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BGP Flow Specification for SRv6
draft-li-idr-flowspec-srv6-00

Abstract

This draft proposes BGP flow specification rules that are used to filter SRv6 packets.

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 [RFC2119].

Status of This Memo

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1. Introduction

BGP Flow Specification (BGP-FS) [RFC5575]defines a new BGP NLRI to distribute traffic flow specification rules via BGP ([RFC4271]). BGP-FS policies have a match condition that may be n-tuple match in a policy, and an action that modifies the packet and forwards/drops the packet. Via BGP, new filter rules can be sent to all BGP peers simultaneously without changing router configuration, and the BGP peer can install these routes in the forwarding table. BGP-FS defines Network Layer Reachability Information (NLRI) format used to distribute traffic flow specification rules. NLRI (AFI=1, SAFI=133) is for IPv4 unicast filtering. NLRI (AFI=1, SAFI=134)is for BGP/MPLS VPN filtering.[I-D.ietf-idr-flowspec-l2vpn][I-D.ietf-idr-flowspec-l2vpn] extends the flow-spec rules for layer 2 Ethernet packets.

Segment Routing (SR) for unicast traffic has been proposed to cope with the usecases in traffic engineering, fast re-reroute, service chain, etc. SR architecture can be implemented over an IPv6 data plane using a new type of Segment Routing Header (SRH)[I-D.ietf-6man-segment-routing-header] . SRv6 Network Programming[I-D.filsfils-spring-srv6-network-programming] defined the SRv6 network programming concept and its most basic functions. SRv6 SID will have the form LOC:FUNCT:ARGS::.

LOC: Each operator is free to use the locator length it chooses. Most often the LOC part of the SID is routable and leads to the node which instantiates that SID

FUNCT: The FUNCT part of the SID is an opaque identification of a local function bound to the SID. (e.g. End: Endpoint, End.X, End.T, End.DX2 etc.)

ARGS: A function may require additional arguments that would be placed immediately after the FUNCT

This document specifies a new subset of BGP-FS component types to support Segment Routing over IPv6 data plane (SRv6) filtering.

2. Definitions and Acronyms

- FS: Flow Specification
- SR: Segment Routing
- SRv6: IPv6 Segment Routing, SRv6 is a method of forwarding IPv6 packets on the network based on the concept of source routing.
- SID: Segment Identifier
- BSID: Binding SID

3. The Flow Specification Encoding for SRv6

This document proposes new flow specifications rules that is encoded in NLRI. The following new component types are defined

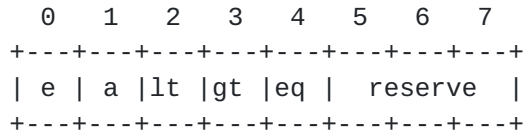
- Whole SID

Type TBD1 - Whole SID

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

Contains a set of {operator, value} pairs that are used to match the SID/binding SID or a range of whole SID.

The operator byte is encoded as:



Where:

e - end-of-list bit. Set in the last {op, value} pair in the list.

a - AND bit. If unset, the previous term is logically ORed with the current one. If set, the operation is a logical AND. It should be unset in the first operator byte of a sequence. The AND operator has

higher priority than OR for the purposes of evaluating logical expressions.

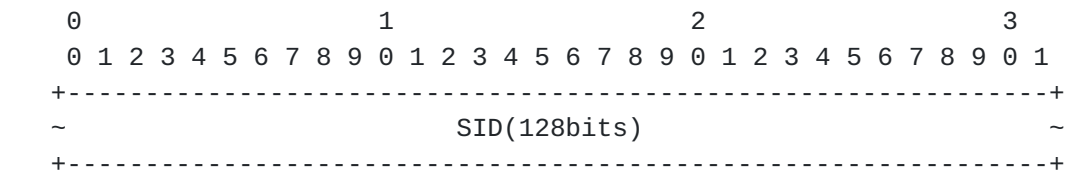
lt - less than comparison between data and value.

gt - greater than comparison between data and value.

eq - equality between data and value.

The bits lt, gt, and eq can be combined to produce match the SID or a range of SID(e.g. less than SID1 and greater than SID2).

The value field is encoded as:



The format of SID is described in [I-D.ietf-6man-segment-routing-header] and [I-D.filsfils-spring-srv6-network-programming]

o Some bits of SID to match

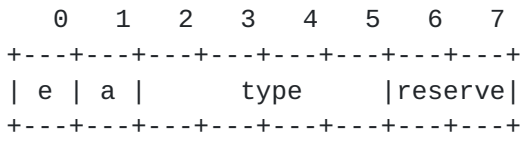
For some scenarios route policy with the whole128 bits SID matching is too long and not necessary. [I-D.filsfils-spring-srv6-network-programming] defined the format of SID is LOC:FUNCT:ARGS::. In some scenarios, traffic packets can just match Locator, Function ID, Argument or combine of these different fields rather than whole 128 bits SID. This document defines a set of new component type TBD2 to reduce the length of matching.

Type TBD2 - Some bits of SID

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

Contains a set of {operator, value} pairs that are used to match some bits of SID.

The operator byte is encoded as:



Where:

e - end-of-list bit. Set in the last {op, value} pair in the list.

a - AND bit. If unset, the previous term is logically ORed with the current one. If set, the operation is a logical AND. It should be unset in the first operator byte of a sequence. The AND operator has higher priority than OR for the purposes of evaluating logical expressions.

type:

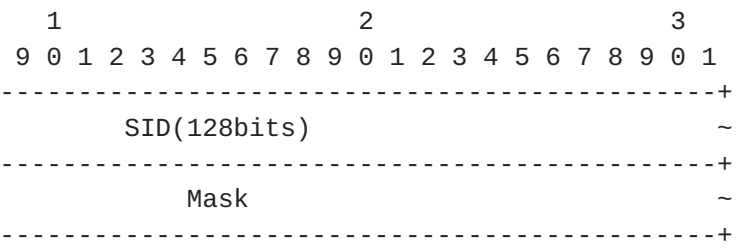
0000 : SID's LOC bits

0001 : SID's FUNCT bits

0010 : SID's LOC:FUNCT bits

0011 : SID's FUNCT:ARGS bits

The value field is encoded as SID with mask to match bits as type defined:



4. Security Considerations

No new security issues are introduced to the BGP protocol by this specification.

5. IANA

IANA is requested to a new entry in "Flow Spec component types registry" with the following values:

Type	RFC or Draft	Description
TBD1	This Draft	SID
TBD2	This Draft	Some bits of SID

6. Contributors

TBD

7. Acknowledgments

TBD

8. References

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