

DETNET multidomain extensions

draft-bernardos-detnet-multidomain-00

IETF 115 – DETNET WG

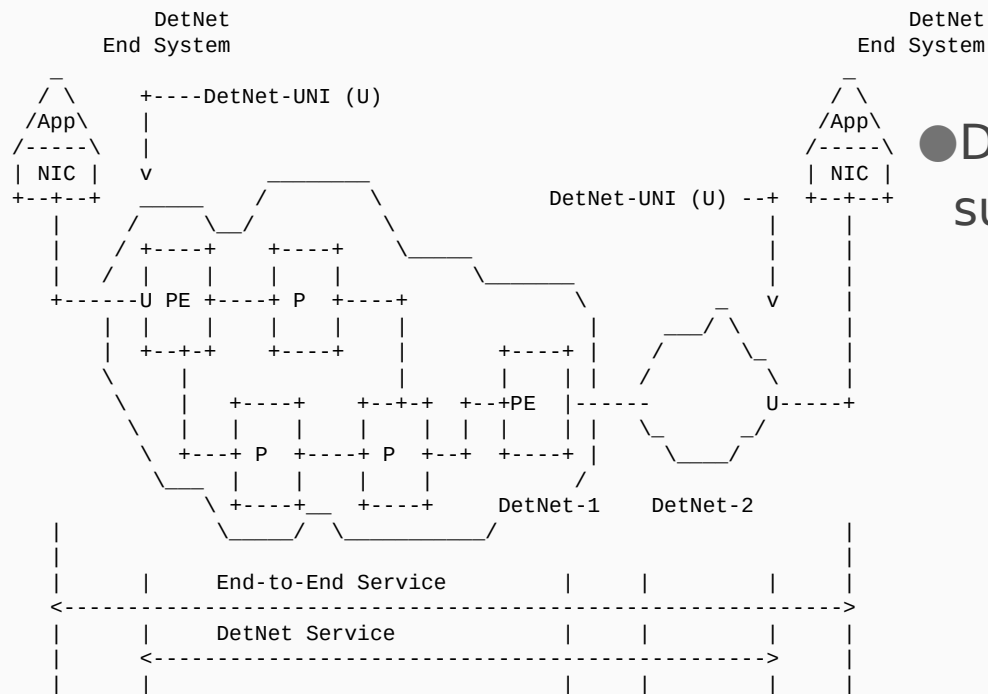
Carlos J. Bernardos
Alain Mourad

July 2022



Aim and scope

- DETNET (and RAW) has been mostly focused on single-domain



- DETNET service reference model supports multi-domain

- But... the WG has not yet worked specifically on the necessary protocol operations to support multi-domain at control and data plane
- Additionally, this is also RAW WG, where multi-domain is relevant

■ See [draft-bernardos-raw-multidomain](#)

Aim and scope

- There are scenarios requiring multidomain DETNET/RAW
 - where hosts are connected to different DETNET domains and they need to communicate to each other with certain reliability and/or availability guarantees
 - E.g., in large factories where networks might be organized in domains (per production lines or building/sites)
- **domain** means *administrative* and/or *technology* domain
- Goal is to explore current DETNET multi-domain gaps (arch, OAM, etc) to identify required solutions

Application plane

- The Application Plane incorporates the **User Agent**, a specialized application that interacts with the end user and operator and performs requests for DetNet services
- In a *multi-domain deployment*, the User Agent might be aware or unaware of the existence of multiple domains:
 - A multi-domain aware User Agent/application plane could *take care of the negotiation of the flows at all involved domains*,
 - whereas a multi-domain unaware User Agent would have to *rely on the network* to take care of it transparently.

Controller plane

- Controller plane: aggregation of the Control and Management planes
 - **Controller Plane Function (CPF)**: any device operating in that plane, whether it is a Path Computation Element (PCE), a Network Management Entity (NME), or a distributed control protocol
 - A (Northbound) Service Interface enables applications in the Application Plane to communicate with the entities in the Controller Plane
- Adding multi-domain support might require some support at the CPF, e.g.:
 - CPFs sitting at different domains need to *discover* themselves, *authenticate* and *negotiate* per-hop behaviors
 - Depending on the multi-domain support provided by the application plane, the controller plane might be relieved from some tasks (e.g., if the application plane performs the splitting of what needs to be provided by each domain)
- RAW brings additional gaps, related to the need of inter-PSE coordination (see [draft-bernardos-raw-multidomain](#))

Network/Data plane

- The Network Plane represents the network devices and protocols as a whole, regardless of the layer at which the network devices operate.
 - It includes the Data Plane and Operational Plane (e.g., OAM) aspects
 - A Southbound (Network) Interface enables the entities in the Controller Plane to communicate with devices in the Network Plane
- In a multi-domain environment, *nodes belonging to different domains might need to exchange information*
 - Potential need for protocol translations and/or abstractions, as the different domains might not offer the same capabilities nor use the same network protocols
 - OAM protocols might also need to be extended to support multi-domain operation
- Performing PREOF or PAREO across multiple domains poses additional challenges, as *knowledge of all the involved domains* might not be available and/or the *data planes at each domain could also be different*

Summary and next steps

- Is there interest in this problem in the WG?
 - Some gaps identified
 - Potential new protocol work needed
 - This is work-in-progress, e.g., to spell out requirements
 - Relation to RAW
 - Discussion also started at the RAW WG
 - <https://datatracker.ietf.org/doc/draft-bernardos-raw-multidomain/>
- Please share your comments on the ML