

NSH Context Header Allocation: Timestamp

Tal Mizrahi*, Ilan Yerushalmi*, David Melman*, Rory Browne[◇]

*Marvell, [◇]Intel

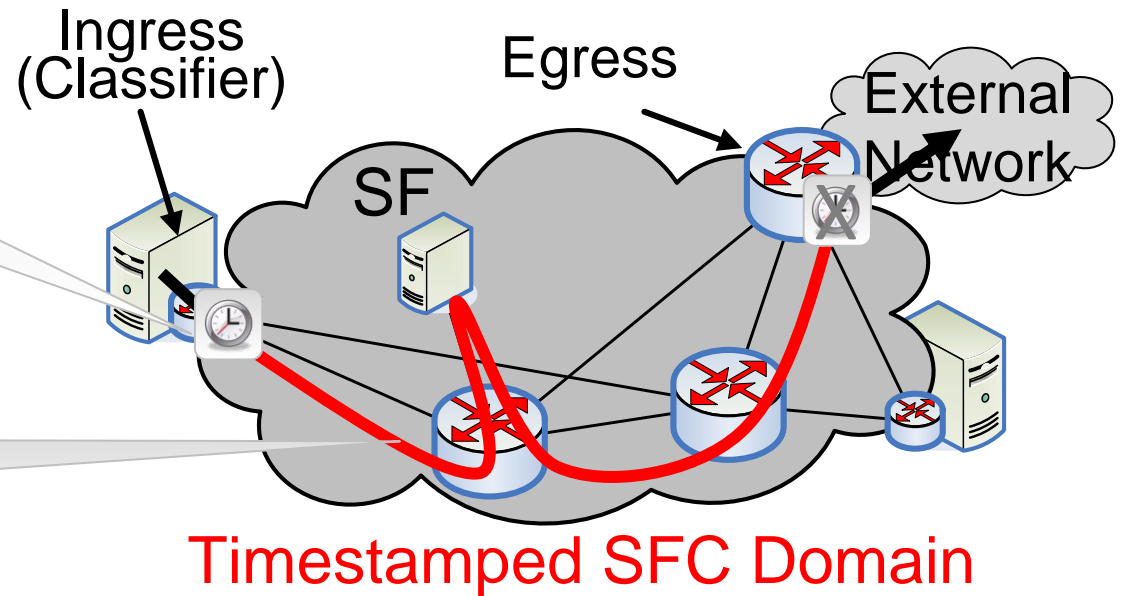
[draft-mymb-sfc-nsh-allocation-timestamp-00](#)

IETF 98, Chicago, March 2017

The NSH Timestamp in a Nutshell

Timestamp is incorporated in metadata (MD Type 0x1).

Timestamp can be read / used by SFFs / SFs.



NSH Timestamp and KPI-Stamping

KPI-Stamping [draft-browne-sfc-nsh-kpi-stamp] :

- Per-hop ingress/egress timestamp and QoS information.
- MD Type 0x2.

The NSH Timestamp can be used with KPI stamping:

- NSH Timestamp used routinely.
- When problem detected:
 - Use KPI-stamping or IOAM.

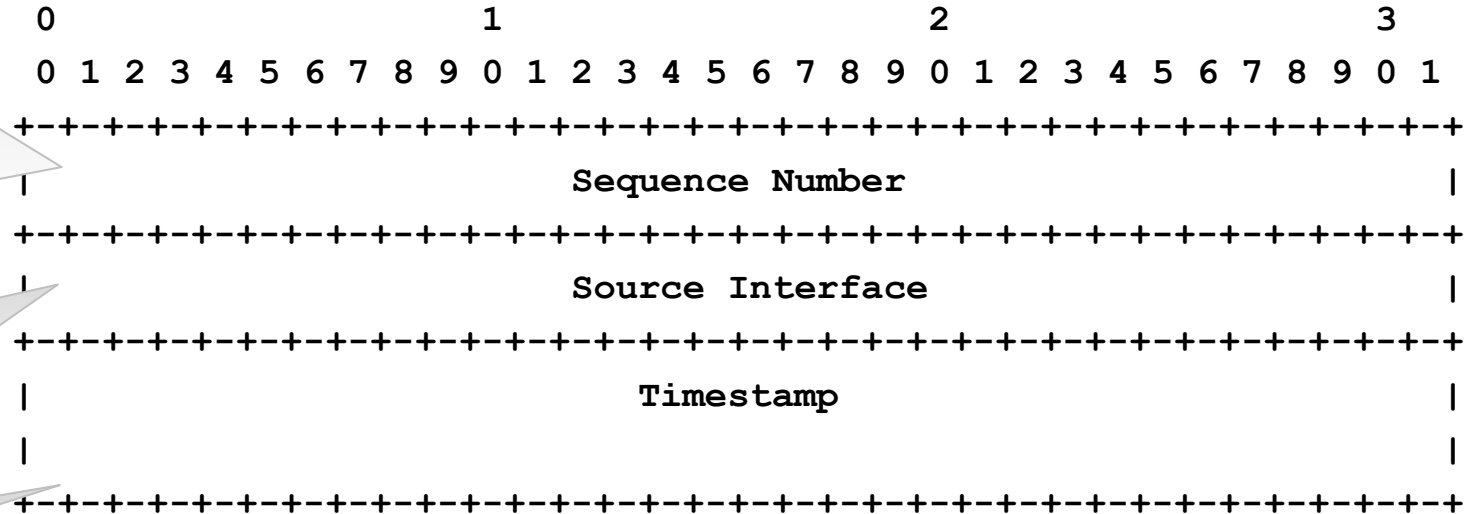
NSH Timestamp Allocation Format

Can be used for detecting:

- Out-of-order
- Duplicates
- Loops

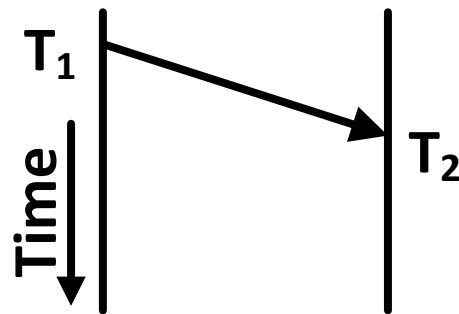
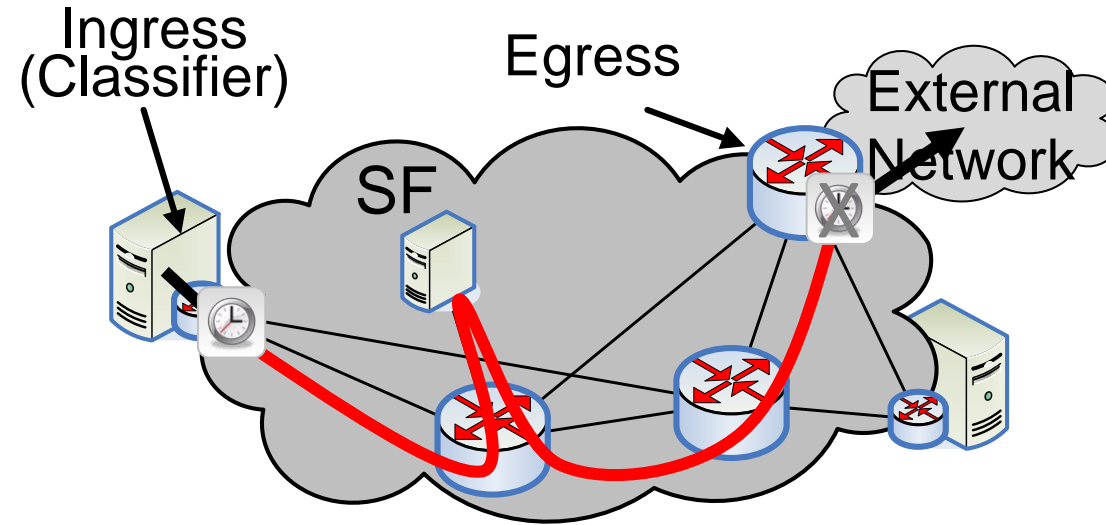
Interface identifier at the classifier.

Timestamp in IEEE 1588 truncated format.



Use Cases

Delay Measurement Use Case

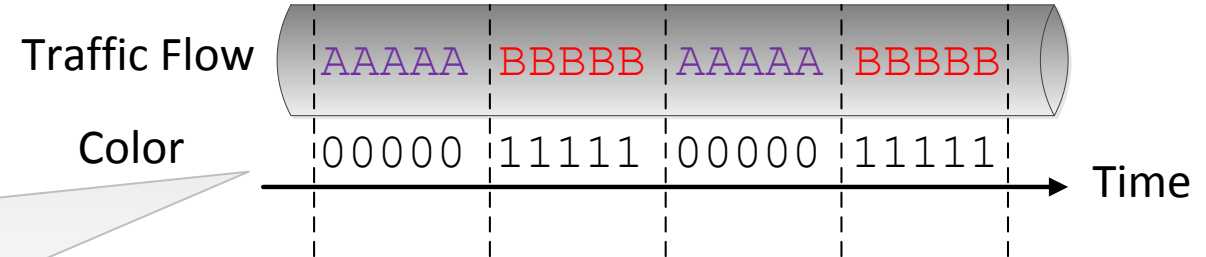


One-way delay: $T_2 - T_1$

Alternate Marking Use Case

Alternate Marking [draft-ietf-ippm-alt-mark]

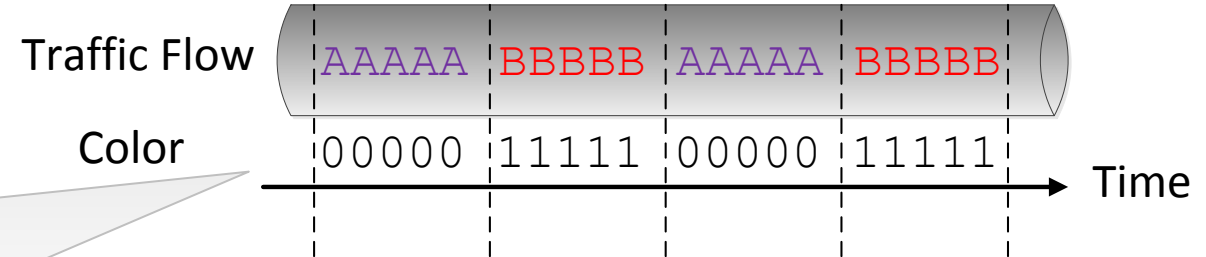
- A bit in the header is used as a color indicator.
- Coloring enables loss and delay measurement.



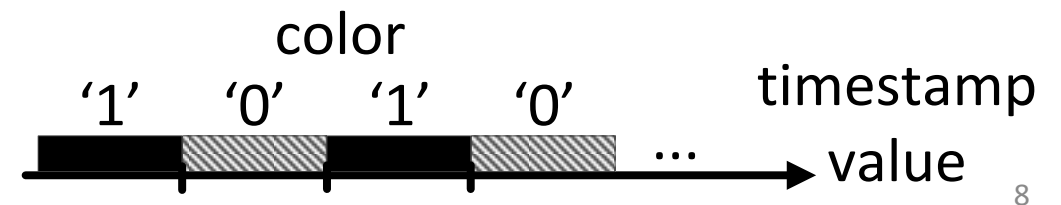
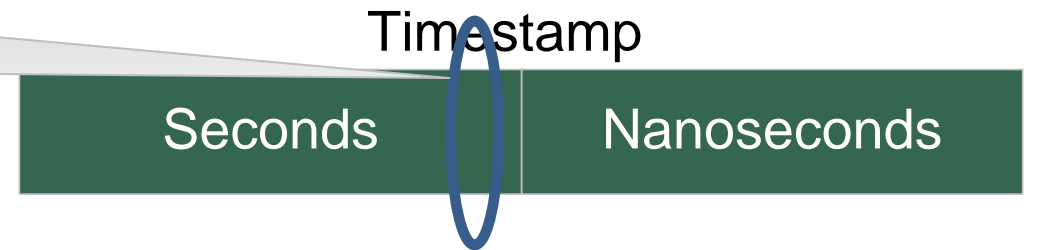
Alternate Marking Use Case

Alternate Marking [draft-ietf-ippm-alt-mark]

- A bit in the header is used as a color indicator.
- Coloring enables loss and delay measurement.

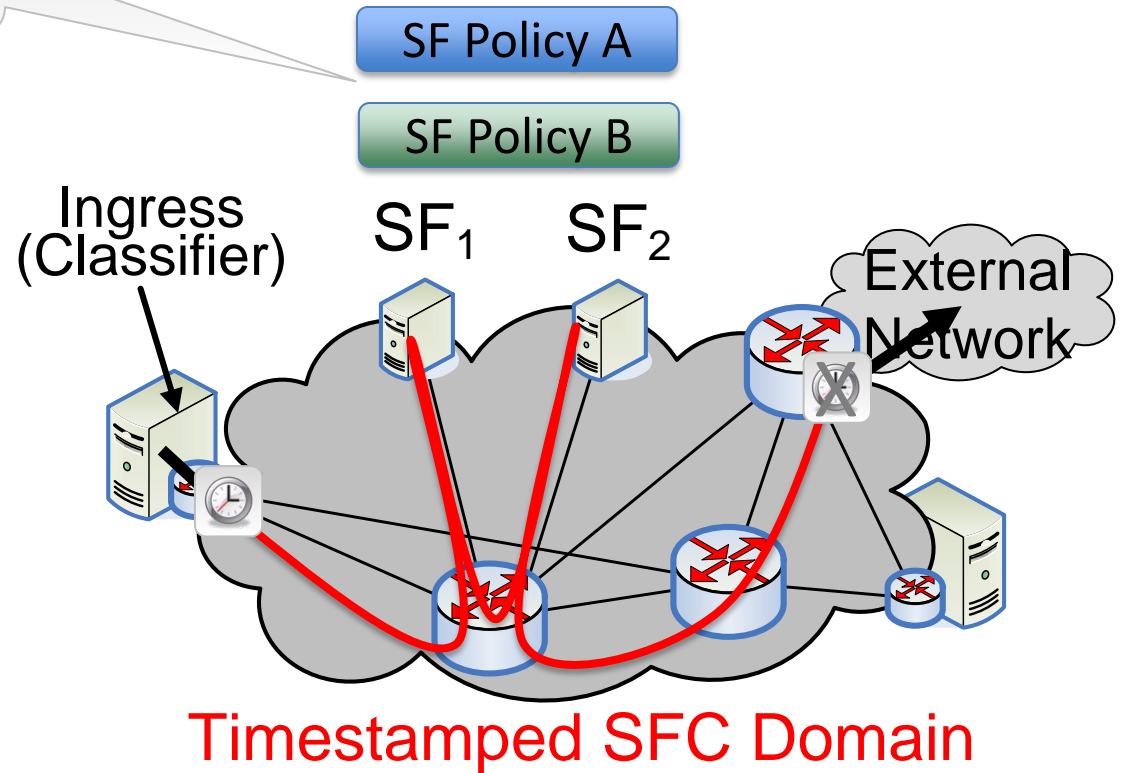


- Choose **1 bit** from the timestamp.
- Use this bit as the color indicator.



Consistent Update Use Case

Consistent (atomic) update from policy A to policy B.

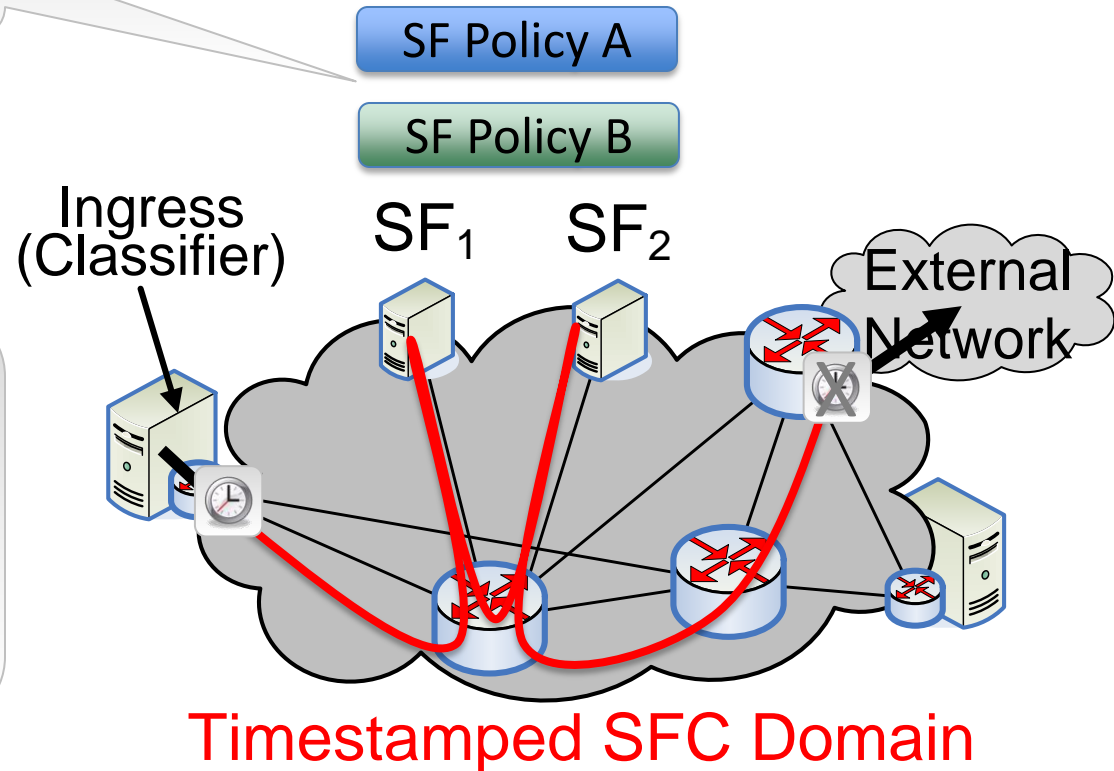


Consistent Update Use Case

Consistent (atomic) update from policy A to policy B.

Maybe this can work?
At time $< T_0$ Policy A.
At time $\geq T_0$ Policy B.

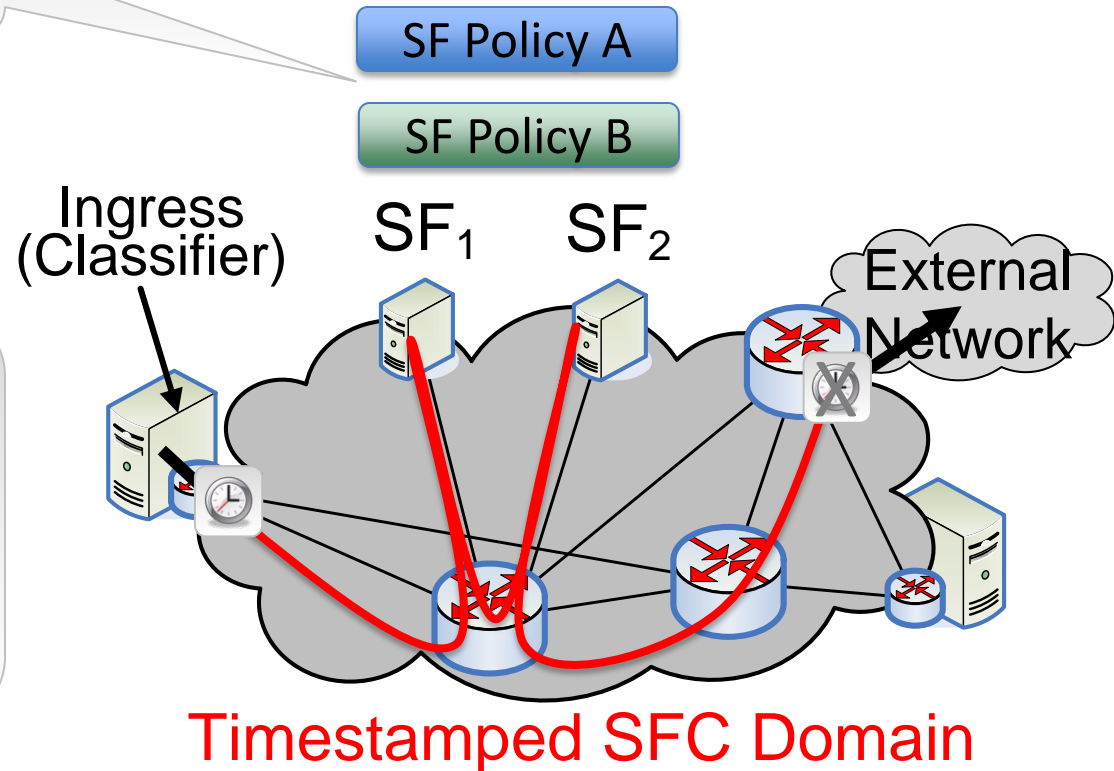
Not consistent!



Consistent Update Use Case

Consistent (atomic) update from policy A to policy B.

Consistent update:
At **timestamp** $< T_0$ Policy A.
At **timestamp** $\geq T_0$ Policy B.



Next Steps

Draft Status and Next Steps

- January 2017 – draft 00 submitted.
- Next steps:
 - Working group feedback.
 - Consider WG adoption.

Thanks!

Related Work

- This presentation summarizes [1].
- The NSH timestamp of this draft can be used in conjunction with [2] or [4], which also use timestamping in NSH.
- NSH timestamping can be used for various use cases (e.g., [3], [5]) .
- Security considerations are discussed in [1] and in [2]. Security considerations of time protocols are discussed in [6].

References

- [1] T. Mizrahi, I. Yerushalmi, D. Melman, R. Browne, “Network Service Header (NSH) Context Header Allocation: Timestamp”, draft-mymb-sfc-nsh-allocation-timestamp-00, work in progress, 2017.
- [2] R. Browne, A. Chilikin, T. Mizrahi, “Network Service Header KPI Stamping”, draft-browne-sfc-nsh-kpi-stamp-00, work in progress, 2016.
- [3] G. Fioccola, A. Capello, M. Cociglio, L. Castaldelli, M. Chen, L. Zheng, G. Mirsky, T. Mizrahi, “Alternate Marking method for passive performance monitoring”, draft-ietf-ippm-alt-mark, work in progress, 2017.
- [4] F. Brockners, S. Bhandari, C. Pignataro, H. Gredler, J. Leddy, S. Youell, T. Mizrahi, D. Mozes, P. Lapukhov, R. Chang, "Data Formats for In-situ OAM", draft-brockners-inband-oam-data-03 (work in progress), 2017.
- [5] T. Mizrahi, Y. Moses, "[The Case for Data Plane Timestamping in SDN](#)", IEEE INFOCOM Workshop on Software-Driven Flexible and Agile Networking (SWFAN), 2016.
- [6] T. Mizrahi, "Security Requirements of Time Protocols in Packet Switched Networks", RFC 7384, 2014.