

# Header Compression over MPLS

(draft-ietf-avt-hc-mpls-reqs-03.txt)  
(draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

Jerry Ash  
AT&T  
gash@att.com

George Swallow  
Cisco Systems, Inc.  
swallow@cisco.com

Bur Goode  
AT&T  
bgoode@att.com

Raymond Zhang  
Infonet Services Corporation  
zhangr@sa.infonet.com

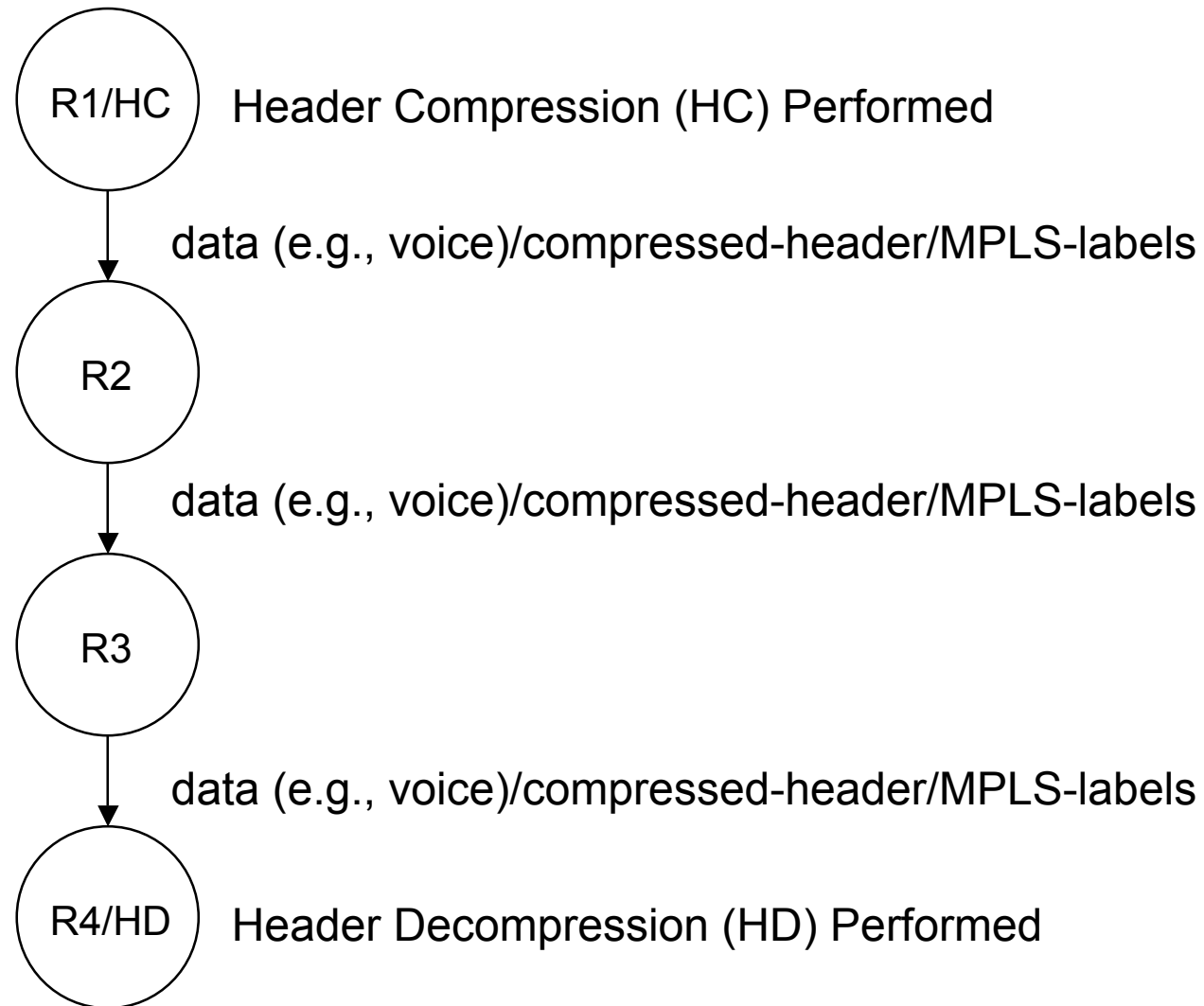
Jim Hand  
Consultant  
hand17@earthlink.net

# Outline

**(draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)**

- header compression over MPLS concept
- changes from previous version
- open issues raised on list
- next steps

# Header Compression over MPLS Concept



# Changes from Previous Version

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

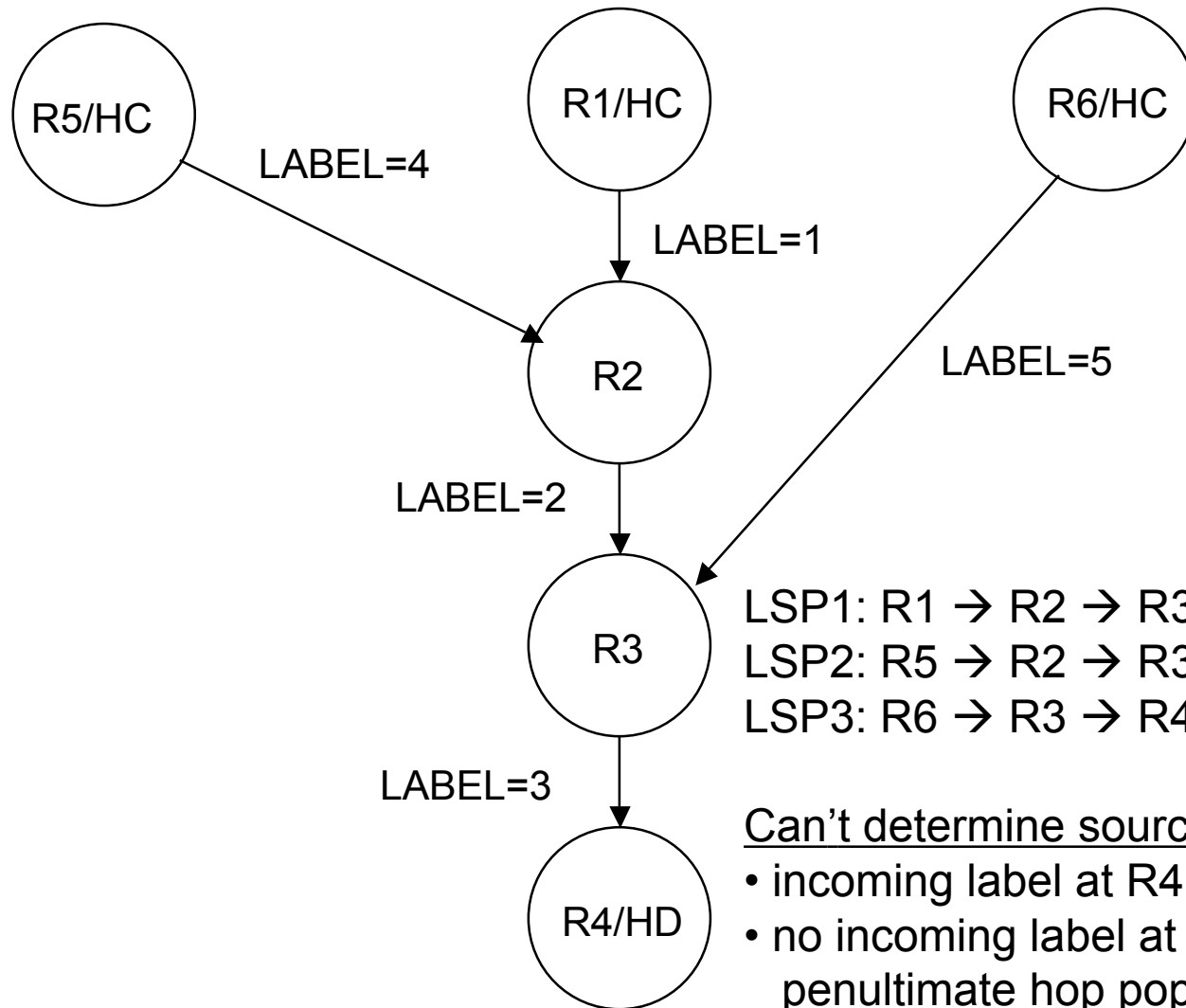
- ❑ added text to Introduction
  - ❖ ECRTP over MPLS solution meets requirements in <http://www.ietf.org/internet-drafts/draft-ietf-avt-hc-mpls-reqs-03.txt>.
- ❑ changed the CID\_Packet\_Type designation in Section 2.2 (Link Layer Packet Type Field)
  - ❖ from 00010000 to 00000000
  - ❖ based on constraints on the first nibble as specified in <http://www.ietf.org/internet-drafts/draft-ietf-mpls-ecmp-bcp-00.txt>
  - ❖ avoid values that could be mistaken as IPv4, IPv6, or VPN/PseudoWire encapsulations
- ❑ updated boilerplate & other edits

# Open Issues Raised on List

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ fundamental issue: all header compression mechanisms assume a point to point link
  - ❖ how to do HC over MPLS?
    - MPLS is a multipoint to point mechanism
    - N HC sources & one HD receiver
- ❑ current draft proposes signaling to assign unique CID at compressor
  - ❖ to uniquely identifies flow at decompressor
  - ❖ issue: basic change to HC methods
- ❑ Magnus & Lars-Erik argue to extend current "link-layer" negotiation & encapsulation methods
  - ❖ use RFC 3544 ('IPHC over PPP') & RFC 3409 ('lower layer guidelines for ROHC') as a basis
  - ❖ extensions for HC over MPLS MUST be designed to meet this requirement
  - ❖ issue: need mechanism to identify HC source at HD receiver

# Multipoint to Point MPLS Label Switched Paths (LSPs)



LSP1: R1 → R2 → R3 → R4

LSP2: R5 → R2 → R3 → R4

LSP3: R6 → R3 → R4

Can't determine source HC from label

- incoming label at R4 the same
- no incoming label at R4 if penultimate hop popping (PHP) is used at R3

# Open Issues Raised on List

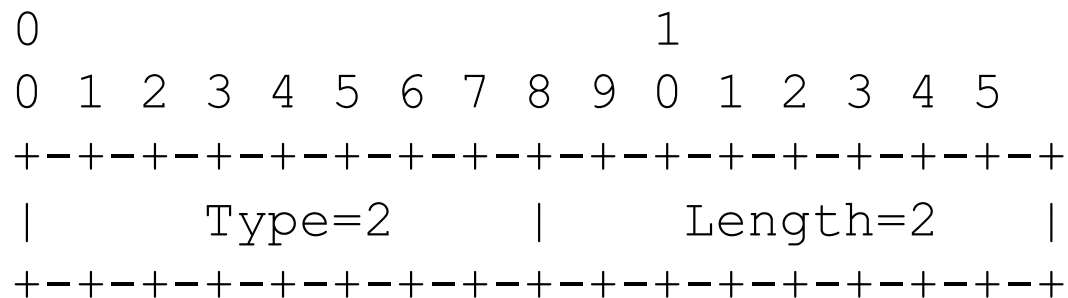
## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ issue: need mechanism to identify HC source at HD receiver
- ❑ can't determine source HC from MPLS label
  - ❖ incoming label at HD receiver can be the same for multiple HC sources
  - ❖ no incoming label at HD receiver if penultimate hop popping (PHP) is used
- ❑ use CID at HD receiver to uniquely identify flow
  - ❖ HD receiver MUST resolve CID collisions
  - ❖ reuse existing (but undocumented) methods for
    - CID collision resolution
    - CID release & reuse
    - HD receiver could associate CID with HC IP address for collision resolution

# Open Issues Raised on List

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ issue: use RFC 3544 ('IPHC over PPP') & RFC 3409 ('lower layer guidelines for ROHC') to negotiate HC scheme parameters
- ❑ response: these RFCs oriented toward negotiating over a single PPP link
  - ❖ need to extend to negotiating over MPLS LSP
  - ❖ RFC 3544 uses RFC 1332 ('PPP IP Control Protocol (IPCP)') to signal/negotiate HC parameters
  - ❖ for HC over MPLS, objects MUST be sent between HCO & HD over an MPLS LSP
    - identify as one of the packet types (discussed later)
  - ❖ e.g., to enable ECRTP [RFC3545], sub-option 2 is negotiated, this object MUST be sent between HCO & HD over MPLS LSP





# Open Issues Raised on List

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ issue: packet type identification inconsistency, 4-bit or 8-bit packet type? Explain first octet of zeros.
- ❑ response: propose 1-byte packet type identifier (extends RFC 3544)

```
0 1 2 3 4 5 6 7 8
```

```
+--+--+--+--+--+--+--+
```

```
|0 0 0 0|Pkt Typ|
```

```
+--+--+--+--+--+--+--+
```

"Packet Type" encoding:

0: Reserved

1: FULL\_HEADER

2: COMPRESSED\_TCP

3: COMPRESSED\_TCP\_NODELTA

4: COMPRESSED\_NON\_TCP

5: COMPRESSED\_RTP\_8

6: COMPRESSED\_RTP\_16

7: COMPRESSED\_UDP\_8

8: COMPRESSED\_UDP\_16

9: CONTEXT\_STATE

10: ROHC

11: IPCP

12-15: RESERVED

- ❑ first nibble set to 0000 to avoid being mistaken for IP
  - ❖ MPLS payload not IP
  - ❖ consistent with PWE3 control word [PWE3-CNTL-WORD], [ECMP-AVOID]

# Open Issues Raised on List

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ issue: address all HC schemes IPHC (RFC 2507), CRTP (RFC 2508), ECRTP (RFC 3545), ROHC (RFC 3095)
- ❑ response: OK as long as complexity/issues doesn't get out of hand
- ❑ issue: address operational considerations for compression schemes
  - ❖ e.g. how to handle reordering
    - ROHC & ECRTP reordering drafts can be a useful source of information
      - <http://www.ietf.org/internet-drafts/draft-ietf-rohc-over-reordering-01.txt>
      - <http://www.ietf.org/internet-drafts/draft-koren-avt-ecrtp-reorder-00.txt>
    - ECRTP & ROHC evaluation
      - <http://epubl.luth.se/1402-1617/2004/286/LTU-EX-04286-SE.pdf>
- ❑ response: OK, will include operational considerations section

# Open Issues Raised on List

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ issue: what creates a feedback channel
- ❑ response: propose additional text to explain creation of feedback MPLS LSP channel:
  - ❖ R1/HC sends RSVP-TE PATH message to R4/HD
    - R4/HD sends RSVP-TE RESV message to R1/HC
    - creates R1 --> R4 LSP that follows R1 --> R2 --> R3 --> R4
    - R1/HD uses LSP to send CONTEXT\_STATE packets to R4/HC
    - R1/HC uses LSP to send compressed packets to R4/HD
  - ❖ R4/HC sends RSVP-TE PATH message to R1/HD
    - R1/HD sends RSVP-TE RESV message to R1/HC
    - creates R4 --> R1 LSP that follows R4 --> R3 --> R2 --> R1
    - R4/HD uses LSP to send CONTEXT\_STATE packets to R1/HC
    - R4/HC uses LSP to send compressed packets to R1/HC

# Summary of Proposed Changes

## (draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)

- ❑ address all HC schemes IPHC (RFC 2507), CRTP (RFC 2508), ECRTP (RFC 3545), ROHC (RFC 3095)
- ❑ include operational considerations section
- ❑ specify IPCP objects be sent between header compressor & header decompressor over MPLS LSP
- ❑ reuse existing header compression methods for
  - ❖ CID collision resolution
  - ❖ CID release & reuse
- ❑ provide additional text to explain creation of feedback MPLS LSP channel
- ❑ specify 1-byte packet type identifier
- ❑ reissue I-D with above changes

# Next Steps

**(draft-ietf-avt-hc-mpls-reqs-03.txt)**

**(draft-ash-avt-ecrtp-over-mpls-protocol-02.txt)**

- ❑ requirements draft to RFC Editor?
- ❑ charter extension?
- ❑ continue to progress solution I-D within AVT
  - ❖ with review by MPLS & ROHC WGs