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BGP Flow Specification for Network Resource Partition
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Abstract

[RFC8955] defines BGP flow specification version 1 (FSv1) and [I-D.hares-idr-flowspec-v2] defines BGP flow specification (FSv2) protocol. This document proposes extensions to BGP Flow Specification Version 2 to support IETF network slice filtering.

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Internet-Draft

BGP-FS for NRP

April 2022

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[1.](#) Introduction

[I-D.ietf-teas-ietf-network-slices] provides the definition of a network slice for use within the IETF and discusses the general framework for requesting and operating IETF Network Slices, their characteristics, and the necessary system components and interfaces. It also discusses the function of an IETF Network Slice Controller and the requirements on its northbound and southbound interfaces.

[I-D.bestbar-teas-ns-packet] introduces a Slice-Flow Aggregate as the collection of packets (from one or more IETF network slice traffic streams) that match an NRP Policy selection criteria and are offered the same forwarding treatment. The NRP Policy is used to realize an NRP by instantiating specific control and data plane resources on select topological elements in an IP/MPLS network. The NRP Identifier (NRP-ID) is globally unique within an NRP domain and that can be used in the control or management plane to identify the resources associated with the NRP.

The NRP-ID can be encapsulated in various data plane in order to provide QoS on a per slice basis. In an IPv6 scenario, the NRP-ID could be carried in either the IPv6 fixed header or the extension headers. In an MPLS scenario, the NRP-ID could be carried in either the MPLS label stack or following the MPLS label stack.

[RFC8955] defines BGP flow specification version 1 (FSv1) and [\[I-D.hares-idr-flowspec-v2\]](#) defines BGP flow specification (FSv2) protocol. This document proposes extensions to BGP Flow

Specification Version 2 to support IETF network slice filtering. It specifies new FSv2 traffic Filters and Actions.

[2.](#) 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](#)].

cloud transport network: It is usually a national or province backbone network to achieve interconnection between multiple regional clouds/core clouds deployed in the country/province.

[3.](#) BGP Flow Specification Encoding for NRP

[I-D.hares-idr-flowspec-v2] uses an NRLI with the format for AFIs for IPv4 (AFI =1), IPv6 (AFI = 2), L2 (AFI = 6), L2VPN (AFI=25), and SFC (AFI=31) with two following SAFIs to support transmission of the flow specification which supports user ordering of traffic filters and actions for IP traffic and IP VPN traffic. It defines FSv2 traffic Filters and Actions. This document specifies new FSv2 traffic Filters and Actions. This document specifies new FSv2 traffic Filters and Actions.

[3.1.](#) Filtering Rules for NRP

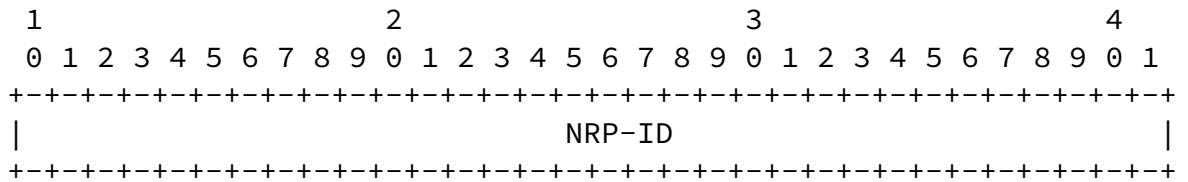
[I-D.hares-idr-flowspec-v2] defines several types for FSv2 TLV format of the NRLI, such as IP header rules, L2 traffic rules, SFC Traffic rules, and others. This document defines a new IP sub-TLV type for IETF slice network.

Function: This match applies to NRP-ID carried in the packet.

Encoding:< type (1 octet), length (1 octet), [operator, value] +>.

It contains a set of {operator, value} pairs that are used to match NRP-ID. The operator field is encoded as specified in [Section 4.2.1.1 of \[RFC8955\]](#).

The value field is encoded as:



[3.2.](#) Traffic Action for NRP

[I-D.hares-idr-flowspec-v2] defines the FSv2 actions may be sent in an Extended Community or a Wide Community, and it defines the several FSv2-Action in the Wide Community, such as, ACO (action chain operation), TAIS (traffic actions per interface group) ,and others. This document defines two new action in the Wide Community for IETF slice network.

Function: NRP-ID Action.

Sub-TLV: TBD2

Length: 8 octets

Value:

[Action (1 octet)]

[NRP-ID (4 octets)]

Where Action:

Action	Function
0	Encapsulate the NRP-ID
1	Rewrite the NRP-ID

2 ~255	Reserved
--------	----------

The location of the NRP-ID is determined according to local policy. The location of the NRP-ID can also be carried in the NRP-ID action, which can be discussed in subsequent versions.

4. Application Example

BGP FlowSpec Controller signals the filter Rules and action to ingress node of a domain. [RFC8955], [RFC8956] and [I-D.hares-idr-flowspec-v2] define several rule condition to match a particular traffic flow, for example, the 5-tuple components (e.g. destination IP address and source IP address).

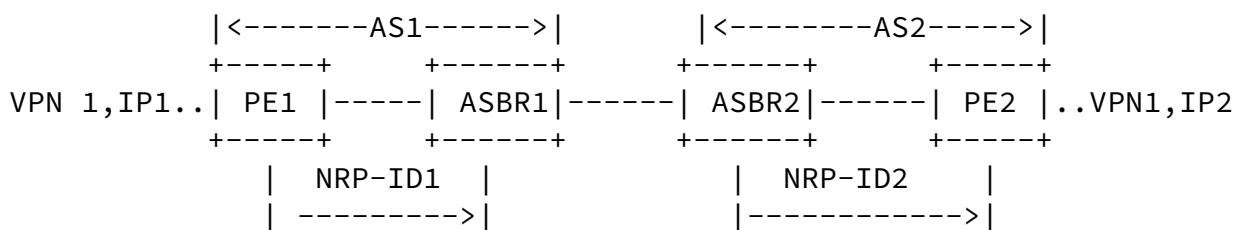


Figure 1: Usage of FlowSpec with NRP-ID

An example of BGP-FS rule1 (locally configured) for PE1:

Filters:

```

  destination ip prefix:IP2/32
  source ip prefix:IP1/32
  
```

Actions: Wide Communities-- NRP-ID Action

```

  Encapsulate the NRP-ID
  
```

Notice: In this example, it use the global NRP-ID. In some scenario, each AS may have different NRP-ID, so the "Rewrite the NRP-ID" action

may be used for ASBR2.

Another example of BGP-FS rule2 (locally configured) for ASBR2:

Filters:

NRP-ID

Actions: Wide Communities-- NRP-ID Action
Rewrite the NRP-ID

[5.](#) Acknowledgements

TBD.

[6.](#) IANA Considerations

TBD.

[7.](#) Security Considerations

TBD.

[8.](#) Normative References

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