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BGP Flow-Spec Traffic Compress Action

Abstract

Flow-spec is an extension to BGP that allows for the dissemination
of traffic flow specification rules and traffic filtering actions.
This document specifies a new traffic filtering action to support
compressing traffic.

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].

Status of This Memo

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Table of Contents

1. Introduction

Flow-spec [RFC8955] [RFC8956] is an extension to BGP that allows for the dissemination of traffic flow specification rules and traffic filtering actions. The flow-spec standard defines widely-used filter actions such as discard, rate limit, traffic marking and so on.

Data transmitted on the enterprise network, data center, office, and external connections is inconsistent. The data may be text, audio, or video.

The BGP flowSpec extension allows traffic filters to be distributed to routers on the entire network. However, some nodes are suitable for compression and have a large compression ratio. Some nodes have no compression space. Some nodes have no compression or decompression capabilities. Therefore, a new traffic action needs to be added to selectively compress different traffic based on the existing traffic filters.

For example, database data is transmitted between financial data centers. We need to compress the data of different network nodes to save bandwidth.

This document specifies a new traffic filtering action that provides
a method of traffic compressing. The details of the action,
including compression algorithms, are encoded in newly defined BGP
extended communities

2. Traffic compress Extended Community

This document proposes a new BGP extended community called the
"flow-spec traffic compress action". It has a Generic Transitive
Extended Community type "0x80". The sub-type value [to be assigned
by IANA] indicates that the global administrator and local
administrator fields encode a flow-spec traffic compress action. In
the new extended community the 2-byte global administrator field
encodes compression algorithms called Compression Parameter Index
(CPI) [RFC-3173]. And the 4-byte local administrator field is
reserved for future use.

This new BGP extended community is encoded as follows :

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    0x80     |   Sub-Type   |                CPI               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          RESERVED                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

   *Sub-Type: TBD.

   *CPI: 2 octets. The values 0-63 designate well-known compression
    algorithms.The values 64-255 are reserved for future use. The
    values 256-61439 are negotiated between the two nodes in
    definition of an IPComp Association[RFC3173].

   *RESERVED: 4 octets. All bits in the local administrator field
    MUST be set to 0 by the originating BGP speaker and ignored by
    receiving BGP speakers.

Generally, the receive end of Flowspec Traffic Compress Extended
Communityfunctions as the compressing end and the transmit end
functions as the decompressing end. In addition, the CPI can be
delivered through the controller or other devices. In this case, the
traffic receiver must have the decompression capability
corresponding to the traffic compression extended community.

3. Error Handling

If multiple traffic compression extended communities exist in the
BGP route attribute, the value of the first traffic compression
extended community must be used.

The validation of the TLVs/sub-TLVs introduced in this document and defined in their respective sub-sections of Section 2 MUST be performed to determine if they are malformed or invalid. In case of any error detected, the error handling should comply with [RFC7606].

4. IANA Considerations

This document requests the creation of a new registry called "Traffic compress Extended Community" under the "Extended Community" registry.

```
SubType   Description
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  TBD     Traffic compress Extended Community
```

5. Security Considerations

There are no additional security risks introduced by this design.

6. Acknowledgements

7. References

7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

7.2. References

[RFC8955] Loibl, C., Hares, S., Raszuk, R., McPherson, D., and M. Bacher, "Dissemination of Flow Specification Rules", RFC 8955, DOI 10.17487/RFC8955, December 2020, <https://www.rfc-editor.org/info/rfc8955>.

7.3. References

[RFC8956] Loibl, C., Ed., Raszuk, R., Ed., and S. Hares, Ed., "Dissemination of Flow Specification Rules for IPv6", RFC 8956, DOI 10.17487/RFC8956, December 2020, <https://www.rfc-editor.org/info/rfc8956>.

7.4. References

[RFC3173] Shacham, A., Monsour, B., Pereira, R., and M. Thomas, "IP Payload Compression Protocol (IPComp)", RFC 3173, DOI 10.17487/RFC3173, September 2001, <https://www.rfc-editor.org/info/rfc3173>.

7.5. References

[RFC7606]   Chen, E., Ed., Scudder, J., Ed., Mohapatra, P., and K.
            Patel, "Revised Error Handling for BGP UPDATE Messages",
            RFC 7606, DOI 10.17487/RFC7606, August 2015, <https://
            www.rfc-editor.org/info/rfc7606>.

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