

Requirements for MPLS Label Stack Indicators and Ancillary Data

draft-bocci-mpls-miad-adi-requirements-02

Mathew Bocci (Nokia)

Stewart Bryant (University of Surry 5GIC)

Overview

- Captures the key requirements for both ancillary data and indicators in the MPLS label stack to support network actions that use that ancillary data
- Product of the MPLS Open Design Team
- Requirements largely derived from a number of proposals for additions to the MPLS label stack to allow decisions about actions based on application data
 - Application data (ancillary data) can exist within or below the label stack
 - Actions can be performed by intermediate (transit) or terminating LSRs on the LSP
- Requirements are on protocol design, NOT implementations

Draft Structure

- Terminology
 - New Terms needed to define new objects in MPLS
- General Requirements
 - A set of design principles that underpin this work
- Requirements on Ancillary Data Indicators
- Requirements on Ancillary Data itself

Key New Terminology

May change depending on framework draft

Ancillary Data:

- Data relating to the MPLS packet that may be used to affect the forwarding or other processing of that packet, either at an LER [RFC4221] or LSR. This data may be encoded within the label stack (in-stack data), and/or after the bottom of the label stack (post-stack data).

Ancillary Data Indicator (ADI):

- An indicator in the MPLS label stack that ancillary data exists in this packet. It MAY also indicate the specific type of the ancillary data.

End-to-End and Hop-By-Hop:

- These need to be defined in the framework.

General Requirements

These are mainly about ensuring consistency of the design with MPLS, and efficiency of the protocol.

- MPLS combines extensibility, flexibility and efficiency by using control plane context combined with a simple data plane mechanism to allow the network to make forwarding decisions about a packet. Any solution MUST maintain these properties of MPLS.
- Any solutions to these requirements MUST NOT restrict the generality of MPLS architecture [RFC3031], [RFC3032].
- If extensions to the MPLS data plane are required, they MUST NOT be inconsistent with the MPLS architecture [RFC3031], [RFC3032].
- The design of any mechanism SHOULD be such that an LSR is able to efficiently parse the label stack.
- Mechanisms MUST NOT add more labels to the stack than is necessary.

Requirements on ADIs

Specific requirements on the design of ancillary data indicators

These address the following themes:

- The need for an ADI
- Coexistence of the ADI (which is in the label stack) with existing MPLS mechanisms
- The need for mechanisms to enable a head end LER to know whether and where in the label stack to insert an ADI on an LSP
- ADI Support for end to end and hop by hop processing of ancillary data

Requirements on Ancillary Data

High level requirements on the design of ancillary data

These address the following themes:

- Coexistence of the ancillary data (which may be in the label stack) with existing MPLS mechanisms, incl. post-stack e.g. CW & G-ACH
- Protocol efficiency: ensure ancillary data is not too deep in the packet
- Whether processing impacts the immediate forwarding operation or if mis-ordering is allowed (fast-path vs. slow path processing depends on the application)
- Scope of ancillary data: MAY be control/maintenance or MAY be related to the user traffic
- Security: Solution is needed to verify authenticity of ancillary data. Design must not expose confidential information.

Summary

- Several versions of the draft have been reviewed line-by-line in the MPLS Open Design Team
- Needs some editorial clean up and merge of duplicate requirements
- One set of comments received on v02 which need to be addressed
- Once this is done, authors believe the draft is mature and ready for MPLS working group adoption