DetNet Configuration YANG Model

draft-geng-detnet-conf-yang-01

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DetNet Models Overview and Relationship

[Diagram showing relationships between DetNet flow information model, Flow data model, Service data model, Topology data model, Config data model, Status data model, and User.]

- DetNet flow information Model
- DetNet Configuration YANG Models
DetNet Topology Data Model

- Augmentation to TE Topology model
- Node attribute augmentation
- Link attribute augmentation
DetNet Topology Attribute

- Node Type
  - Edge Node/Relay Node/ Transit Node
- Replication Capability
- Elimination Capability
- Queuing Management Algorithm
  - Type
  - Basic Parameters
- Resource Reservation Base
  - Max FanIn Ports
  - Max Packet Size
  - Max DetNet Classes(?)

- Bandwidth Metric
  - DetNet Unreserved Bandwidth
  - Maximum DetNet Reservable Bandwidth
- Delay Metric(?)
  - Link Delay (defined in RFC7471 and RFC 7810)
  - Maximum Packet Processing Delay
  - Minimum Packet Processing Delay
  - Maximum Output Queuing Delay
  - Minimum Output Queuing Delay

Do we need more than one DetNet Traffic Classes?

Whether such delay classification (link delay + processing delay + output queuing delay) is reasonable?
DetNet Flow Configuration Data Model

Diagram showing the relationships between Ingress Node, Replication Node, Transit Node, Elimination Node, and Egress Node.
# Configuration Based on DetNet Architecture

<table>
<thead>
<tr>
<th>Network Architecture</th>
<th>Encapsulation Layer</th>
<th>Node Type</th>
<th>Main Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Service Layer proxy</td>
<td>Edge Node</td>
<td>Encapsulation/Decapsulation</td>
</tr>
<tr>
<td></td>
<td>Service Layer</td>
<td>Relay Node</td>
<td>Packet Replication and Elimination</td>
</tr>
<tr>
<td></td>
<td>Transport Layer</td>
<td>Transit Node</td>
<td>Congestion Protection</td>
</tr>
</tbody>
</table>

*draft-ietf-detnet-architecture-04*
DetNet Transit Node Configuration

• Transit Node Configuration
  • Flow Priority
  • Flow Identification
  • Queuing Management Algorithm Configuration
  • Explicit Route (covered by draft-ietf-mpls-static-yang-05)

• Qos YANG Model
  • IETF - QoS - CLASSIFIER
  • IETF - QoS - POLICY
  • IETF - QoS - ACTION
  • IETF - QoS - TARGET
  • IETF - DIFFSERV

Whether it can be the extension of the Qos YANG Mode defined in draft-asechoud-rtgwg-qos-model-05
DetNet Relay Node Configuration

- Replication Node Configuration
  - Flow Identification (e.g., incoming s-Label)
  - Operation: replication
  - Copy Number
  - Flow Identifications in next reply/edge nodes (e.g., outgoing s-Labels)

- Elimination Node Configuration
  - Flow Identification
  - Operation: elimination
  - Flow Identification in next reply/edge node (e.g., outgoing s-Label)
Example: Relay Node Configuration

Configuration Parameters:

- **Flow Identification**: in the current data plane design, 5-tuple, S-label or other relevant information can be used in flow identification.
- **Operation**: replication/elimination/elimination & replication;
- **Next Relay Node**;
- **Output Port**;

For example:

<table>
<thead>
<tr>
<th>Incoming S-Label</th>
<th>Replication</th>
<th>Elimination</th>
<th>Outgoing S-Label</th>
<th>Output Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Yes</td>
<td>No</td>
<td>2001</td>
<td>1</td>
</tr>
<tr>
<td>1001</td>
<td>Yes</td>
<td>No</td>
<td>2001</td>
<td>2</td>
</tr>
<tr>
<td>1002</td>
<td>No</td>
<td>Yes</td>
<td>2002</td>
<td>3</td>
</tr>
</tbody>
</table>
Example: Relay Node Configuration (cont.)

Configuration in Relay Node 1:

<table>
<thead>
<tr>
<th>Incoming S-Label</th>
<th>Replication</th>
<th>Elimination</th>
<th>Outgoing S-Label</th>
<th>Output Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Yes</td>
<td>No</td>
<td>2001</td>
<td>1</td>
</tr>
<tr>
<td>1001</td>
<td>Yes</td>
<td>No</td>
<td>2001</td>
<td>2</td>
</tr>
</tbody>
</table>

Configuration in Relay Node 2:

<table>
<thead>
<tr>
<th>Incoming S-Label</th>
<th>Replication</th>
<th>Elimination</th>
<th>Outgoing S-Label</th>
<th>Output Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>No</td>
<td>Yes</td>
<td>3001</td>
<td>1</td>
</tr>
</tbody>
</table>
DetNet Edge Node Configuration

- Ingress Node Configuration
  - Flow Identification
  - Packet Sequencing
  - Packet Encapsulation
  - Traffic Specification
  - \textit{Flow Aggregation (?)}

- Egress Node Configuration
  - Flow Identification
  - Packet Reordering
  - Packet Decapsulation
What is the next?

• This is just the beginning of this part of work:
  • More Considerations about Queuing Algorithm Configuration
  • Improve the replication and elimination part
  • Add DetNet Status Data Model
• Solicit more contributions and comments
Thanks