A Framework for Enhanced Virtual Private Networks (VPN+)
draft-dong-teas-enhanced-vpn-02

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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
    • Different levels of isolation (from soft isolation to hard isolation)
    • Determinism of packet loss and 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.
Enhanced data plane (resource reservation, scheduling)

Customized Virtual Networks (overlay & underlay integration)

Control & Management (dynamic, flexible, scalable)

Service Interface/models
Spectrum of Resource Isolation

- 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.

What VPN+ seeks to provide
## Candidate Technologies

### Underlay Data Plane
- Flexible Ethernet (FlexE)
- Dedicated queues
- Time Sensitive Networking (TSN)
- ...

### Network Layer
- MPLS-TE
- SR-MPLS/SRv6 [1]
- Detnet*
- ...

### Control Plane
- Distributed: RSVP-TE, IGP, BGP... [2]
- Centralized: PCEP, BGP-LS... [3]

### Management Plane
- 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 RTGWG and Network Slicing BoF

• IETF 100  -01 with architecture section added
  • Presented in RTGWG

• IETF 101  -02 with architecture section updated
  • Presented in RTGWG, 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 “Introduction” section, add references to network slicing related works in industry.
- In “Requirement” section, update the description of the isolation requirement.
- In “Candidate Technologies” section, simplify the introduction about segment routing.
- In “Candidate Technologies” section, update the control plane subsection.
- In “Candidate Technologies” section, add a new subsection for management plane.
- Add references to the 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.