Update on BIER IPv6 Encapsulation

draft-xie-bier-ipv6-encapsulation-08

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IETF 108 Online,

Wednesday Session I, 11:00-12:40, July 29, 2020 (UTC)
IETF 102 (v00 -> v01):
- Initial proposal is a “Native IPv6” approach, using IPv6 extension header carrying BIER Header.

IETF 103 (v01):
- WG suggested a requirements draft.

IETF 104 (v02 -> v00):
- Split the drafts into requirement document and encapsulation document; Requirement document was adopted.

IETF 105 (v00 ->v02):
- BIER IPv6 covered in BIER charter was confirmed.

IETF 106 (v02 -> v03):
- Change multicast address to unicast address after WG discussion.

IETF 107/interim (v03 -> v06):
- add OAM support; Add a section about security, addressing all the previous comments.

IETF 108 (v06 -> v08):
- See following slides.
BIERv6 Draft Update and BIER WG Feedback (rev-06)

- BIERv6 encapsulation update in rev-06 (2020-3-9):
  - Use the Next Header value 143 for Ethernet packet in IPv6. ([https://www.iana.org/assignments/protocol-numbers/protocol-numbers.xhtml#protocol-numbers-1](https://www.iana.org/assignments/protocol-numbers/protocol-numbers.xhtml#protocol-numbers-1))
  - Eliminate the need for Next Header code point allocation.
  - Update the “security consideration” section.

- Comments received and addressed:
  - Detailed Review comments and some high level comments. ([https://mailarchive.ietf.org/arch/msg/bier/y96tvDJNrX3AegHqDBlwuSr4850/](https://mailarchive.ietf.org/arch/msg/bier/y96tvDJNrX3AegHqDBlwuSr4850/))
  - All comments are answered and addressed in the mailing list.

- BIER WG’s feedback:
  - Review by the 6MAN WG is necessary before any further discussion in the BIER WG.
BIERv6 Draft Update and 6MAN WG Feedback (rev-07)

- BIERv6 encapsulation update in rev-07 (2020-6-29):
  - Terminologies like “BIERv6 domain” are added or updated.
  - The use of “Proto” field in BIER header and “Next Header” field in IPv6 header is revised.
    - Simplified OAM mechanism and main technical improvement in this version.
  - Editorial changes in security considerations.
  - Issues raised by IDnits tool are fixed.
  - Co-authors are added.

- Comments from 6MAN Mailing List:
  - Review request is sent to 6MAN ML (sync to BIER as well).
  - Rev-07 is baseline version for 6MAN review.
• BIERv6 encapsulation update in rev-08 (2020-7-12), per the suggestions received:
  • A diagram showing BIERv6 per hop packet processing in an IPv6 domain is added in section 4.
  • Clarification of BIERv6 aligning with BIER architecture is added in Appendix A.
  • References for control plane extension are noted in Appendix B.
  • Text for the use of unicast address in section 3.2 is moved to Appendix C.

• Comments from BIER Mailing list:
  • Request for adoption sent to BIER WG.
    • Positive feedback with lots of support.
    • No further technical concerns yet.
What is the next?

- Consecutive improvements are made according to comments from WG, including:
  - BIERv6 alignment with BIER architecture defined in RFC 8279.
  - Simplified BIERv6 OAM.
  - BIERv6 security well considered.

- Comprehensive and constructive discussion in IETF:
  - Acknowledgement and positive review from 6MAN WG.
  - Positive feedback for adoption request in BIER WG.
  - Consensus of IPv6 address semantics in IETF community.

- The authors believe the draft is mature and ready for WG adoption.
Thank you!
BIERv6 Encapsulation

IPv6 header | IPv6 DO Header with BIER Option | X type of C-multicast packet
---|---|---
Next Hdr = 60 | Nxt Hdr = X | (IPv4/IPv6/Ethernet)

Non-MPLS BIER Header (defined in RFC8296)

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Next Header | Hdr Ext Len | Option Type | Option Length |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Non-MPLS BIER Header (defined in RFC8296) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| BIFT-id | TC | S | TTL |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Nibble | Ver | BSL | Entropy |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| OAM Rsv | DSCP | Proto | BFIR-id |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| BitString (first 32 bits) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| BitString (last 32 bits) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
```

```
Hex Value | act | chg | rest | Description | Reference
---|---|---|---|---|---
0x70 | 01 | 1 | 10000 | BIER Option | This draft
```
Forwarding Procedure