DetNet Configuration YANG Update

draft-ietf-detnet-yang-03

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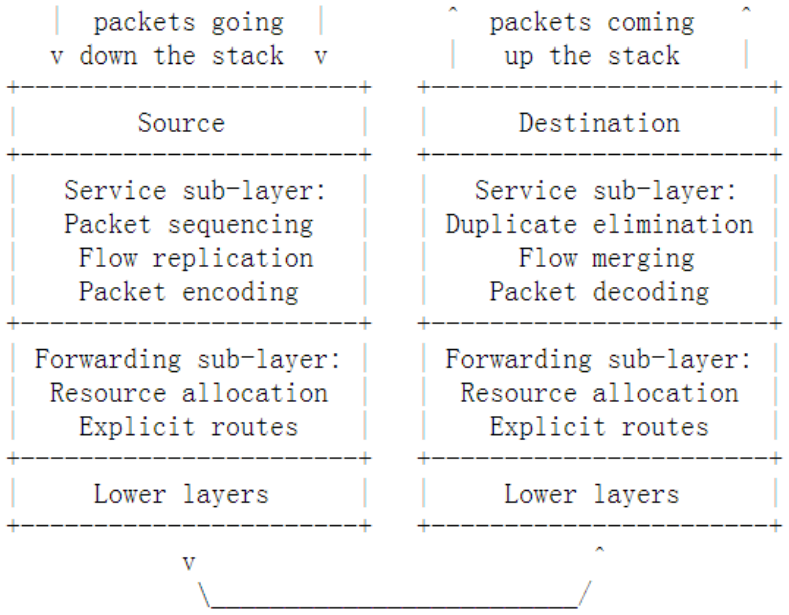
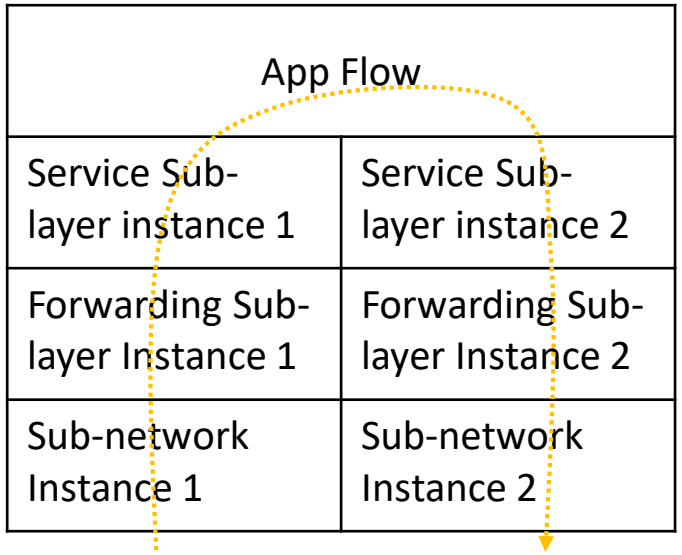
DetNet Configuration Instance

DetNet Config:

- App Flow Instance
- Service Sub-layer Instance
- Forwarding Sub-layer Instance
- TSN Sub-network Instance (TBD)



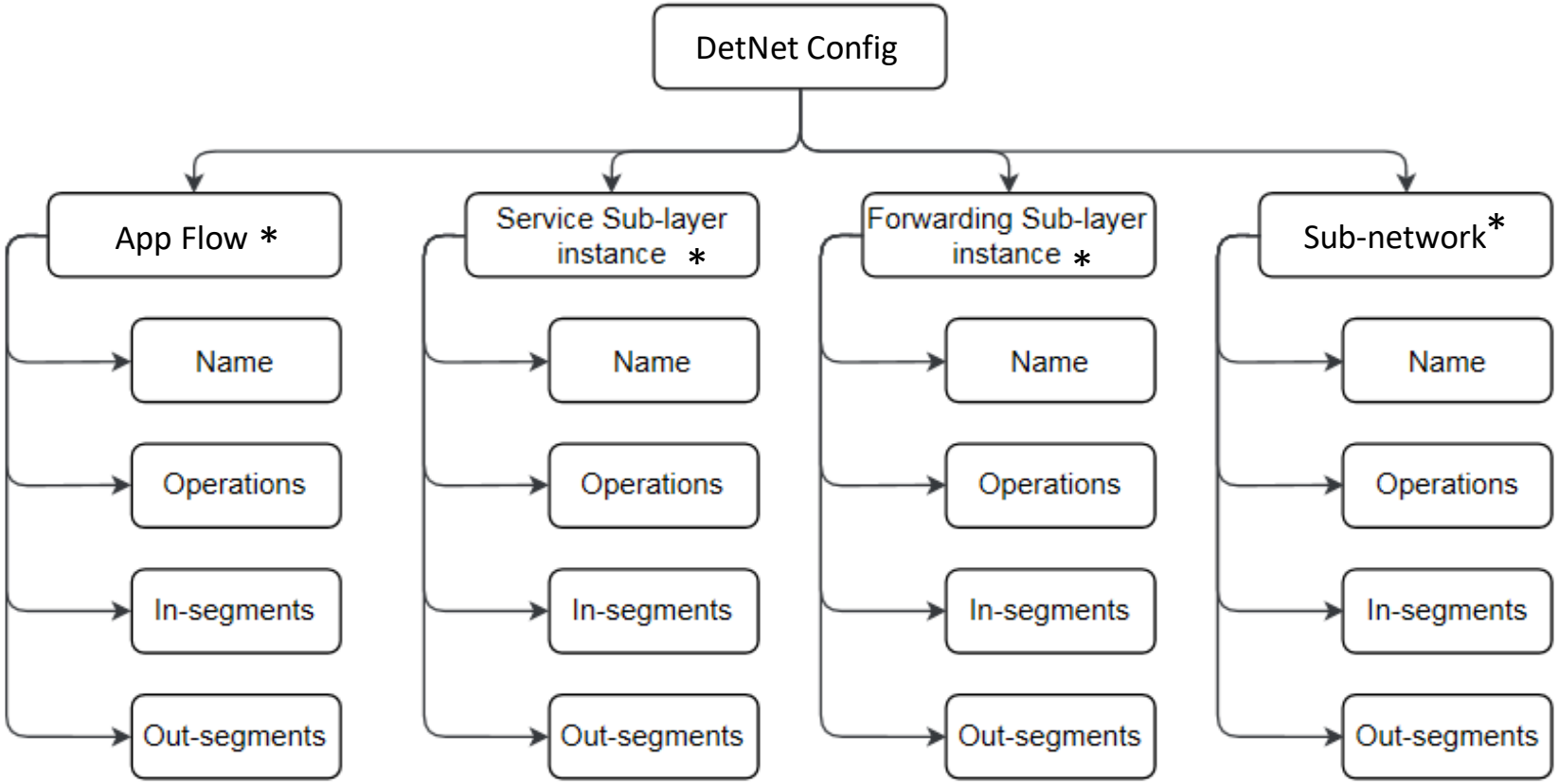
DetNet data plane protocol stack*



DetNet Configuration Instance

*： draft-ietf-detnet-architecture-13 Section4.1.1(https://tools.ietf.org/html/draft-ietf-detnet-architecture-13)

DetNet Configuration Structure Update



App Flow

Operations

- Sequence Number Generation:
  - copy-from-app-flow
  - generate-by-detnet-flow
  - sequence-number-length
  - none

In-segments

- L3-app-flow-identification
  - Ipv4-identification
  - Ipv6-identification
- L2-app-flow-identification
  - L2-identification
- detnet-flow-identification
  - Ipv4-identification
  - Ipv6-identification
  - Mpls-identification

Out-segments

- DetNet Service Sub-layer Instance

*Question: Whether Sequence Number Generation should be in App flow Instance or Service sub-layer instance?

App Flow Tree

```
+--rw proxy
|  +--rw operations
|  |  +--rw sequence-number
|  |     +--rw sequence-number-generation-type?   sequence-number-generation-type
|  |     +--rw sequence-number-length?            uint8
|  +--rw in-segments
|  |  +--rw app-flow-type?             flow-type-ref
|  |  +--rw source-mac-address?        yang:mac-address
|  |  +--rw destination-mac-address?   yang:mac-address
|  |  +--rw ethertype?                 eth:ethertype
|  |  +--rw vlan-id?                   uint16
|  |  +--rw pcp?                       uint8
|  |  +--rw src-ipv4-prefix            inet:ipv4-prefix
|  |  +--rw dest-ipv4-prefix           inet:ipv4-prefix
|  |  +--rw protocol                   uint8
|  |  +--rw dscp?                      uint8
|  |  +--rw dscp-bitmask?              uint8
|  |  +--rw src-ipv6-prefix            inet:ipv6-prefix
|  |  +--rw dest-ipv6-prefix           inet:ipv6-prefix
|  |  +--rw next-header                uint8
|  |  +--rw traffic-class?             uint8
|  |  +--rw traffic-class-bitmask?     uint8
|  |  +--rw flow-label?                inet:ipv6-flow-label
|  |  +--rw flow-label-flag?           boolean
|  |  +--rw lower-source-port?         inet:port-number
|  |  +--rw upper-source-port?         inet:port-number
|  |  +--rw lower-destination-port?    inet:port-number
|  |  +--rw upper-destination-port?    inet:port-number
|  +--rw out-segments
|     +--rw detnet-service-sub-layer?   lower-layer-ref
```

Service Sub-layer Instance

Operations

- Service Operation
  - Service Initiation
  - Service Termination
  - Service Relay
- Service Protection Operations:
  - Replication
  - Elimination
  - Ordering
  - Elimination & Ordering
  - Elimination & Replication
  - Elimination & Ordering & Replication
  - None

In-segments

- DetNet Flow identification
  - Ipv4-identification
  - Ipv6-identification
  - Mpls-identification

Out-segments

- DetNet Service sub-layer Encapsulation
  - DetNet-mpls-header
  - DetNet-ipv4-header
  - DetNet-ipv6-header
- DetNet Forwarding Sub-layer Instance

Service Sub-layer Instance Tree

```
+--rw service-sub-layer
|  +--rw operations
|  |  +--rw service-operation
|  |  |  +--rw service-operation-type?   service-operation-ref
|  |  +--rw service-protection
|  |     +--rw service-protection-type?   service-protection-type
|  +--rw in-segments
|  |  +--rw detnet-service-type?   flow-type-ref
|  |  +--rw detnet-service-list* [detnet-service-index]
|  |     +--rw detnet-service-index        uint8
|  |     +--rw src-ipv4-prefix             inet:ipv4-prefix
|  |     +--rw dest-ipv4-prefix            inet:ipv4-prefix
|  |     +--rw protocol                    uint8
|  |     +--rw dscp?                       uint8
|  |     +--rw dscp-bitmask?               uint8
|  |     +--rw src-ipv6-prefix             inet:ipv6-prefix
|  |     +--rw dest-ipv6-prefix            inet:ipv6-prefix
|  |     +--rw next-header                 uint8
|  |     +--rw traffic-class?              uint8
|  |     +--rw traffic-class-bitmask?      uint8
|  |     +--rw flow-label?                 inet:ipv6-flow-label
|  |     +--rw flow-label-flag?            boolean
|  |     +--rw mpls-flow-identification
|  |        +--rw platform-label-flag?        boolean
|  |        +--rw non-platform-label-space
|  |        |  +--rw incoming-interface?         if:interface-ref
|  |        |  +--rw non-platform-label-stack* [index]
|  |        |     +--rw index    uint8
|  |        |     +--rw label?   rt-type:mpls-label
|  |        |     +--rw tc?      uint8
|  |        +--rw platform-label-space
|  |           +--rw label?   rt-type:mpls-label
|  |           +--rw tc?      uint8
|  +--rw out-segments
|     +--rw detnet-service-processing-type?   flow-type-ref
|     +--rw detnet-service-encapsulation
|        +--rw detnet-service-processing-list* [detnet-service-processing-index]
|           +--rw detnet-service-processing-index     uint32
|           +--rw ip-flow
|           |  +--rw ipv4-flow
|           |  |  +--rw src-ipv4-address     inet:ipv4-address
|           |  |  +--rw dest-ipv4-address    inet:ipv4-address
|           |  |  +--rw protocol             uint8
|           |  |  +--rw dscp?                uint8
|           |  +--rw ipv6-flow
|           |  |  +--rw src-ipv6-address     inet:ipv6-address
|           |  |  +--rw dest-ipv6-address    inet:ipv6-address
|           |  |  +--rw next-header          uint8
|           |  |  +--rw traffic-class?       uint8
|           |  |  +--rw flow-label?          inet:ipv6-flow-label
|           |  +--rw l4-port-header
|           |     +--rw source-port?        inet:port-number
|           |     +--rw destination-port?   inet:port-number
|           +--rw mpls-flow
|           |  +--rw detnet-mpls-label-stack* [index]
|           |     +--rw index                    uint8
|           |     +--rw label?                   rt-type:mpls-label
|           |     +--rw tc?                      uint8
|           |     +--rw s-bit?                   boolean
|           |     +--rw d-cw-encapsulate-flag?   boolean
|           +--rw detnet-forwarding-sub-layer-info
|              +--rw detnet-forwarding-sub-layer?   lower-layer-ref
```

Forwarding Sub-layer Instance

Operations

- Resource Allocation
  - Traffic-Specification
    - Interval
    - max-packets-per-interval
    - max-payload-size
    - average-packets-per-interval
    - average-payload-size

In-segments

- Forwarding Identification
  - Ipv4-destination-address
  - Ipv6-destination-address
  - Mpls-identification

Out-segments

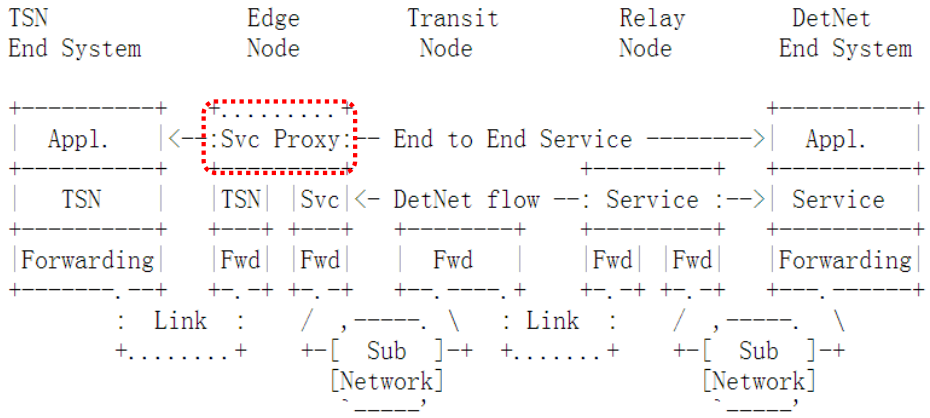
- Forwarding Sub-layer Encapsulation
  - DetNet-mpls-header
  - Outgoing interface
- Sub-network Instance

Forwarding Sub-layer Instance Tree

```
+--rw forwarding-sub-layer
|  +--rw operations
|  |  +--rw forwarding-operation
|  |  |  +--rw forwarding-operation-type?   forwarding-operation-ref
|  |  +--rw resource-allocate
|  |  |  +--rw interval?                       uint32
|  |  |  +--rw max-packets-per-interval?       uint32
|  |  |  +--rw max-payload-size?               uint32
|  |  |  +--rw average-packets-per-interval?   uint32
|  |  |  +--rw average-payload-size?           uint32
|  |  +--rw qos
|  +--rw in-segments
|  |  +--rw detnet-forwarding-type?     flow-type-ref
|  |  +--rw src-ipv4-prefix             inet:ipv4-prefix
|  |  +--rw dest-ipv4-prefix            inet:ipv4-prefix
|  |  +--rw protocol                    uint8
|  |  +--rw dscp?                       uint8
|  |  +--rw dscp-bitmask?               uint8
|  |  +--rw src-ipv6-prefix             inet:ipv6-prefix
|  |  +--rw dest-ipv6-prefix            inet:ipv6-prefix
|  |  +--rw next-header                 uint8
|  |  +--rw traffic-class?              uint8
|  |  +--rw traffic-class-bitmask?      uint8
|  |  +--rw flow-label?                 inet:ipv6-flow-label
|  |  +--rw flow-label-flag?            boolean
|  |  +--rw mpls-flow-identification
|  |     +--rw platform-label-flag?        boolean
|  |     +--rw non-platform-label-space
|  |     |  +--rw incoming-interface?         if:interface-ref
|  |     |  +--rw non-platform-label-stack* [index]
|  |     |     +--rw index    uint8
|  |     |     +--rw label?   rt-type:mpls-label
|  |     |     +--rw tc?      uint8
|  |     +--rw platform-label-space
|  |        +--rw label?   rt-type:mpls-label
|  |        +--rw tc?      uint8
|  +--rw out-segments
|     +--rw detnet-forwarding-processing-type?   flow-type-ref
|     +--rw natively-detnet-forwarding
|     |  +--rw ipv4-flow
|     |  |  +--rw ipv4-next-hop-address?   inet:ipv4-address
|     |  +--rw ipv6-flow
|     |     +--rw ipv6-next-hop-address?   inet:ipv6-address
|     +--rw detnet-forwarding-encapsulation
|        +--rw ip-flow
|        |  +--rw ipv4-flow
|        |  |  +--rw src-ipv4-address     inet:ipv4-address
|        |  |  +--rw dest-ipv4-address    inet:ipv4-address
|        |  |  +--rw protocol             uint8
|        |  |  +--rw dscp?                uint8
|        |  +--rw ipv6-flow
|        |  |  +--rw src-ipv6-address     inet:ipv6-address
|        |  |  +--rw dest-ipv6-address    inet:ipv6-address
|        |  |  +--rw next-header          uint8
|        |  |  +--rw traffic-class?       uint8
|        |  |  +--rw flow-label?          inet:ipv6-flow-label
|        |  +--rw l4-port-header
|        |     +--rw source-port?        inet:port-number
|        |     +--rw destination-port?   inet:port-number
|        +--rw mpls-flow
|        |  +--rw detnet-mpls-label-stack* [index]
|        |     +--rw index                    uint8
|        |     +--rw label?                   rt-type:mpls-label
|        |     +--rw tc?                      uint8
|        |     +--rw s-bit?                   boolean
|        |     +--rw d-cw-encapsulate-flag?   boolean
|        +--rw lower-layer-info
|           +--rw lower-layer-type?   flow-type-ref
|           +--rw interface
|           |  +--rw outgoing-interface?   if:interface-ref
|           +--rw sub-layer
|              +--rw sub-layer?   lower-layer-ref
```

“App flow” or “DetNet Service Proxy”?

- Proxy can be the name of the node, maybe it also can be the name of the “sub-layer”:
  - the picture in draft-ietf-detnet-architecture-13 shows:



  - The text of draft-ietf-detnet-architecture-13 as follows:

“ DetNet Edge Node: an instance of a DetNet relay node that acts as a source and/ or destination at the DetNet service sub-layer. For example, it can include a DetNet service sub-layer proxy function for DetNet service protection (e.g., the addition or removal of packet sequencing information) for one or more end systems, or starts or terminates resource allocation at the DetNet forwarding sub-layer, or aggregates DetNet services into new DetNet flows. It is analogous to a Label Edge Router (LER) or a Provider Edge (PE) router. ”

What is the next?

- The structure is accepted by the WG in this IETF (hopefully)
- More detailed designs are still under discussion
  - Aggregation Case
  - Some unsolved issues mentioned in the slides
  - Sub-network
- Please review the draft and give comments
- or just join us
- Weekly discussion about the yang model modification is suggested

Thanks