

Architecture of Enhanced VPN



Control & Management
(dynamic, flexible, scalable)



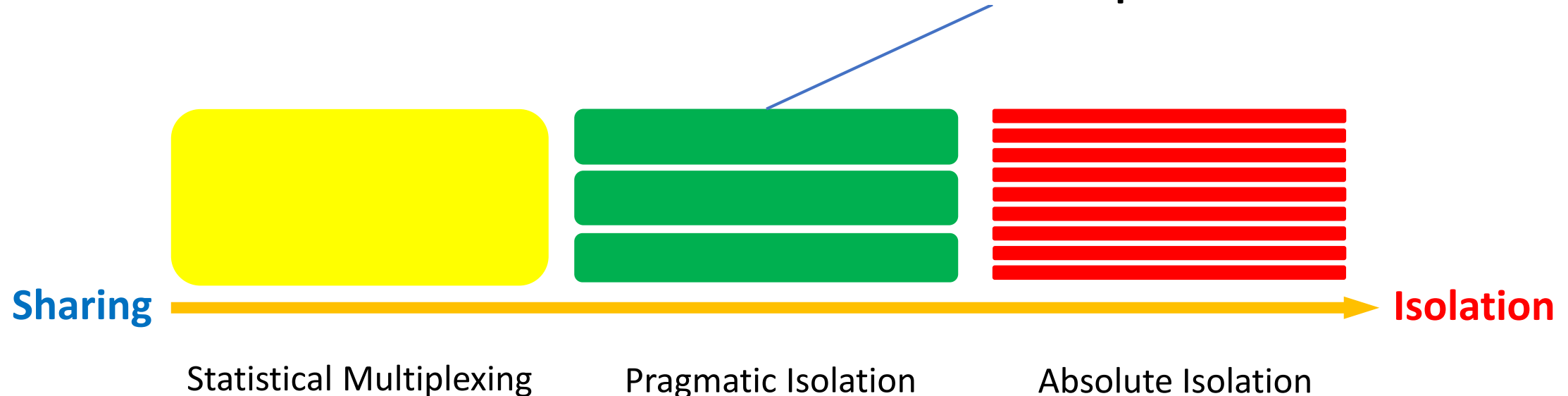
Customized Virtual Networks
(overlay & underlay integration)



Enhanced data plane
(resource reservation, scheduling)

Spectrum of Resource Isolation

What VPN+ seeks to provide



- No Resource means No Guarantee
- Resource = Any network resource in data / control / management plane
e.g. Link, Bandwidth, Queue, Buffer, Forwarder/NPU, CPU, Memory etc.

Candidate Technologies

Underlay Data Plane	<ul style="list-style-type: none">• Flexible Ethernet (FlexE)• Dedicated queues• Time Sensitive Networking (TSN)• ...
Network Layer	<ul style="list-style-type: none">• MPLS-TE• SR MPLS/SRv6 [1]• Detnet*• ...
Control Plane	<ul style="list-style-type: none">• Distributed: RSVP-TE, IGP, BGP... [2]• Centralized: PCEP, BGP-LS... [3]
Management Plane	<ul style="list-style-type: none">• ACTN architecture and data models• Service models: L3SM, L2SM, etc.

[1][2][3] Potential extensions needed in relevant WGs

* Enhancement needed for integration with virtual networks

History of This Document

- IETF 99 draft-bryant-rtgwg-enhanced-vpn-00 submitted
 - Presented in RTGWWG and Network Slicing BoF
- IETF 100 -01 with architecture section added
 - Presented in RTGWWG
- IETF 101 -02 with architecture section updated
 - Presented in RTGWWG, chairs suggested moving to TEAS
- IETF 102 draft-dong-teas-enhanced-vpn-00 submitted
 - Presented in TEAS, extensive discussion and interest to move forward
- After IETF 102
 - 2 revisions to solve the comments received online and offline

Updates since -00 in TEAS

- In Section 1 “Introduction”, add references to network slicing related works in industry.
- In section 2 “Requirement”, update the description of the isolation requirement.
- In section 4 “Candidate Technologies”, reduce the introduction about segment routing.
- In section 4 “Candidate Technologies”, update the control plane subsection.
- In section 4 “Candidate Technologies”, add a new subsection for management plane.
- Add references to candidate technologies.
- Editorial changes to improve readability.

Next Steps

- This document has been discussed widely at a number of IETF meetings.
- This document is the foundation of other related drafts.
- After several rounds of update, the content is getting stable.
- The authors believe it is ready to initiate the WG adoption on this draft.