

DetNet Service Model

draft-varga-detnet-service-model-00

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Berlin, July 18, 2016

DetNet WG

Overview

- Target
- Current content
- Next steps

Disclaimer

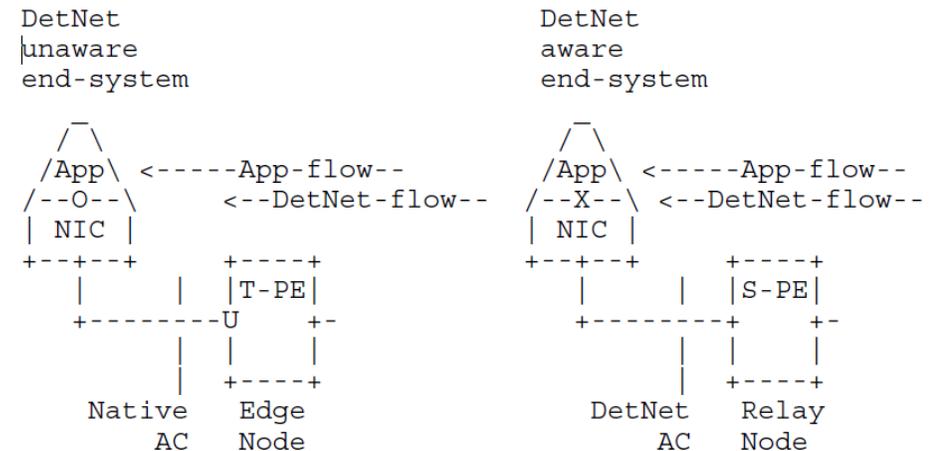
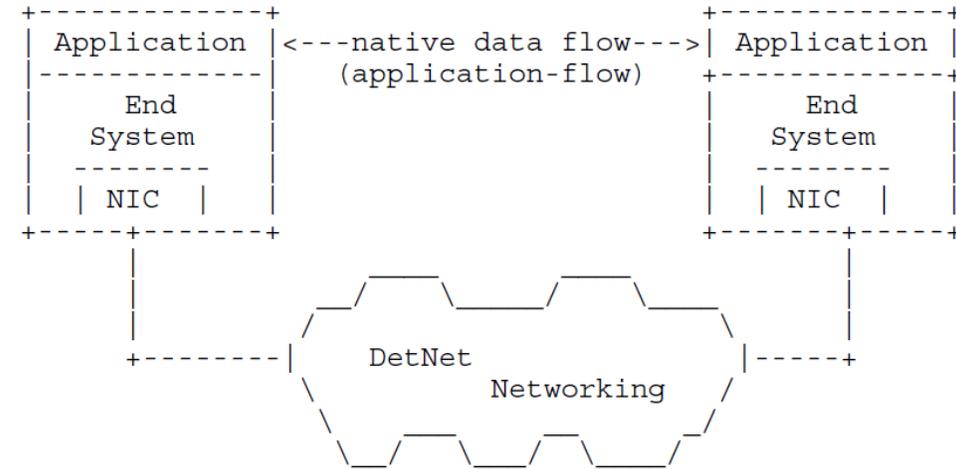
- The I-D is work in progress and subject to undergo multiple changes.

Target of the draft

- Describes
 - service model for scenarios requiring deterministic networking
- Defines
 - service reference points, service components and naming for service scenarios to achieve common understanding of the detnet service model
- Content
 - 4. End-systems connected to DetNet
 - 5. DetNet service model
 - 6. DetNet service instances
 - 7. DetNet data flows over multiple technology domains

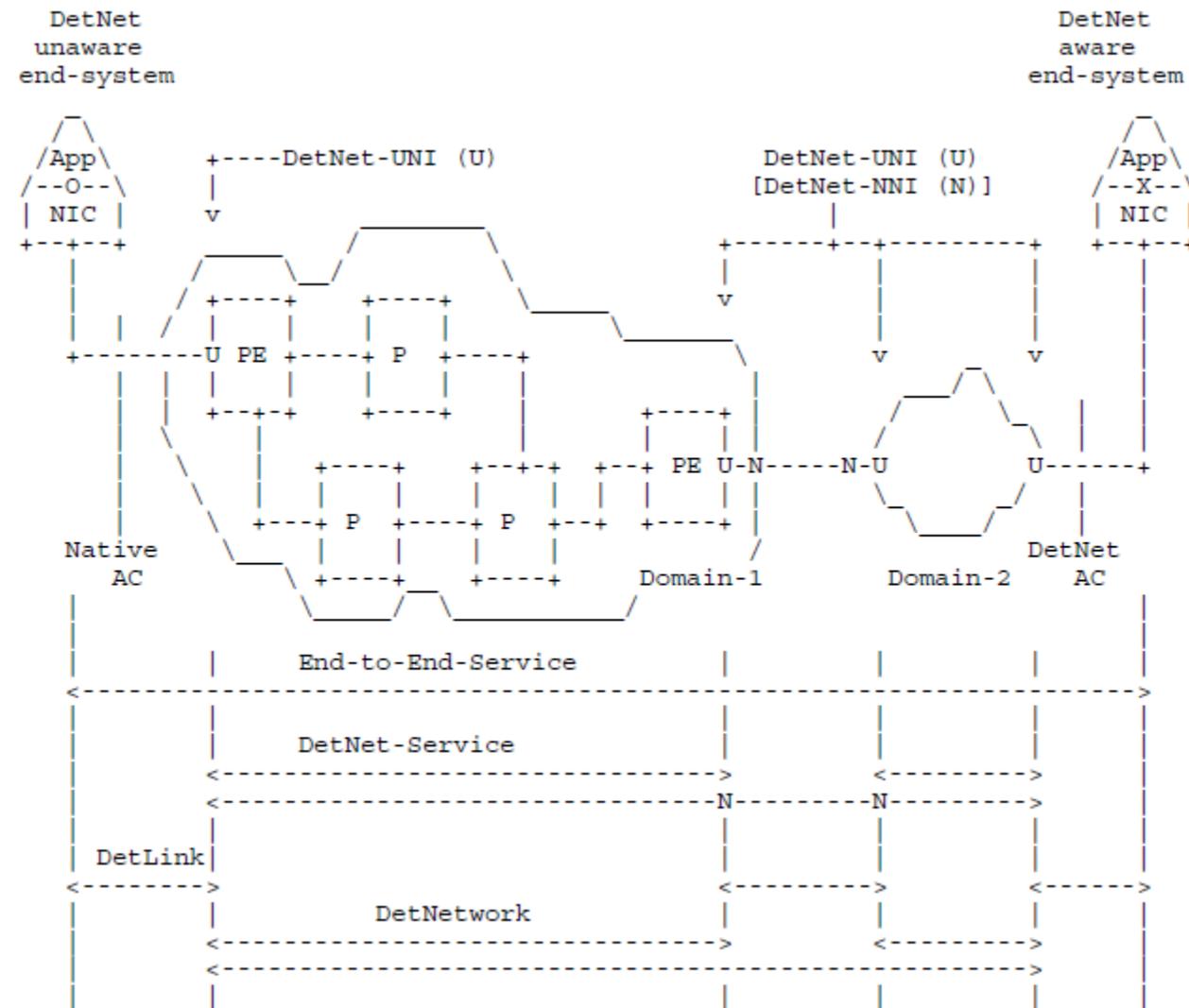
End-systems connected to DetNet

- Time/loss sensitive application(s)
 - runs on an End-system
 - requires deterministic transport during communication with its peer(s).
- Application-flow (app-flow)
 - native data flow between the source/sink End-Systems
- DetNet unaware End-system
 - a.k.a. TSN End-system
 - originates a native data flow
 - connected via "Native AC" to DetNet
- DetNet aware End-system
 - same forwarding paradigm as DetNet
 - creates the DetNet-flow from the App-flow
 - connected via "DetNet AC" to DetNet



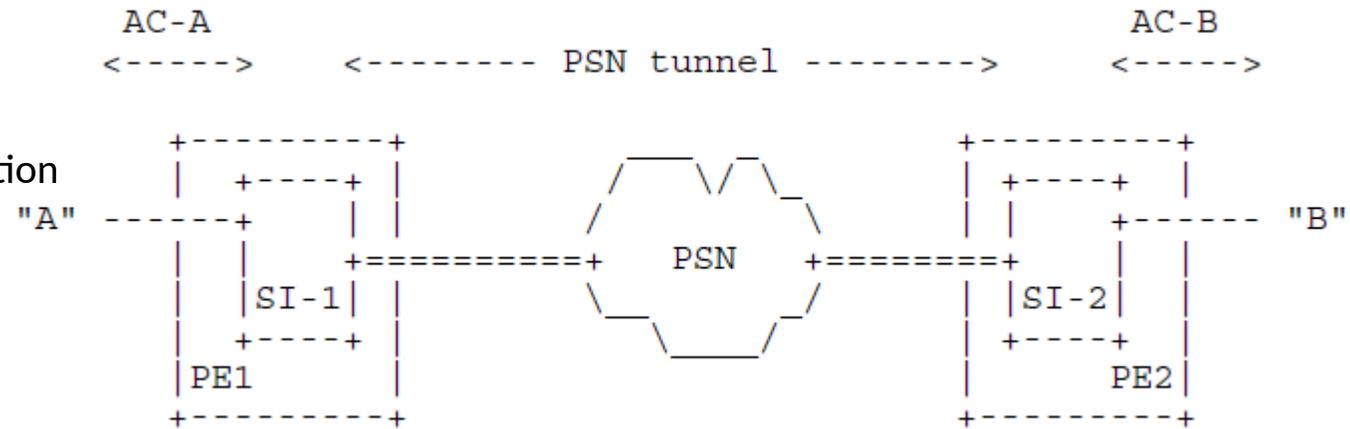
DetNet service model

- App-flow endpoints:
 - end-system's internal reference point
- DetNet-UNI:
 - edge node UNI interface of a domain
- End-to-End-Service:
 - the service reaches out to final source/sink nodes
- DetNet-Service:
 - the service connects networking islands (between the borders of network domains).
- DetLink:
 - direct link between two entities (node/end-system) used for deterministic transport.
- DetNetwork:
 - network between DetNet-UNIs



DetNet service instances

- Local attributes used by DetNet functions
 - Flow-ID
 - Sequence number (Seq-Num)
(Note: Seq-num is used only by the duplicate elimination functionality)
- PSN tunnel
 - transports exclusively the DetNet data flow
- Service instance
 - is configured to implement a flow specific routing or bridging function depending on what connectivity (L2 or L3) the participating end systems require.
 - may or may not be shared by multiple DetNet data flows
(Note: sharing the service instance by multiple DetNet-flows requires properly populated forwarding tables of the service instance.)



- Out-of-scope (currently)
 - serving regular traffic and DetNet data flows by the same service instance (but some related thoughts are described in the annex)

DetNet data flows over multiple technology domains

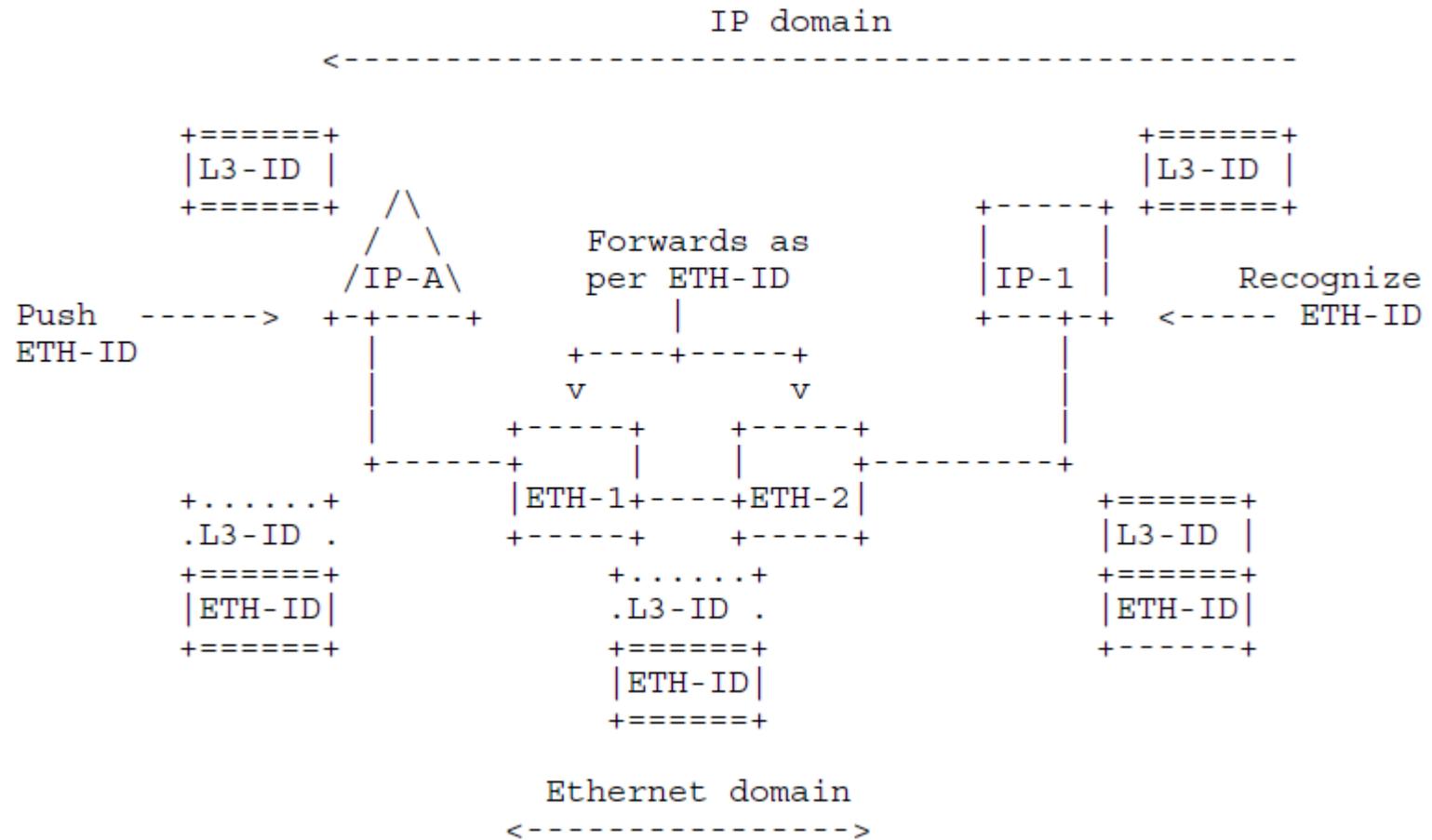
- Forwarding methods considered for deterministic networking are:
 - IP routing
 - MPLS label switching
 - Ethernet bridging
- Domain specific Flow-ID
 - can be created
 - by a domain specific function or
 - derived from the original Flow-ID of the App-flow
 - must be unique inside the given domain

Note: original Flow-ID of the app-flow is still present in the packet, but transport nodes may lack the function to recognize it, that's why the additional Flow-ID is added (pushed).
- Generalized flow identification example
 - define a unique Flow-ID triplet per DetNet data flow
 - IP: "IPv6-flow-label"+"IPv6-address,,
 - MPLS: "PW-label"+"LSP-label,,
 - Ethernet: "VLAN-ID"+"MAC-address,,
 - DetNet encoding function
 - of technology border nodes to adapt to capabilities of the next hop node.
 - push a further (forwarding paradigm specific) Flow-ID to packets, ensuring that flows can be easily recognized by domain internal nodes.
 - additional Flow-ID might be removed when packet leave a given technology domain.
 - You can treat it as a "Flow-ID-stack"

[Note: Seq-num attribute may require a similar functionality at technology border nodes.]

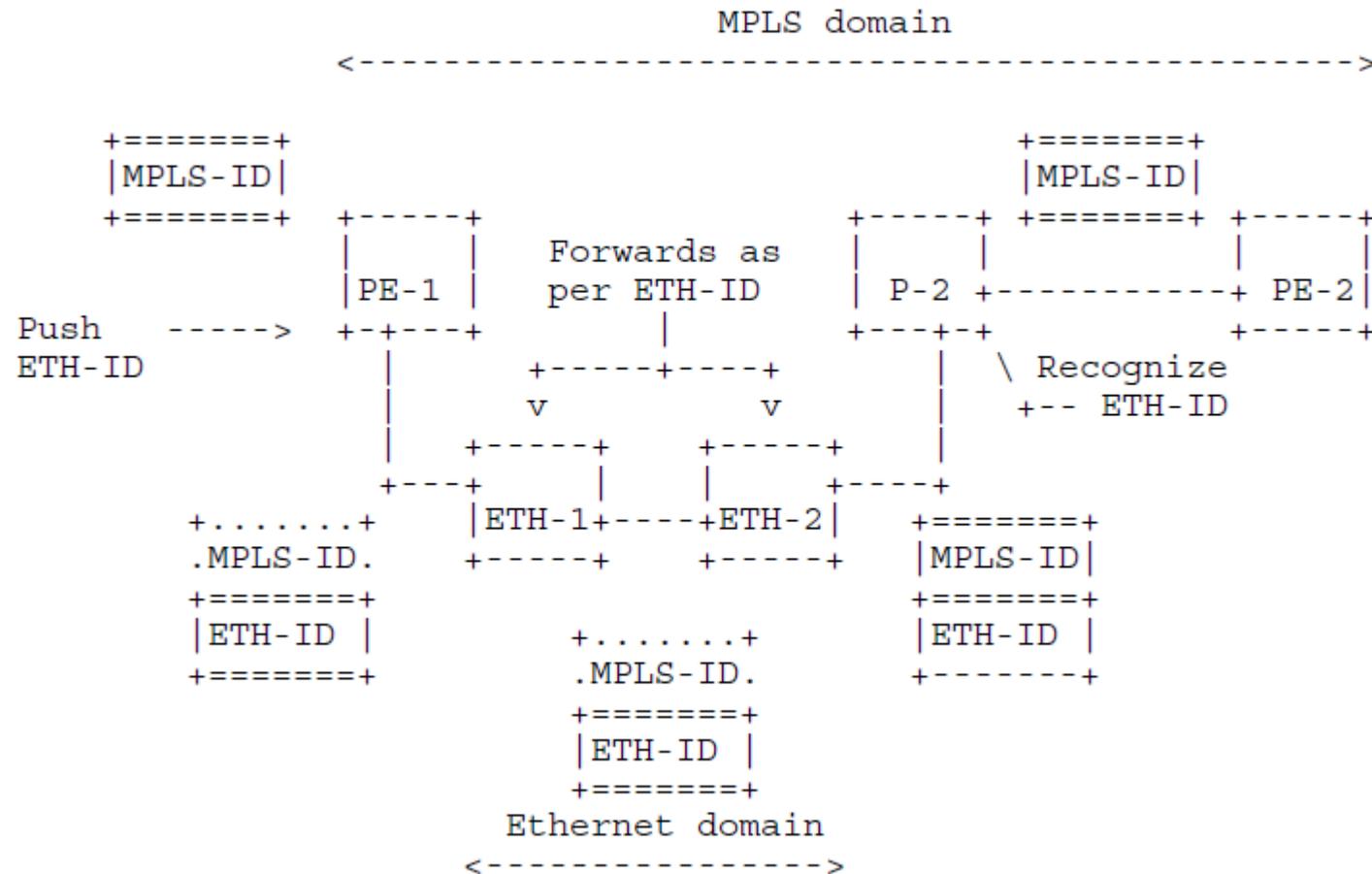
Flow-ID mappings examples (1)

- IP nodes interconnected by an Ethernet domain



Flow-ID mappings examples (2)

- MPLS nodes interconnected by an Ethernet domain



Next steps

- Contribute to conclude on terminology
- Continue discussion on service model