DetNet problem statement

draft-finn-detnet-problem-statement
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Doc charter

• This effort will establish the deployment environment and deterministic network requirements.
• The working group will document which deployment environments and types of topologies are within (or outside) the scope of the DetNet architecture.
Deployment environment(s)

- Extending beyond the LAN
- Applies to RAN, SmartGrid, Pro-Audio, ...
- Extent of the network TBD (multiple admin, WAN...)
- Enable a fully scheduled operation orchestrated by a central controller
- May support a more distributed operation with probably lesser capabilities
Requirements

DetNet should thus produce the complete SDN architecture with describes at a high level the interaction and data models to:

• report the topology and device capabilities to the central controller;
• request a path setup for a new flow with particular characteristics over the service interface and control it through its life cycle;
• signal the new path to the devices, modify it to cope with various events such as loss of a link, update it and tear it down;
• expose the status of the path to the end devices (UNI interface)
• provide additional reliability through redundancy, in particular with packet replication and elimination;
Out of scope

• Bridging operations
  – Already defined at IEEE 802.1 TSN

• Time Sync
  – Already defined at IEEE (PTP 802.1AS or 1588)
  – Or other groups (TICTOC, NTP)

• Shapers and queue management
  – Already defined at IEEE
DetNet Architecture

1) Topology and Capabilities reporting

2) Application Specifies Requirements

3) Controller computes paths

4) State installation

5) Shaping and Per-Hop Behavior

Application / Service Controller

Network Controller (PCE)

Service Interface (northbound)

Control Management Interface (southbound)

1) Topology and Capabilities reporting

2) Application Specifies Requirements

3) Controller computes paths

4) State installation

5) Shaping and Per-Hop Behavior

Packet with Flow ID
In scope

• Interaction Models
  - Centralized architecture (distributed also?)
  - SouthBound flows
  - UNI (LMI++, CIR++ …)

• Information Models
  - TSpec (flow characterization)
  - Data model for per-flow state (buffers, Qs, timing)
  - Flow identification in packets (FlowID, seq#, time)
  - Data Plane transport (MPLS, IPv6…)
  - Data plane OAMs