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# NVGRE and VXLAN Encapsulation for L3 Overlay

draft-yong-l3vpn-nvgre-vxlan-encap-03

Lucy Yong Xiaohu Xu

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# Problem Statement

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- Both NVGRE (draft-sridharan-virtualization-nvgre-03) and VXLAN (draft-mahalingam-dutt-dcops-vxlan-05) are originally specified for L2 virtualization overlay data encapsulation
- Network Virtualization Overlay (NVO3) states the need of the L2 and L3 virtualization overlays
- Simple NVGRE and VXLAN enhancement can achieve the L3 virtualization overlay

# About this draft

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- Propose NVGRE enhancement for L3 virtualization overlay data encapsulation
- Propose VXLAN enhancement for L3 virtualization overlay data encapsulation

# NVGRE Enhancement

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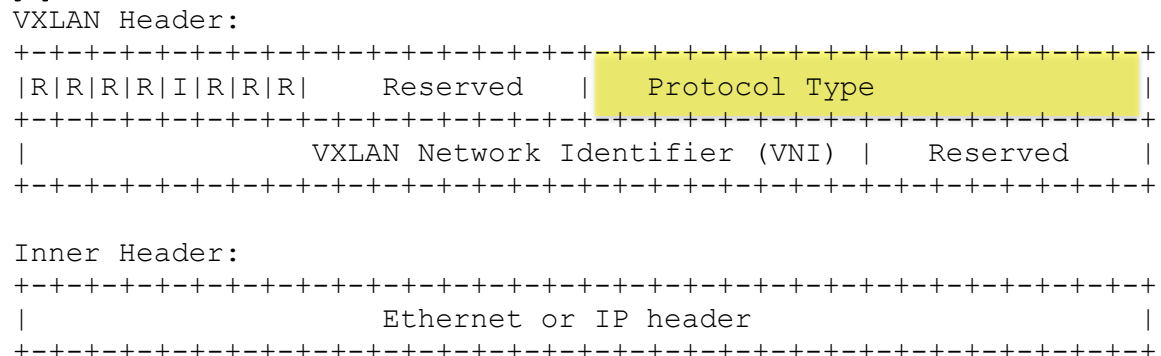
- Propose 0x0800/0x86dd as the protocol type for IPv4/v6 payload in NVGRE header
  - 0x6558 is the protocol type for Ethernet payload [NVGRE]
- No change to other fields in NVGRE header
  - The usage of other fields remains the same too
- No change to outer header
- MUST be IP payload in the inner header if 0x800/086dd in the protocol type

```
GRE Header:
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|0| |1|0| Reserved          | Ver | Prot Type=0x6558/0x0800/0x86dd|
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                               Virtual Subnet ID (VSID)           | Reserved |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
Inner Header
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                               IP Header                             |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
```

# VXLAN Enhancement

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- Use 16 reserved bits in VXLAN header as protocol type field
  - 0x0800/0x86dd for IPv4/v6 payload and 0x6558 as Ethernet payload
  - For the backward compatibility, value 0x0000 is treated as Ethernet payload
- No change to other fields in VXLAN header
  - The usage of other fields remains the same too
- No change to outer header
- Inner header may be Ethernet or IP depending on the value in protocol type



# Others in Draft

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- Backward compatibility in both methods
  - i.e. if tunnel egress only supports original method
- Benefit of these enhancements
  - Enable both encapsulation methods to support L3 virtualization overlay
  - To be a generalized network virtualization overlay data plane encapsulation format
    - The application for other payload type is for future study

# Open Discussion

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- Do we need two network virtualization overlay data encapsulation methods?
  - This draft and draft-yong-tsvwg-gre-in-udp make the enhanced NVGRE and VXLAN encapsulations very similar in the formats, the difference between two:
    - Use different standard UDP port number
    - Use different bit (3 or 5) to indicate overlay header existence
- Should IETF standardizes one or both?
  - ✓ One: no need interworking or supporting both
  - ✓ Both: used in industry already, if two are very similar, hardware supports both at no cost

# Next Step

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- Welcome comment and feedback on this
- Ready for the WG adoption