DetNet
Data Plane Drafts
TSN-related

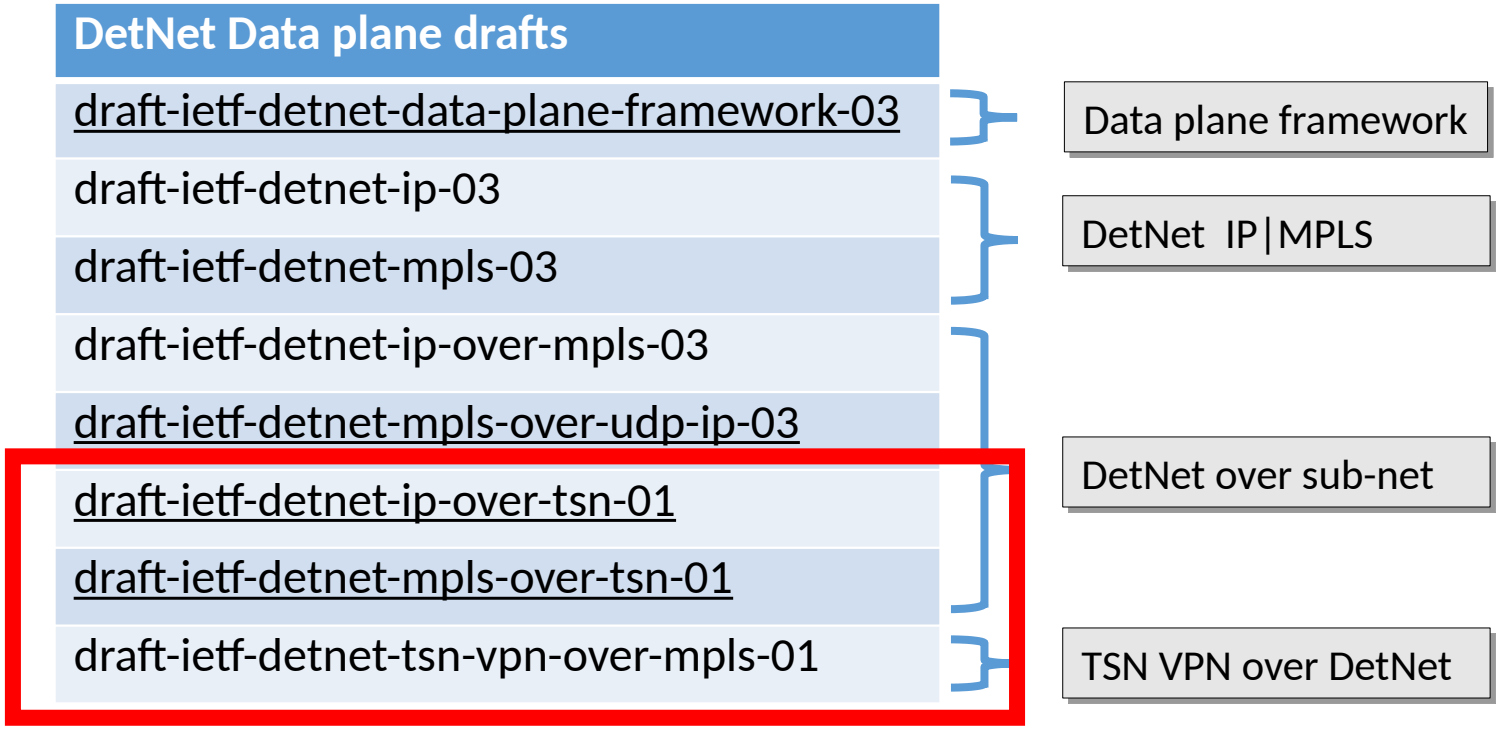
Balázs Varga, János Farkas, Andrew Malis, Stewart Bryant, Don Fedyk

DetNet WG

Singapore, 21st November, 2019

Data plane documents
Status

- Building block approach



DetNet Data Plane: TSN related cases

- DetNet Data Plane: IP over IEEE 802.1 Time Sensitive Networking (TSN) draft-ietf-detnet-ip-over-tsn-01
- DetNet Data Plane: MPLS over IEEE 802.1 Time Sensitive Networking (TSN) draft-ietf-detnet-mpls-over-tsn-01

- DetNet Data Plane: IEEE 802.1 Time Sensitive Networking over MPLS draft-ietf-detnet-tsn-vpn-over-mpls-01

New common document structure. Cleaned up and filled up with new text where necessary.

DetNet Data Plane: IP over 802.1 TSN

draft-ietf-detnet-ip-over-tsn-01

- Content
  - specifies the Deterministic Networking IP data plane when operating over a TSN sub-network.
- DetNet IP Data Plane
  - DetNet forwarding sub-layer only
  - Service protection within the TSN sub-network
- Management and Control Information Summary

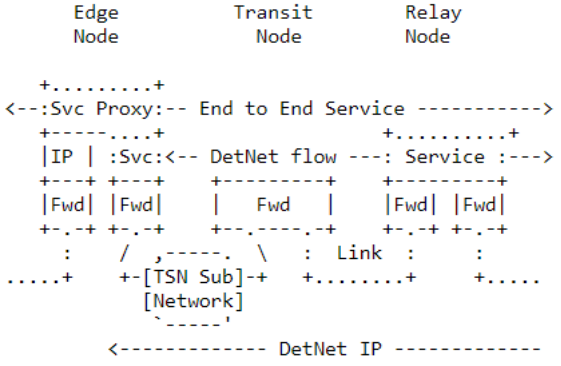
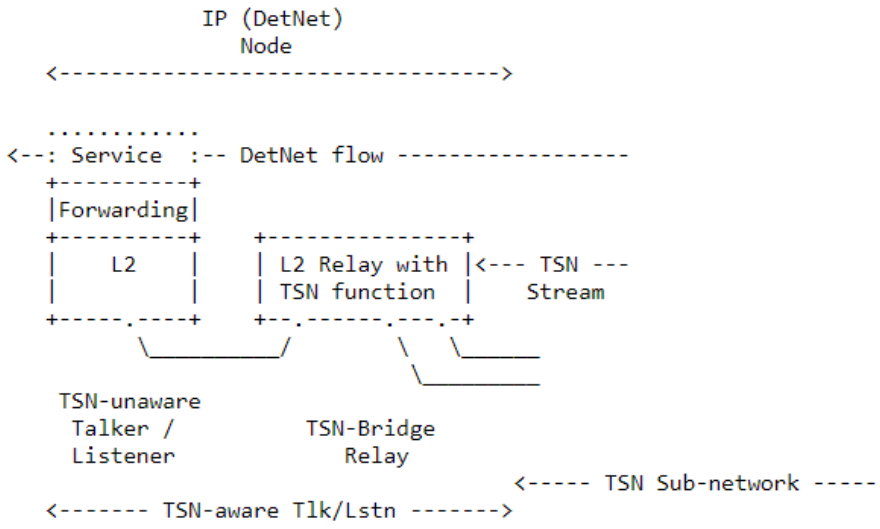


Figure 1: Part of a Simple DetNet (DN) Enabled IP Network using a TSN sub-net

Table of Contents

1. Introduction 2
2. Terminology 3
2.1. Terms Used In This Document 3
2.2. Abbreviations 3
2.3. Requirements Language 3
3. DetNet IP Data Plane Overview 3
4. DetNet IP Flows over an IEEE 802.1 TSN sub-network 5
4.1. Functions for DetNet Flow to TSN Stream Mapping 6
4.2. TSN requirements of IP DetNet nodes 6
4.3. Service protection within the TSN sub-network 8
4.4. Aggregation during DetNet flow to TSN Stream mapping . . 8
5. Management and Control Implications 8
6. Security Considerations 9
7. IANA Considerations 10
8. Acknowledgements 10
9. References 10
9.1. Normative references 10
9.2. Informative references 10
Authors' Addresses 12



DetNet Data Plane: IP over 802.1 TSN
Management and Control Information Summary

DetNet flow and TSN Stream mapping related information are required:

- TSN-aware IP DetNet nodes are member of both the DetNet domain and the TSN sub-network.
- Within the TSN sub-network the TSN-aware IP (DetNet) node has a TSN-aware Talker/Listener role.
- DetNet flow ID and flow related parameters/requirements must be converted to a TSN Stream ID and stream related parameters/requirements.

- Triggering the setup/modification of a TSN Stream in the TSN sub-network is an example where management and/or control plane interactions are required between the DetNet and TSN sub-network.

- TSN-unaware IP (DetNet) nodes make such a triggering even more complicated as they are fully unaware of the sub-network and run independently.

DetNet Data Plane: MPLS over 802.1 TSN

draft-ietf-detnet-mpls-over-tsn-01

- Content
  - specifies the Deterministic Networking MPLS data plane when operating over a TSN sub-network.
- DetNet MPLS Data Plane
  - DetNet service and forwarding sub-layer
  - Service protection interworking scenarios are left for further study.
- Management and Control Information Summary

Table of Contents

1. Introduction 2
2. Terminology 3
   2.1. Terms Used in This Document 3
   2.2. Abbreviations 3
   2.3. Requirements Language 4
3. DetNet MPLS Data Plane Overview 4
4. DetNet MPLS Operation Over IEEE 802.1 TSN Sub-Networks . . . 5
   4.1. Functions for DetNet Flow to TSN Stream Mapping 7
   4.2. TSN requirements of MPLS DetNet nodes 7
   4.3. Service protection within the TSN sub-network 9
   4.4. Aggregation during DetNet flow to TSN Stream mapping . . 9
5. Management and Control Implications 9
6. Security Considerations 11
7. IANA Considerations 11
8. Acknowledgements 11
9. References 11
   9.1. Normative References 11
   9.2. Informative References 11
Authors' Addresses 13

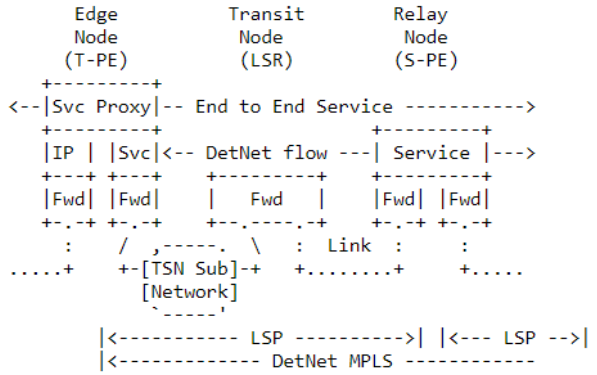


Figure 1: Part of a Simple DetNet MPLS Network using a TSN sub-net

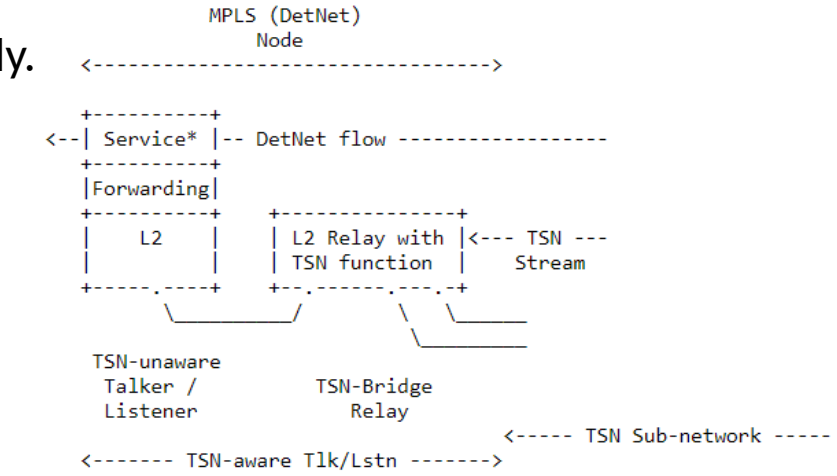


Figure 3: MPLS (DetNet) Node with TSN Functions

DetNet Data Plane: MPLS over 802.1 TSN
Management and Control Information Summary

DetNet flow and TSN Stream mapping related information are required:

- TSN-aware MPLS DetNet nodes are member of both the DetNet domain and the TSN sub-network.
- Within the TSN sub-network the TSN-aware MPLS (DetNet) node has a TSN-aware Talker/Listener role.
- DetNet flow ID and flow related parameters/requirements must be converted to a TSN Stream ID and stream related parameters/requirements.
- Triggering the setup/modification of a TSN Stream in the TSN sub-network is an example where management and/or control plane interactions are required between the DetNet and TSN sub-network.
- TSN-unaware MPLS (DetNet) nodes make such a triggering even more complicated as they are fully unaware of the sub-network and run independently.
- Service protection interworking scenarios are left for further study.

DetNet Data Plane: 802.1 TSN over MPLS

draft-ietf-detnet-tsn-vpn-over-mpls-01

- Content
  - specifies the Deterministic Networking data plane when TSN networks are interconnected over a DetNet MPLS Network.
- Concept
  - TSN Stream(s) treated as DetNet App-flow.
  - DetNet domain behaves as a TSN relay node for the TSN streams
  - Service proxy behaves as a port of that TSN relay node.
- TSN over MPLS Data Plane Procedures defined:
  - TSN related
  - DetNet Service Proxy
  - DetNet service and forwarding sub-layer
  - Service protection interworking scenarios are left for further study
- Management and Control Information Summary

Table of Contents

1. Introduction 2
2. Terminology 3
   2.1. Terms Used in This Document 3
   2.2. Abbreviations 3
   2.3. Requirements Language 4
3. IEEE 802.1 TSN Over DetNet MPLS Data Plane Scenario 4
4. DetNet MPLS Data Plane 6
   4.1. Overview 6
   4.2. TSN over DetNet MPLS Encapsulation 7
5. TSN over MPLS Data Plane Procedures 8
   5.1. Edge Node TSN Procedures 8
   5.2. Edge Node DetNet Service Proxy Procedures 9
   5.3. Edge Node DetNet Service and Forwarding Sub-Layer Procedures 9
6. Controller Plane (Management and Control) Considerations . . 10
7. Security Considerations 11
8. IANA Considerations 11
9. Acknowledgements 11
10. References 11
   10.1. Normative References 11
   10.2. Informative References 12
Authors' Addresses 13

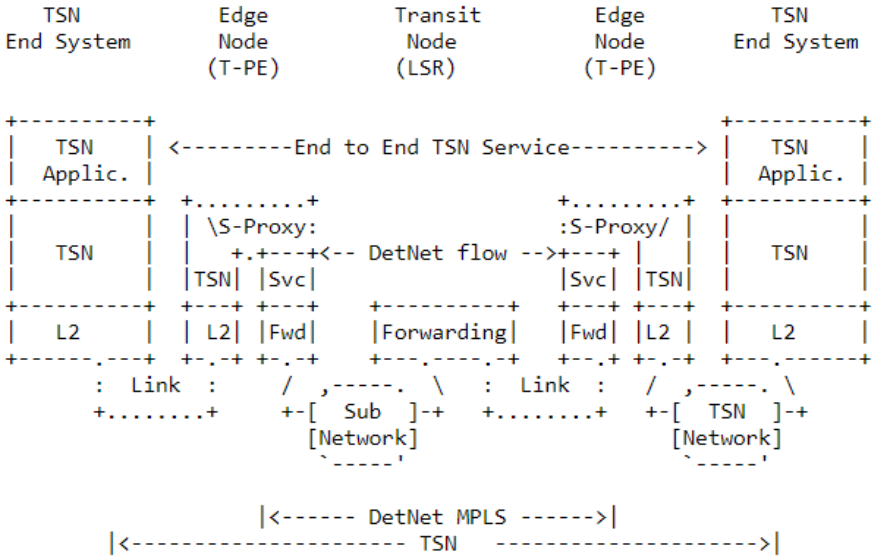


Figure 1: A TSN over DetNet MPLS Enabled Network

DetNet Data Plane: 802.1 TSN over MPLS
Management and Control Information Summary

DetNet flow and TSN Stream mapping related information are required:

- for the service proxy function of MPLS (DetNet) Edge nodes
- MPLS DetNet Edge nodes are member of both the DetNet domain and the connected TSN network.
- From the TSN network perspective the MPLS (DetNet) Edge node has a "TSN relay node" role, so TSN specific management and control plane functionalities must be implemented.

- TSN Stream ID(s) and stream(s) related parameters/requirements must be converted to a DetNet flow-ID and flow related parameters/requirements.
- Triggering the setup/modification of a TSN Stream in the TSN sub-network is an example where management and/or control plane interactions are required between the DetNet and TSN network.

- Service protection interworking scenarios are left for further study.

Summary – Next Steps

- Collecting feedback …
- Add conformance language

Thanks …