UDP Overlay Transport For NSH

draft-kumar-sfc-nsh-udp-transport-00

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Current NSH Transport Landscape

- SFC WG is not chartered to define transports
  - All transports are out-of-scope
- Implementations are required to standardize their own transports
  - Required to follow up in different/appropriate WGs
- NVO3 WG adopted VXLAN-GPE, which signals NSH
  - Requires Virtual Networks
  - Does not carry NSH directly over UDP
Motivation for NSH over UDP

- There is no transport in SFC WG for NSH!

- Need a transport encapsulation for NSH, that is
  - Very simple, no barrier to entry
  - Based on existing protocols
  - Works in existing L3 Networks – IPv4/IPv6
  - Has minimal or no overhead beyond NSH itself
  - Meets the transport independence goal of NSH
Overview

- Describes how to carry NSH encapsulated packets, directly over UDP
- This draft specifies the use of UDP port no. 6633
  - which is assigned to “Cisco vPath Services Overlay”
  - And instructs IANA to reassign this port to NSH
- Alternatively, and preferably, a new port could be assigned for NSH
**NSH UDP Overlay Packet Format**

**NSH Over UDP Packet Structure**

| NSH Over UDP Packet Structure | L2 (Ethernet) Header | L3 (IPv4|IPv6) Header | UDP Header | NSH Header | Original (underlay) Packet|Frame |
|-------------------------------|----------------------|----------------------|------------|------------|---------------------------|------|

**NSH Over UDP Packet Structure Diagram**

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Source Port = XXXXX | Dest Port = 6633 (or new) | UDP |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Length | Checksum | Hdr |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| | | UDP |
~ Network Service Header (NSH) ~
| | | Payload |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| | | Original L2/L3 frame/packet or other as signaled by NSH |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
Benefits of UDP Transport for NSH

- **Entropy**
  - Allows the use of source UDP port no. to be a function of the inner packet/flow
  - Allows for distribution of inner packets flows, in the network and end points

- **Zero Overhead compared to VXLAN GPE**
  - Use cases may not need virtual networks
  - Where needed, it can be carried as part of NSH metadata
WG Placement And Next Steps

- This draft is presented here in SFC WG as per guidance received from
  - Alia Atlas (Routing AD), Spencer Dawkins (Transport AD)
- Authors request this draft to be adopted as SFC WG draft
  - With support from Transport Area (TSV) WG
- Will be updated with Security and Congestion Control guidelines
  - As per RFC5405bis

- As always solicit WG discussion and feedback