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BGP FlowSpec Redirect to Generalized Segment ID Action
draft-li-idr-flowspec-redirect-generalized-sid-00

Abstract

This document defines a new type of the redirect extended community, called as Redirect to Generalized Segment ID Extended Community. When activated, the Redirect to Generalized Segment ID Extended Community is used by BGP FlowSpec Controller to signal the specific redirecting action to BGP Flowspec Client, and then the BGP Flowspec Client will use the Generalized Segment ID and the Segment Type to find a local forwarding entity in a local mapping table.

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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[1.](#) Introduction

Segment Routing [[I-D.ietf-spring-segment-routing](#)] for unicast traffic has been proposed to cope with the usecases in traffic engineering, fast re-route, service chain, etc. Segment Path Programming (SPP) [[I-D.li-spring-segment-path-programming](#)] generalizes more use cases based on segment and proposes the concept of Segment Path Programming. In the field of Segment Path Programming: 1. The Segment used in the programmed segment path is not only used in the forwarding plane, but also used in the control plane. 2. The programmed segment path is not only used in the transport layer, but also used in the service layer.

[RFC5575] defines the flow specification (FlowSpec) that allows to convey flow specifications and traffic Action/Rules associated (rate-limiting, redirect, remark ...). BGP Flow specifications are encoded within the MP_REACH_NLRI and MP_UNREACH_NLRI attributes. Rules (Actions associated) are encoded in Extended Community attribute. The BGP Flow Specification function allows BGP Flow Specification routes that carry traffic policies to be transmitted to BGP Flow Specification peers to control attack traffic.

Now the drafts of BGP Flowspec for redirecting to VRF/IP/Tunnel keep the traditional way to extend BGP FlowSpec to redirect to an entity

with explicit meaning which has been defined clearly in the existing work.

We can reuse some work of segment routing and generalize the concept of Segment, and then it can provide a base for the abstracted view of different forwarding entities. Since now segment ID can be the indicator of interface, node, tunnel, if we do not map segment ID to MPLS label or IPv6 address, it can be an identifier of all kinds of forwarding entities in the control plane which can be used outside.

This document defines a new type of the redirect extended community, called as Redirect to Generalized Segment ID Extended Community. When activated, the Redirect to Generalized Segment ID Extended Community is used by BGP FlowSpec Controller to signal the specific redirecting action to BGP Flowspec Client, and then the BGP Flowspec Client will use the Generalized Segment ID and Segment Type to find a local forwarding entity in a local mapping table.

Existing technologies (BGP, IGP, LDP, SR, RSVP, Manual-Config, etc...) can be used to setup the mapping tables per segment type.

2. Definitions and Acronyms

- o FS: Flow Specification
- o SR: Segment Routing
- o SID: Segment Identifier
- o GSID: Generalized Segment ID
- o SPP: Segment Path Programming

3. Redirect to Generalized Segment ID Extended Community

This document defines a new type of the redirect extended community, called as Redirect to Generalized Segment ID Extended Community. This extended community is a new transitive extended community with the Type is TBD1 and the Sub-Type field is TBD2.

This document defines the following Redirect to Generalized Segment ID Extended Community:


```

 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
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| Type=TBD1      | Sub-Type=TBD2 | Flags(1 octet)| Segment Type  |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     Generalized Segment ID          |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

Figure 1: Redirect to Generalized Segment ID Extended Community Format

Where:

Type: 1 octet, to be assigned by IANA

Sub-Type: 1 octet, to be assigned by IANA

Flags: 1 octet field, TBD

Segment Type: 1 octet, Per [[I-D.li-spring-segment-path-programming](#)],
the Segment Type includes:

- o 1 - Node Segment
- o 2 - Agency Segment
- o 3 - AS (Autonomous System) Segment
- o 4 - Anycast Segment
- o 5 - Multicast Segment
- o 6 - Tunnel Segment (Tunnel Binding Segment)
- o 7 - VPN Segment
- o 8 - OAM Segment
- o 9 - ECMP (Equal Cost Multi-Path) Segment
- o 10 - QoS Segment
- o 11 - Bandwidth-Guarantee Segment
- o 12 - Security Segment
- o 13 - Multi-Topology Segment
- o etc.

Generalized Segment ID: 4 octets, it can be used to find a local forwarding entity in the mapping table designated by the Segment Type.

4. Using Redirect to Generalized Segment ID Extended Community

In the transport layers, there can be multiple tunnels with different constraints to one specific destination. In the traditional way, the tunnel is set up by the distributed forwarding nodes. As the PCE-initiated LSP setup [I-D.ietf-pce-pce-initiated-lsp] is introduced, the tunnel setup can be triggered by the central controlled way. In order to satisfy the different service requirements, it is necessary to provide the capability to flexibly map the service to different tunnels. Since the central control point has enough information based on the whole network view, it can be an effective way to map the service to the tunnel by the central point and advertise the mapping information to the end-points of the service to guide the mapping in the forwarding node.

The method to implement mapping service to tunnels can directly introduce the tunnel attribute to specify the tunnel proposed by [I-D.li-idr-mpls-path-programming]. [I-D.li-spring-tunnel-segment] proposes one new type of segment, Tunnel Segment, which can provide an alternative way to implement mapping service to tunnels. In the following figure, the central controller can trigger to set up the MPLS TE tunnels through PCE-initiated LSP and allocate Segment ID for the tunnel in the Node-1.

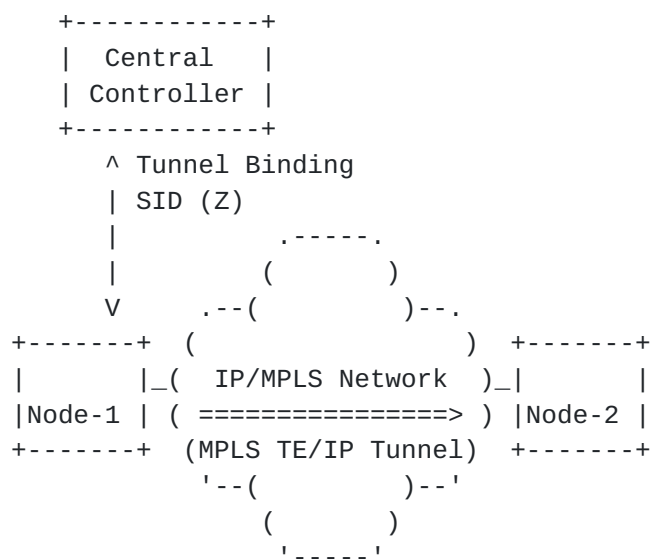


Figure 2: Using Tunnel Segment for Mapping Service to Tunnel

The central controller can send a flowspec route to Node-1 with a 'Redirect to Generalized Segment ID' Extended Community to map a specific service to the tunnel segment identified by the Segment Type and Generalized Segment ID.

When Node-1 receives a flowspec route with a 'Redirect to Generalized Segment ID' Extended Community. It installs a traffic filtering rule that matches the packets described by the NLRI field and redirects them to the tunnel with the Generalized Segment ID.

5. Validation Procedures

The validation check described in [[RFC 5575](#)] and revised in [[I-D.ietf-idr-bgp-flowspec-oid](#)] SHOULD be applied by default to received flowspec routes with a Redirect to Generalized Segment ID Extended Community. This means that a flowspec route with a destination prefix subcomponent SHOULD NOT be accepted from an EBGp peer unless that peer also advertised the best path for the matching unicast route.

6. IANA Considerations

TBD.

7. Security Considerations

TBD.

8. Acknowledgements

TBD.

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