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MPLS Payload Protocol Identifier
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Abstract

The MPLS label stack has no explicit protocol identifier field to indicate the protocol type of the MPLS payload. This document proposes a mechanism for containing a protocol identifier field within the MPLS packet, which is useful for any new encapsulation header which may need to be encapsulated with an MPLS header.

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Table of Contents

- [1. Introduction](#) [2](#)
- [1.1. Requirements Language](#) [2](#)
- [2. Terminology](#) [3](#)
- [3. Protocol Type Field](#) [3](#)
- [4. Data Plane Processing of PIL](#) [3](#)
- [4.1. Egress LSRs](#) [4](#)
- [4.2. Ingress LSRs](#) [4](#)
- [4.3. Transit LSRs](#) [5](#)
- [4.4. Penultimate Hop LSRs](#) [5](#)
- [5. Signaling for PIL Processing Capability](#) [5](#)
- [5.1. LDP](#) [5](#)
- [5.2. RSVP-TE](#) [5](#)
- [5.3. BGP](#) [5](#)
- [5.4. ISIS](#) [5](#)
- [5.5. OSPF](#) [5](#)
- [6. IANA Considerations](#) [5](#)
- [7. Security Considerations](#) [5](#)
- [8. Acknowledgements](#) [6](#)
- [9. References](#) [6](#)
- [9.1. Normative References](#) [6](#)
- [9.2. Informative References](#) [6](#)
- Author's Address [6](#)

[1. Introduction](#)

The MPLS label stack has no explicit protocol identifier field to indicate the protocol type of the MPLS payload. This document proposes a mechanism for containing a protocol identifier field within the MPLS packet, which is useful for any new encapsulation header which may need to be encapsulated with an MPLS header. With this explicit protocol identifier field, there is no need any more for each new encapsulation header to deal with the notorious first nibble issue associated with MPLS individually. More specifically, there is no need to intentionally avoid the first nibble of each new encapsulation header from being 0100 (IPv4) or 0110 (IPv6).

[1.1. Requirements Language](#)

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

payload as per [\[ETYPES\]](#).

Payload: This field contains the MPLS payload which can be an IP packet, an Ethernet frame, or any other type of payload (e.g., network service header).

[4.](#) Data Plane Processing of PIL

Xu

Expires January 1, 2017

[Page 3]

Internet-Draft

MPLS Payload Protocol Identifier

June 2016

[4.1.](#) Egress LSRs

Suppose egress LSR Y is capable of processing the Protocol Type field contained in MPLS packets. LSR Y indicates this to all ingress LSRs via signaling (see [Section 5](#)). LSR Y MUST be prepared to deal with both packets with an imposed Protocol Type field and those without; the PIL will distinguish these cases. If a particular ingress LSR chooses not to impose a Protocol Type field, LSR Y's processing of the received label stack (which might be empty) is as if LSR Y chose not to accept Protocol Type field. If an ingress LSR X chooses to impose the Protocol Type field, then LSR Y will receive an MPLS packet constructed as follows: <Top Label (TL), Application Label (AL), PIL> <Protocol Type field> <remaining MPLS payload>. Note that here the TL could be replaced with an IP-based tunnel [\[RFC4023\]](#) and the AL is optional. LSR Y recognizes TL as the label it distributed to its upstream LSR and pops the TL (note that the TL may be an implicit null label, in which case it doesn't appear in the label stack and LSR Y MUST process the packet starting with the AL label (if present) and/or the PIL.) LSR Y recognizes the PIL with S bit set. LSR Y then processes the Protocol Type field, which will determine how LSR Y processes the MPLS payload.

[4.2.](#) Ingress LSRs

If an egress LSR Y indicates via signaling that it can process the Protocol Type field, an ingress LSR X can choose whether or not to insert it into the MPLS packet destined for LSR Y. The ingress LSR X MUST NOT insert the Protocol Type field into that MPLS packet unless the egress LSR X has explicitly announced that it could process it.

The steps that ingress LSR X performs to insert the Protocol Type field are as follows:

1. On an incoming packet, identify the application to which the packet belongs and determine whether the Protocol Type field needs to be added to the incoming packet.
2. For packets requiring the insertion of the Protocol Type field, prepend the Protocol Type field to the existing MPLS payload; then, push the PIL on to the label stack with the S bit set.
3. Push the application label (AL) label (if required) on to the label stack.
4. Push the EL and the ELI labels [[RFC6790](#)] on to the label stack (if required).
5. Determine the top label (TL) and push it on to the label stack.

6. Determine the output interface and send the packet out.

[4.3.](#) Transit LSRs

Transit LSRs MAY operate with no change in forwarding behavior. If a transit LSR recognizes the PIL and the subsequent Protocol Type field, it MAY be allowed to do some additional value-added processing, such as MPLS payload inspection, on the received MPLS packet containing the PIL and the Protocol Type field.

[4.4.](#) 4.4. Penultimate Hop LSRs

No change is needed at penultimate hop LSRs.

[5.](#) 5. Signaling for PIL Processing Capability

[5.1.](#) LDP

TBD

[5.2.](#) RSVP-TE

TBD

[5.3.](#) BGP

TBD

[5.4.](#) ISIS

TBD

[5.5.](#) OSPF

TBD

[6.](#) IANA Considerations

A special purpose label with value of <TBD> or an extended special purpose label with value of <TBD> for the PIL needs to be assigned by the IANA.

[7.](#) Security Considerations

TBD

Xu

Expires January 1, 2017

[Page 5]

Internet-Draft

MPLS Payload Protocol Identifier

June 2016

[8.](#) Acknowledgements

TBD

[9.](#) References

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