Network Service Header
KPI Stamping
draft-browne-sfc-nsh-kpi-stamp-00

Rory Browne (rory.browne@intel.com)
Andrey Chilikin (andrey.chilikin@intel.com)
Tal Mizrahi (talmi@marvell.com)
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

<table>
<thead>
<tr>
<th>Ver</th>
<th>O</th>
<th>C</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>Length</th>
<th>MD type=0x2</th>
<th>Next Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Path Identifier</th>
<th>Service Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MD Class=KPI Monitoring</th>
<th>C</th>
<th>Type=TSD</th>
<th>R</th>
<th>Len</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>KPI_Type</th>
<th>SI</th>
<th>Flow ID</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Threshold KPI Value</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ingress KPIStamp</th>
</tr>
</thead>
</table>

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
</table>

---

**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

```
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 3 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
```

+---------------------------------------------------------------------+
| Ver | O | C | R | R | R | R | R | Length | MD type=0x2 | Next Proto |
+---------------------------------------------------------------------+
| Service Path ID | Service Index |
+---------------------------------------------------------------------+
| MD Class=KPI Monitoring | C | Type=KPI | R | Len |
+---------------------------------------------------------------------+
| I | E | T | R | R | SSI | Service Index | Flow ID |
+---------------------------------------------------------------------+
| Reference Time |
+---------------------------------------------------------------------+
| I | E | K | K | K | K | K |
+---------------------------------------------------------------------+
| Reserved |
+---------------------------------------------------------------------+
| I | E | K | K | K | K | K | K | K |
+---------------------------------------------------------------------+
| Reserved |
+---------------------------------------------------------------------+
| I | E | K | K | K | K | K | K |
+---------------------------------------------------------------------+
| KPI Value (FSN) |
+---------------------------------------------------------------------+

![Generic KPI Encapsulation (Extended Mode)](image)

- 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)

- 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

Figure 8: NSH Timestamp Encapsulation (Extended Mode)
Extended Mode (QoS)

QoS stamping is performed infrequently on a tiny percentage of traffic.
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!