Network Service Header KPI Stamping

draft-browne-sfc-nsh-kpi-stamp-00

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Overview

- KPI Stamping provides a generic method for examining KPIs at each SF in an NSH service chain
  - We use MD2 to define KPI header structure
- We currently define 2 KPI types, latency and QoS. The method is extensible to other KPI types
- We use detection mode and extensive mode.
  - Detection mode allows the SFC classifier to ingress stamp the KPI and optionally to insert a threshold, that when exceeded constitutes a service violation
  - Extensive mode allows us to aggressively examine the service chain for root cause analysis of KPI violation
- KPIs can be examined, end-to-end, on a specific SF, or hop-by-hop
- Associated control plane is not defined in this draft

Detection Mode

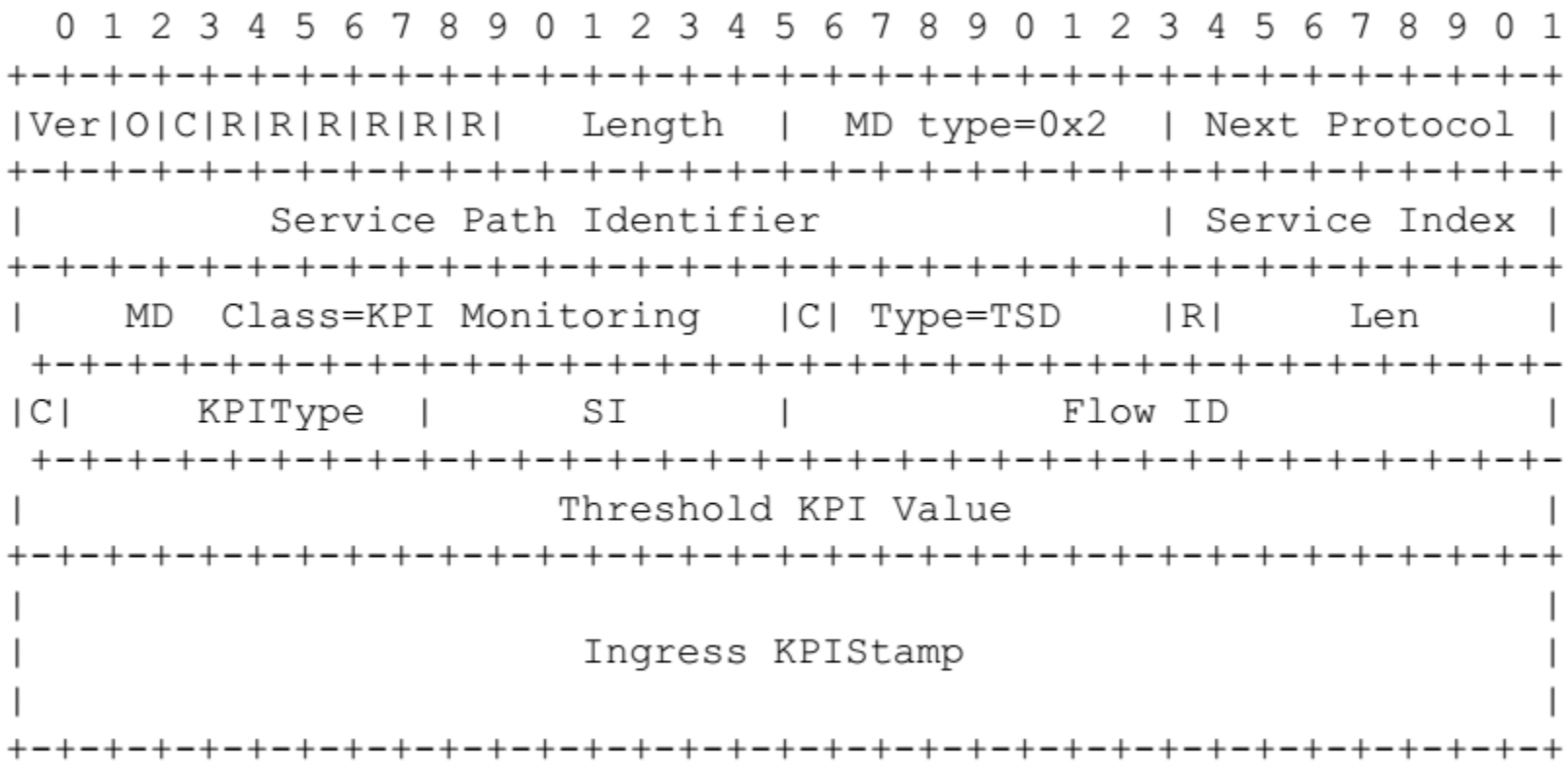

Figure 6: Generic NSH KPI Encapsulation (Detection Mode)

- Low Overhead, no packet growth
- Ingress stamp performed by SFC Classifier (FSN)
- Threshold defines maximum chain latency (for example)

Extended Mode

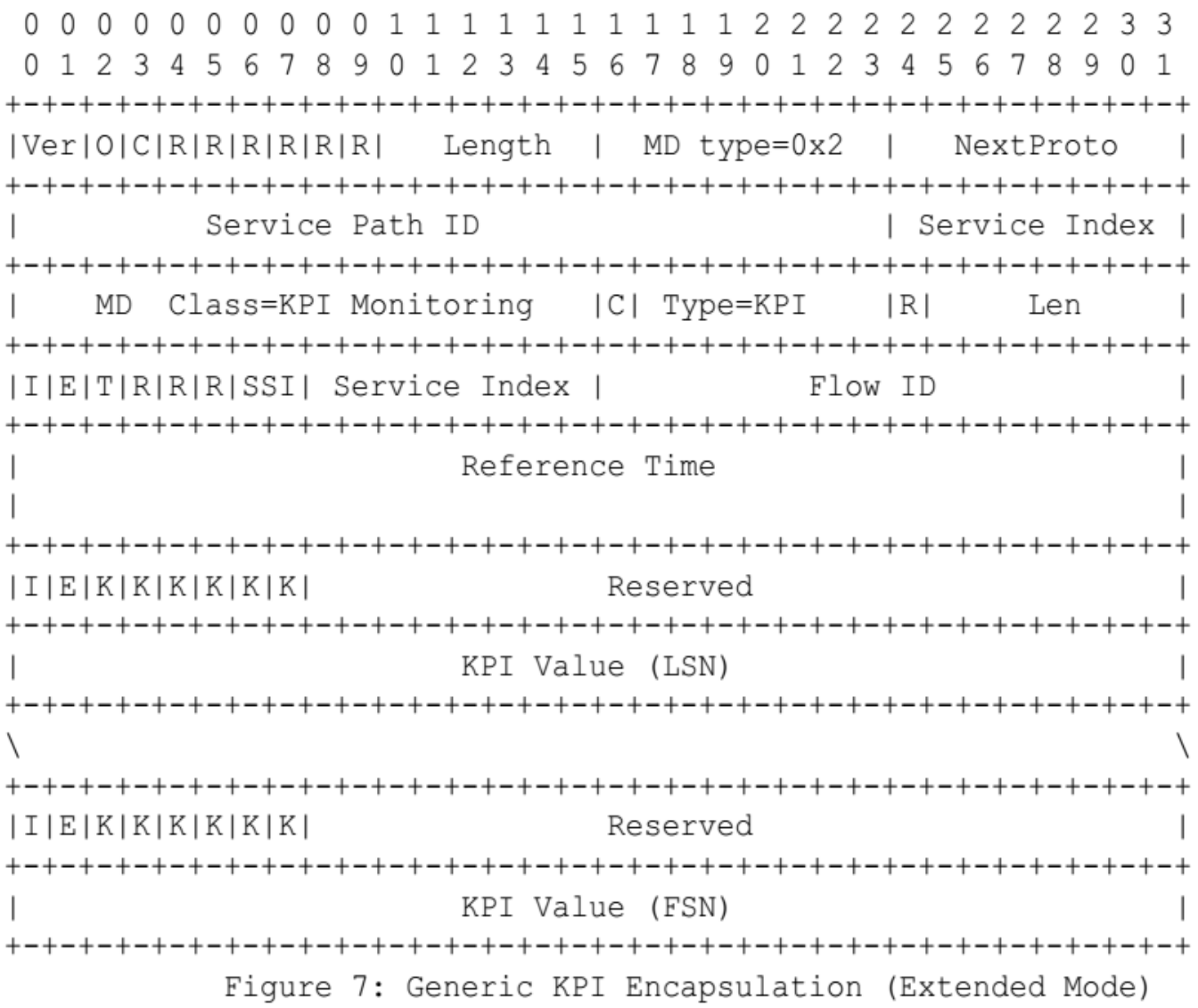

Figure 7: Generic KPI Encapsulation (Extended Mode)

- Reference time and Flow ID are used for offline analysis and correlation
- SSI defines required operation
- E2E stamps at chain ingress and egress
- Specific stamps at 1 SF ingress and egress
- Hop by hop stamps at each SF ingress, egress or both

Extended Mode (Latency)

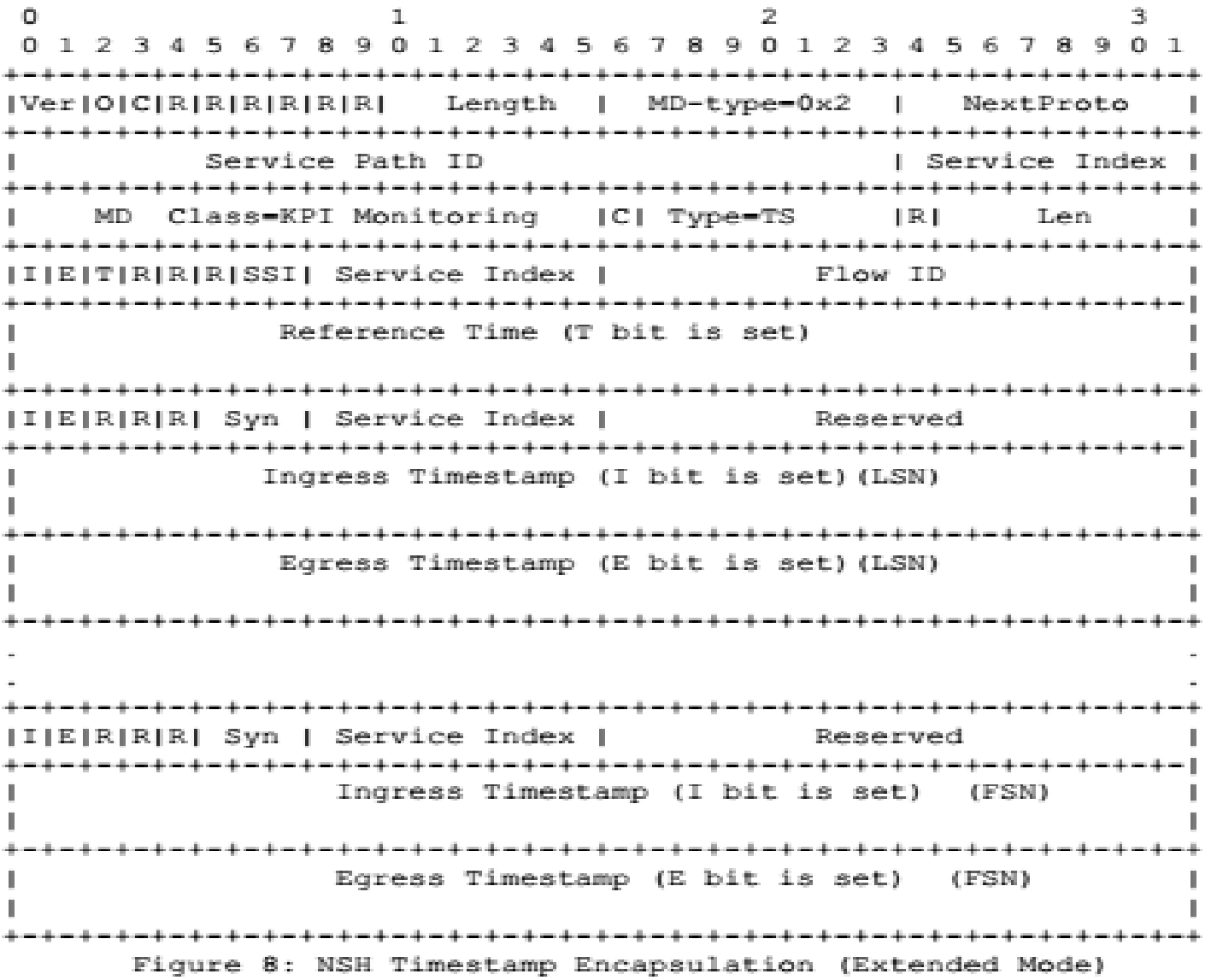

Figure 8: NSH Timestamp Encapsulation (Extended Mode)

- SFs must be in synch
- I, E are ingress, egress flags
- T is reference time flag
- Syn indicates synchronization status
- Fragmentation is out of scope.
- PTP timestamps are used

Extended Mode (QoS)

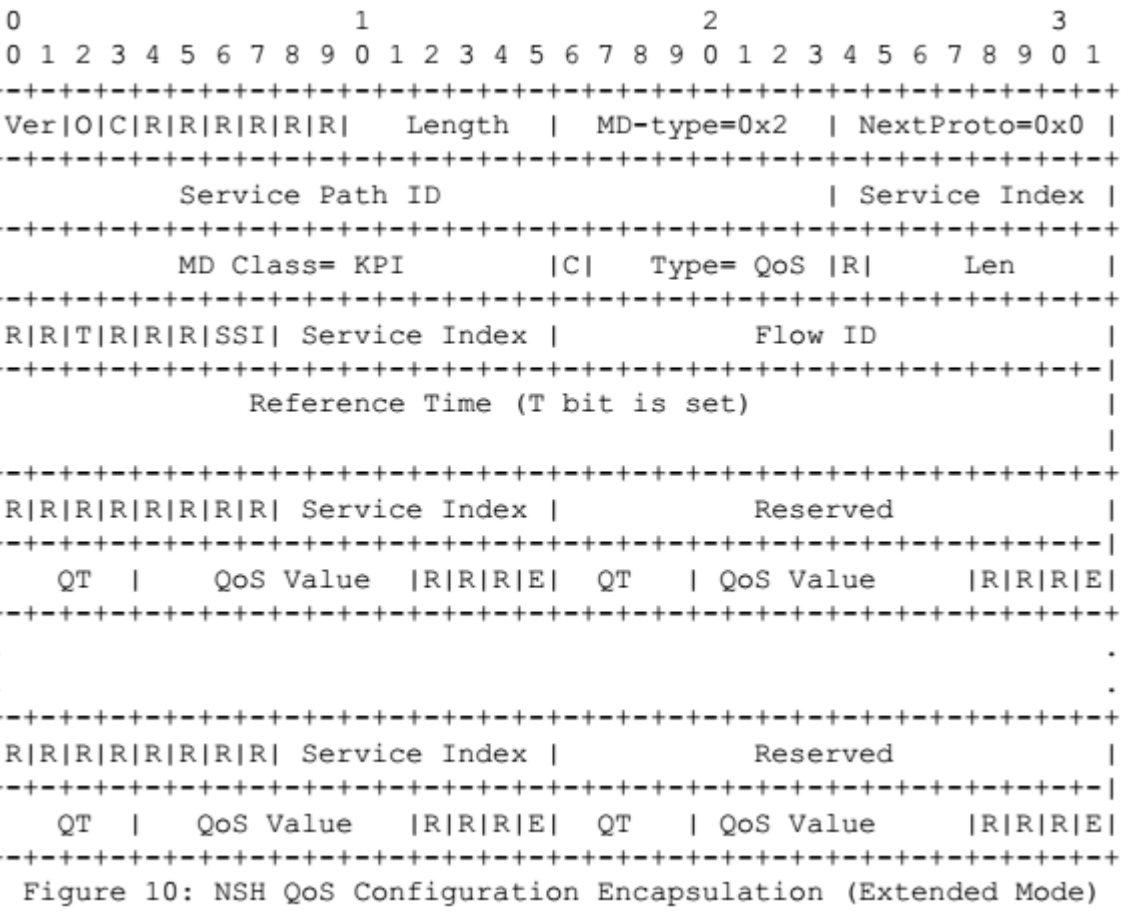

Figure 10: NSH QoS Configuration Encapsulation (Extended Mode)

Q Type(QT)	Value	Length	Comment
IVLAN	0x01	4 Bits	Ingress VLAN (PCP + DEI)
EVLAN	0x02	4 Bits	Egress VLAN
IQINQ	0x03	8 Bits	Ingress QinQ (2x PCP+DEI)
EQINQ	0x04	8 Bits	Egress QinQ
IMPLS	0x05	3 Bits	Ingress Label
EMPLS	0x06	3 Bits	Egress Label
IMPLS	0x07	6 Bits	2 Ingress Labels (2x EXP)
EMPLS	0x08	6 Bits	2 Egress Labels
IDSCP	0x09	8 Bits	Ingress DSCP
EDSCP	0x0A	8 Bits	Egress DSCP

- QoS stamping is performed infrequently on a tiny percentage of traffic

Result Examples

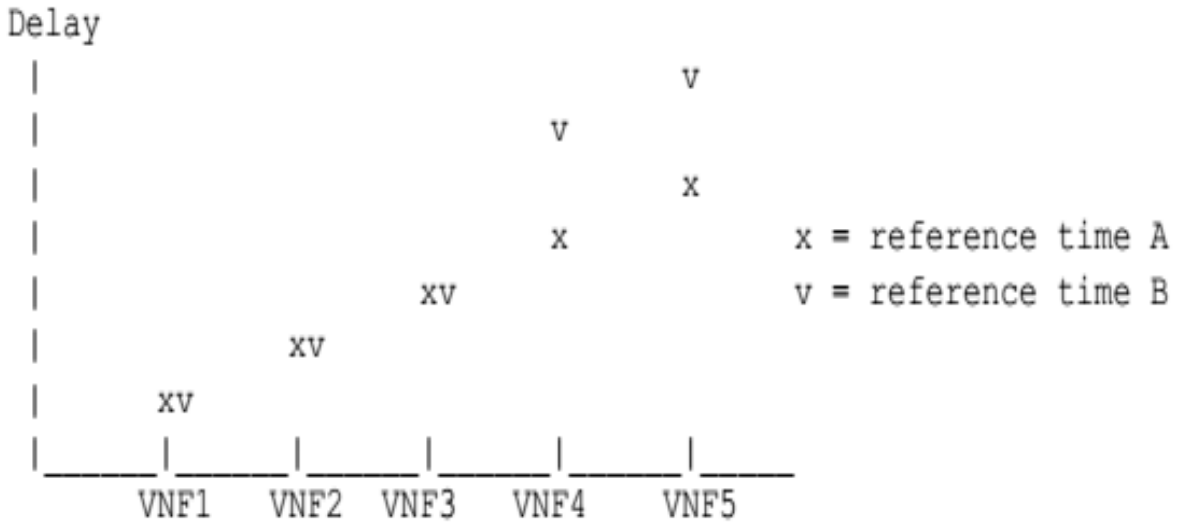

Figure 2: Flow performance in a service chain

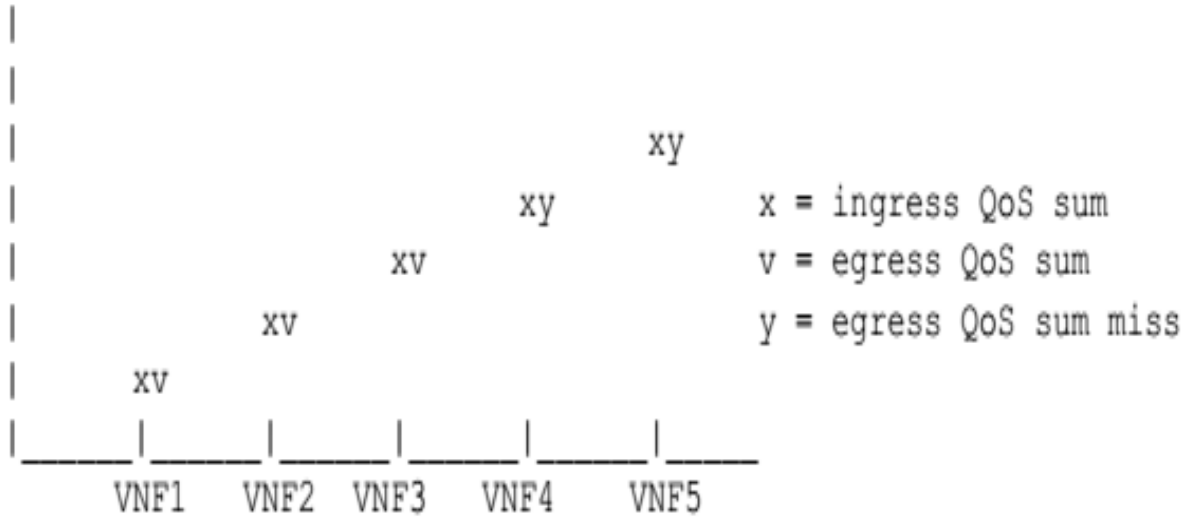

Figure 3: Flow QoS Consistency in a service chain

- Detect and diagnose latency issues in SFs and Vlinks
- Detect QoS configuration issues per SF and Vlink

Summary

- KPI Stamping provides a generic method for examining KPIs at each SF in an NSH service chain in order to
  - Check SF processing times
  - Check Vlink transit times
  - Check QoS configuration consistency in a chain
- KPI stamping is not an OAM protocol – it operates on subscriber traffic
- KPI stamping is performed on a very small subset of traffic
- KPI Stamping is an operational tool that reduces the need for expensive and manual techniques in order to monitor and debug NSH service chains

Thanks!