

YANG-based Control for DetNet

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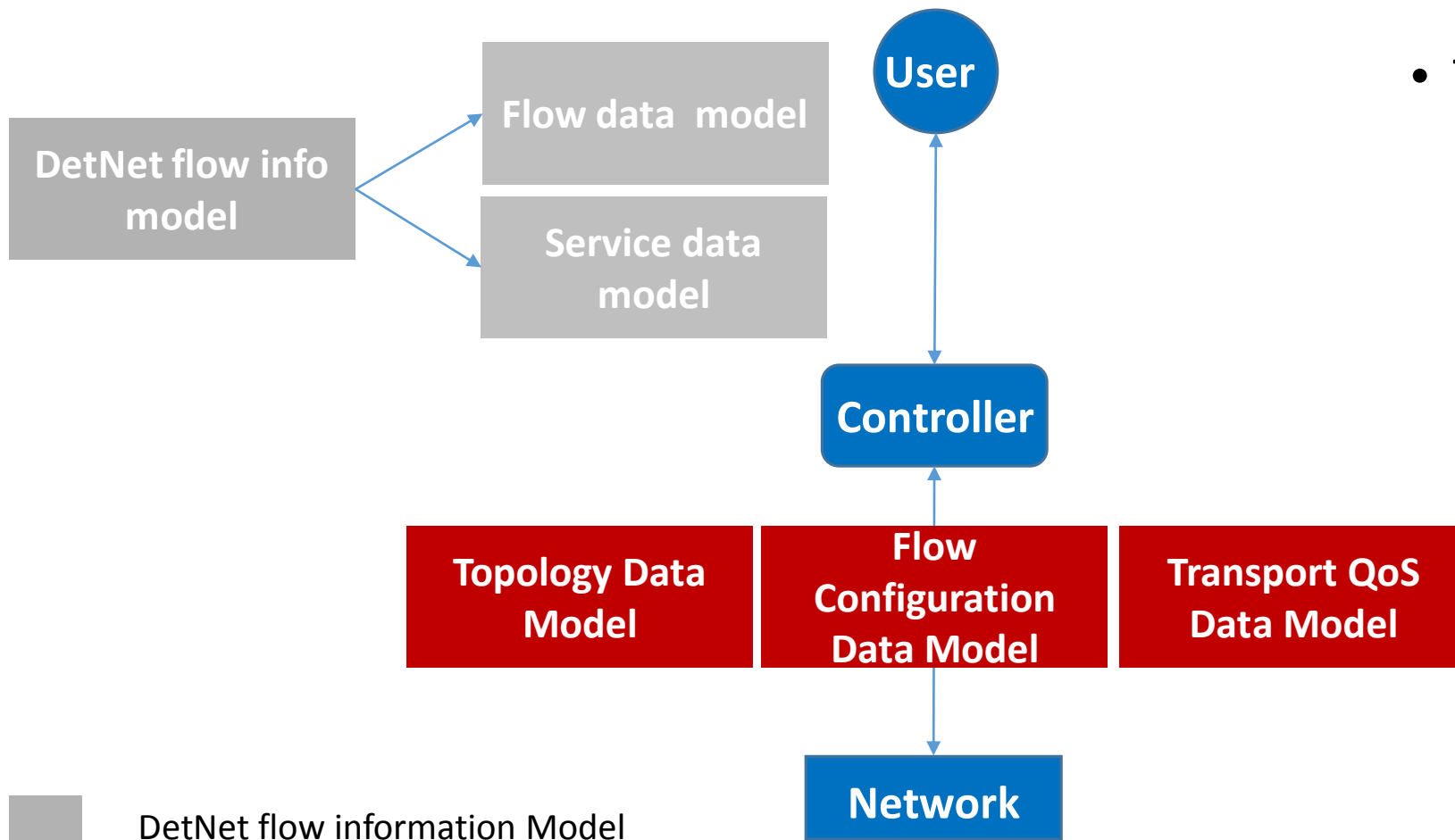
DetNet WG YANG Status

- WG chartered to deliver YANG models that cover:
 - Information needed for flow establishment and control;
 - Device and link capabilities and resources;
- YANG Models expected to be driven by Flow Information and Data Plane Solution documents
- General design principle is to reuse or reference existing YANG modules
- YANG Model draft recently accepted as WG document
 - Early in process, changes are expected;
 - <https://tools.ietf.org/html/draft-ietf-detnet-yang-00>

Key Topics for Discussion

- What information gets covered by both
 - Traffic (flow and stream) ID
 - Service (DetNet and TSN) parameters
 - Links and resources (DetNet L3, TSN L2)
- How do DetNet and TSN models integrate
 - What references are needed between the models
 - - e.g., DetNet Flow to TSN Stream

DetNet Models Overview



• Three Models

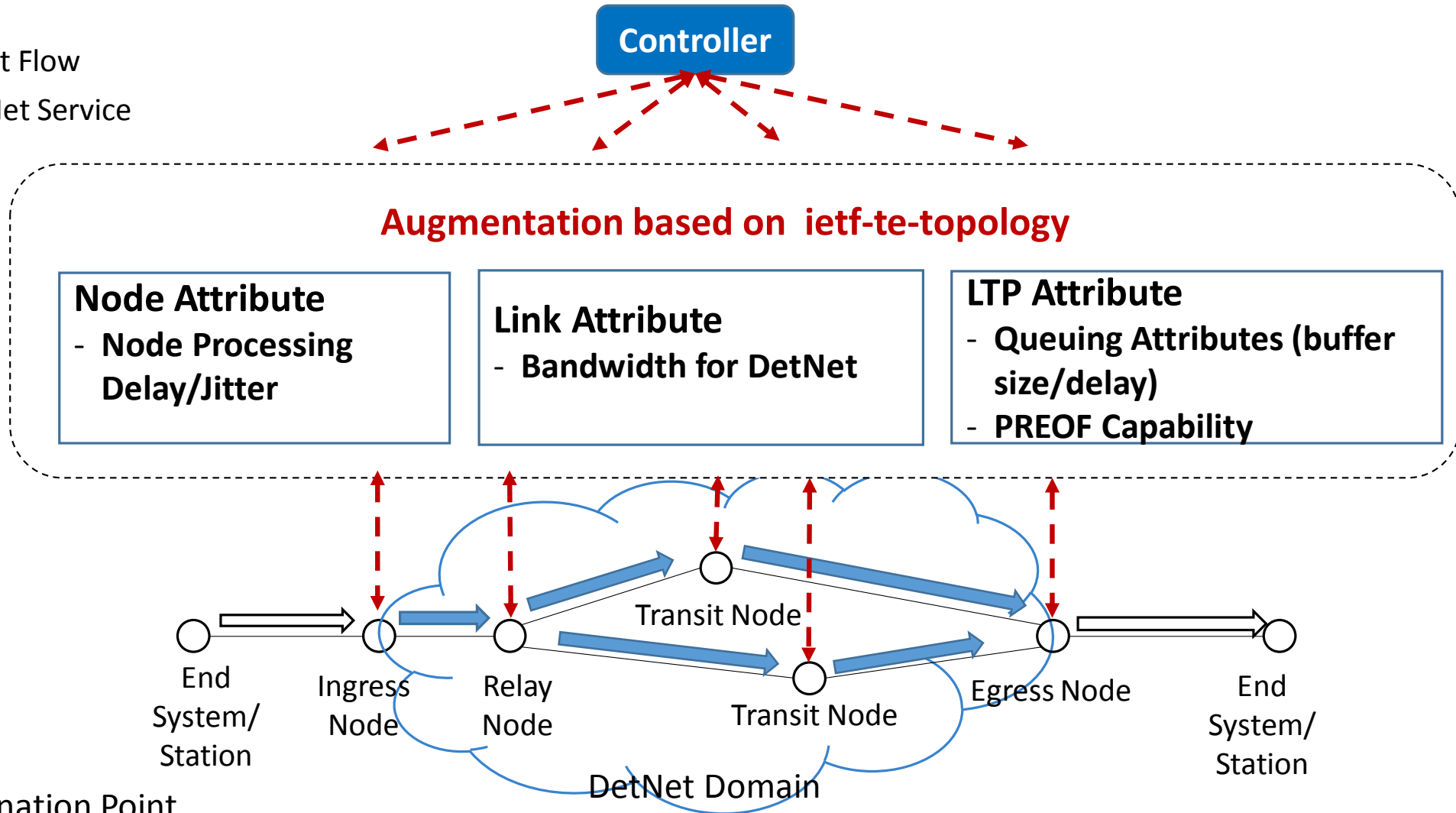
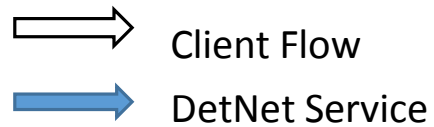
- Topology Data Model
 - Topology/capability discovery;
 - Flow independent configuration;
- Flow Configuration Model
 - Flow configuration (flow dependent);
 - Flow status report;
- Transport QoS Data Model
 - QoS attributes configuration;

DetNet flow information Model

DetNet YANG Models

<https://tools.ietf.org/html/draft-ietf-detnet-flow-information-model-02>
<https://tools.ietf.org/html/draft-ietf-detnet-yang-00>

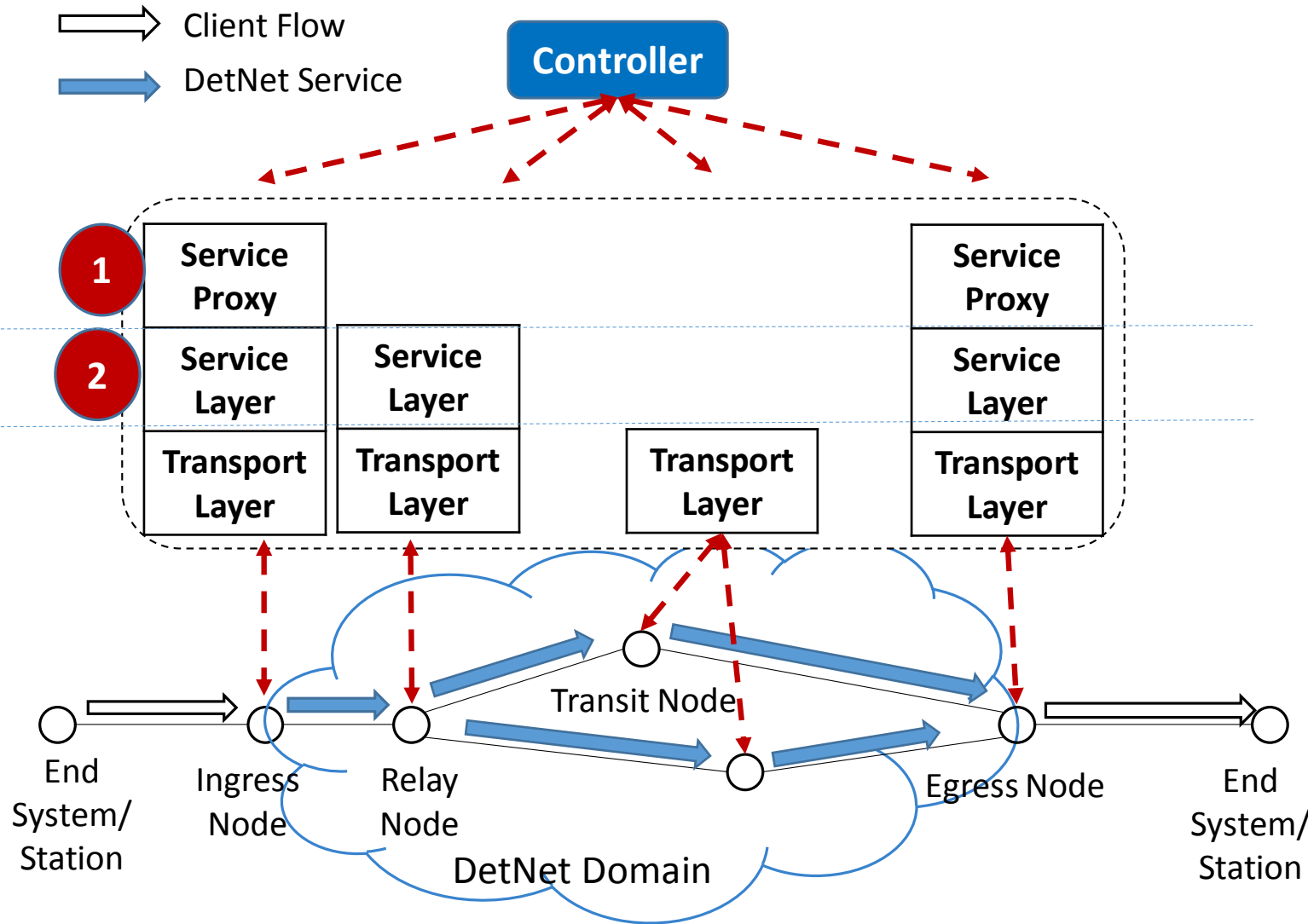
DetNet Topology YANG Model



*LTP: Link Termination Point

*PREOF: Packet Replication, Elimination, Ordering Functions

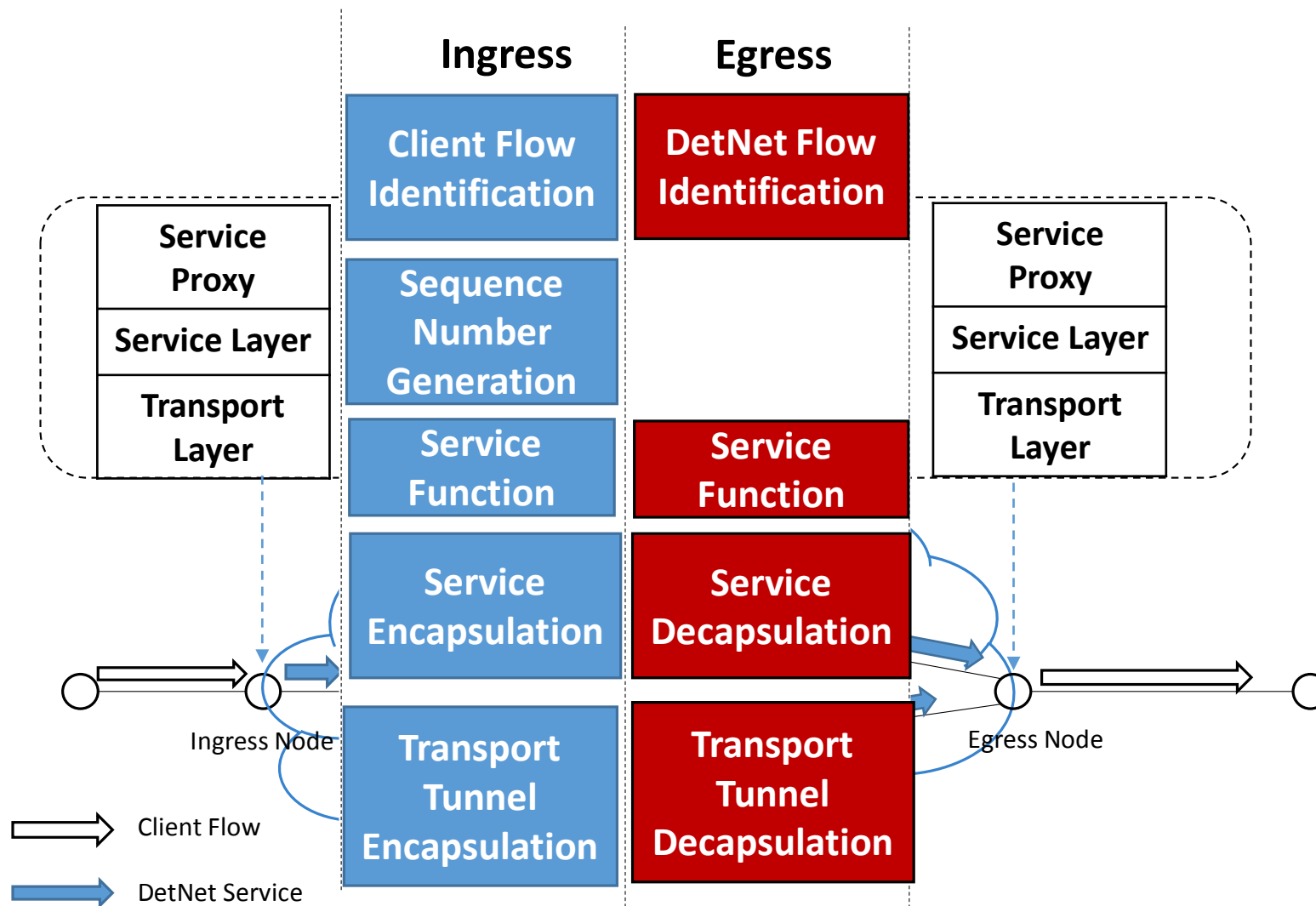
DetNet Flow Configuration YANG Model



- Based on DetNet Encapsulation
 - draft-ietf-detnet-dp-sol-mpls
 - draft-ietf-detnet-dp-sol-ip
- Layer-based
 - Service Proxy
 - Service layer
 - Transport layer
- Role-based
 - Edge Node
 - Relay Node
 - Transit Node
 - End Station/System

1. For end-to-end DetNet service scenario, there is no service proxy
2. Only MPLS-based encapsulation has service layer

MPLS Flow Configuration – Edge Node



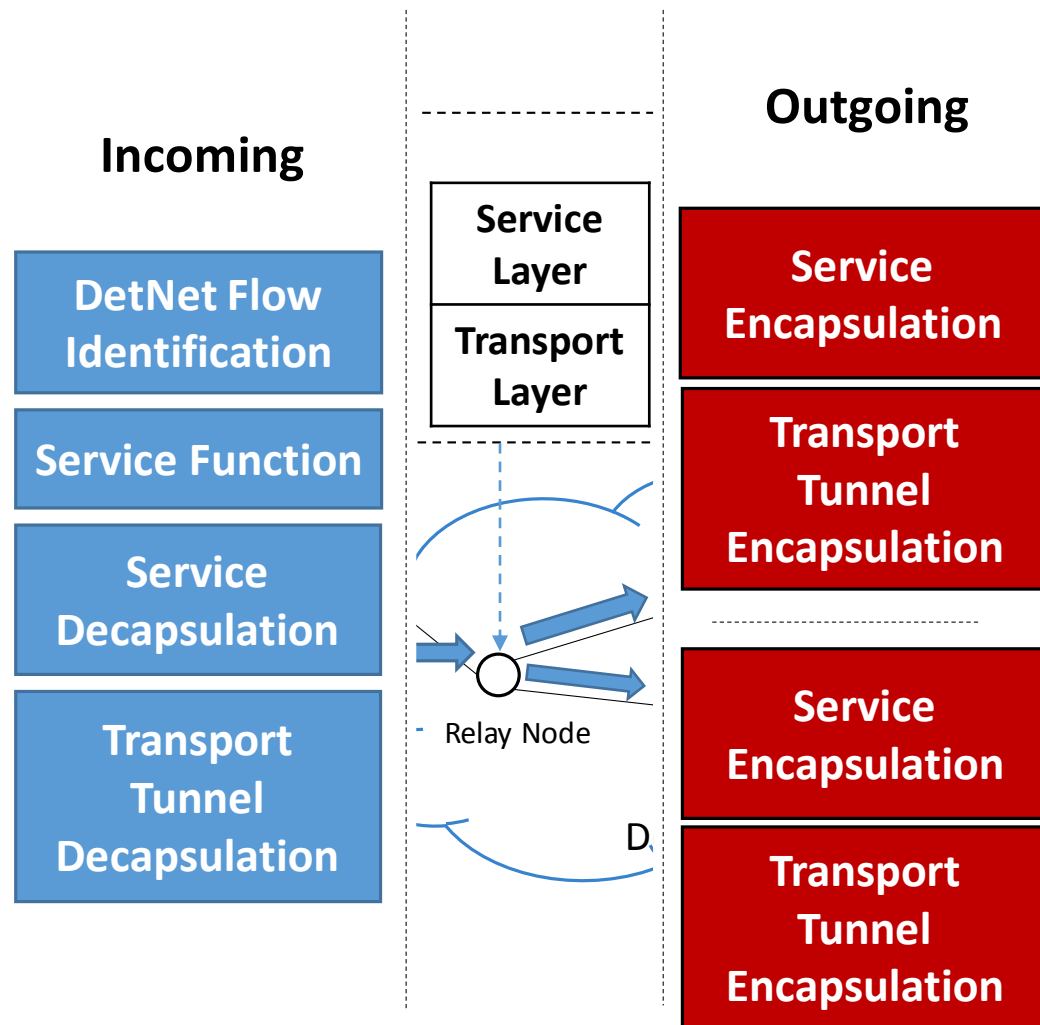
• Ingress Node:

- Client Flows
 - Flow identification
 - Service functions...
- DetNet flows
 - Service encapsulation
 - Tunnel encapsulation...

• Egress Node:

- Flow Identification
- Service function
- Service decapsulation
- Tunnel decapsulation...

MPLS Flow Configuration – Relay Node



- Incoming flows
 - Transport decapsulation
 - Service decapsulation...
- Out-segments
 - DetNet service encapsulation
 - Change to a new service layer
 - DetNet transport encapsulation
 - Add new tunnel to each outgoing flows

Transport QoS Related YANG Models

- Related YANGs in IEEE 802.1:
 - IEEE P802.1 Qcw:
 - YANG Data Models for Scheduled Traffic, Frame Preemption, and Per-Stream Filtering and Policing;
 - IEEE P802.1 Qcr
 - Asynchronous Traffic Shaping YANG;
- Related YANG models in IETF:
 - DetNet Transport QoS YANG model
 - Intend to be included in draft-ietf-detnet-yang;
 - Under discussion, no formal YANG yet;

Some Considerations

- Flow Configuration YANG
 - Encapsulation dependent; TSN and DetNet have their dedicated encapsulations;
 - IETF and IEEE should have their own flow configuration YANG;
- Topology YANG
 - IETF has defined a lot of topology YANG models;
 - DetNet topology YANG (draft-ietf-detnet-yang) augments to ietf-te-topology YANG;
 - Can be used by TSN with necessary argumentations?
- QoS YANG
 - IEEE has defined or plans to define several QoS YANGs;
 - Can be reused by DetNet;
 - DetNet transport QoS YANG
 - Augmentation to TSN QoS YANG; Or
 - Directly use the TSN QoS YANG by leafref;
- How do we maximize common set for TSN and DetNet YANG?

Thanks