DetNet
Service Model
draft-varga-detnet-service-model-00

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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-sytem
  - a.k.a. TSN End-system
  - originates a native data flow
  - connected via "Native AC" to DetNet
- DetNet aware End-sytem
  - 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