

# Using Deterministic Networks for Industry Operations and Control

draft-km-detnet-for-ocn-03

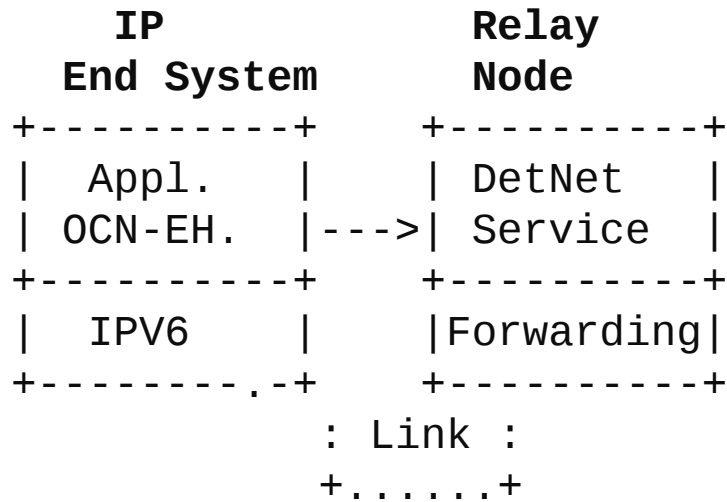
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IETF 118 DetNet WG Meeting

# Overview: Potential Traffic Patterns and Constraints

use case: cloud-native Process Automation (operations and control) over DetNet



Abstract traffic constraints between the endpoints (controller, field devices and map to 'DetNet services').

Network latency budget

Network max tolerable jitter

DetNet -> flows

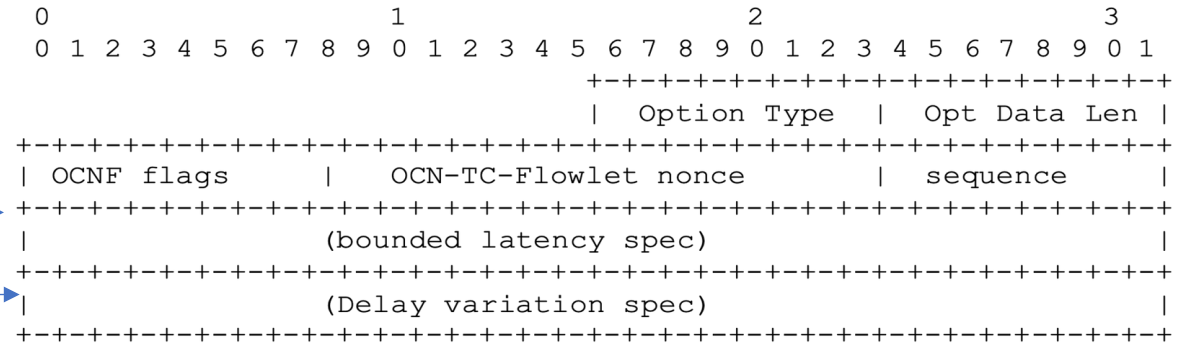


Figure 4: Explicit Traffic Control HBH Options

Flag	Description
U	Urgent. message to be sent immediately. An alarm (no-metadata)
I	the flow is part of periodic packet (look for interval in ~ms)
F	part of flowlet. see Nonce and seq
L	bounded latency spec provided
P	Reliability with no packet loss, this flag can be used by DetNet for selecting in-network reliability techniques.
V	Delay variation with no packet loss tolerance
R	Reply packet to a command identified by flowlet

Urgent alarm

Interval (non-critical types)

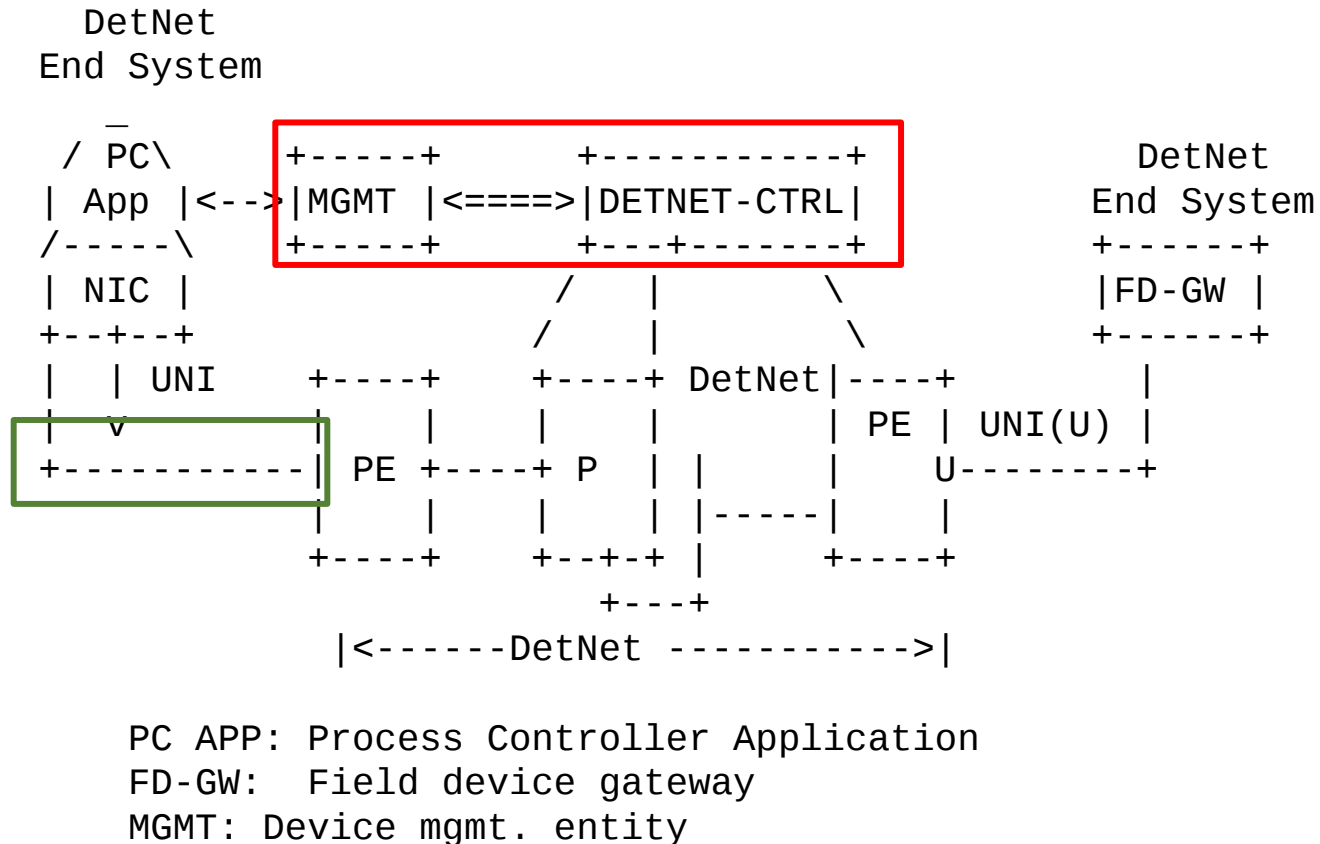
Reliability y/n

# Updates since last meeting

- Minor improvements
  - Trimmed down DetNet architecture background.
  - Emphasize that app-flows and detnet-flows are 2 different constructs.
- Major inclusions in Section 5 update
  - Clearly call out that solution is IP layer. So as to not confuse with TSN or other approaches.
  - Added section 5.1 to address one of the comments about how applications know what to do? should explain the workflow (next slide).
  - Added goals/non-goals – to clarify what we want to achieve here

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# Workflow/system Behavior



- We assume an application management function that can communicate with macro requirements with coarse granularity. This allows DetNet to be provisioned appropriately. But details of these interfaces are not in the scope of this work.
- This was requested to explain how DetNet will have reserved resources per application.

Figure 4: A Realistic DetNet Based Industrial Application Network

# Some Comments for Discussion

- No in-depth analysis of support for **periodic traffic** schedules
  - We did not deep-dive into stringent periodic traffic schedules (on-time) and focused on asynchronous (in-time). Having said that it can be done if we use sequence number, and delay variation (todo: revise text).
  - Let's wait to see what queueing schedulers are capable of.
- Feasibility of **extremely time sensitive flows** are not explicitly explored
  - We make no judgement of what user requests from the DetNet
  - In some cases, it may be possible, others not.
  - There was a
- No intent to change **field device behavior**
  - OCN-EH solution does not expect changes to field-devices.
  - There are translation gateways to do that.

# Some Comments for Discussion (Contd.)

- Some traffic specified are not DetNet e.g. intervals for IoT sensors.
  - But we want one interface to the network. Assumption is that network can handle non-DetNet traffic too. How it does are the details not to be known to users.
- Explicit procedures for **mappings**
  - How they are performed, updated on edge nodes are not covered.
  - We believe this can be proprietary to a specific domain.
  - What does the WG think?
- Open the door for 2 different processing approaches (section 5.6)
  - With EH to relay node => more practically feasible
  - EH as hop-by-hop processing by all the nodes => could work better with large-scale dataplane enhancements.
- On feedback from OT partners
  - Have got enough feedback on the validity of the use case.
  - Most of thinking is very TSN-style. But that's a general challenge for DetNet.

# Next Steps

More review comments

Show the demo next IETF.

**Thank you!**