BGP Flowspec
Redirect Load Balancing Group Community

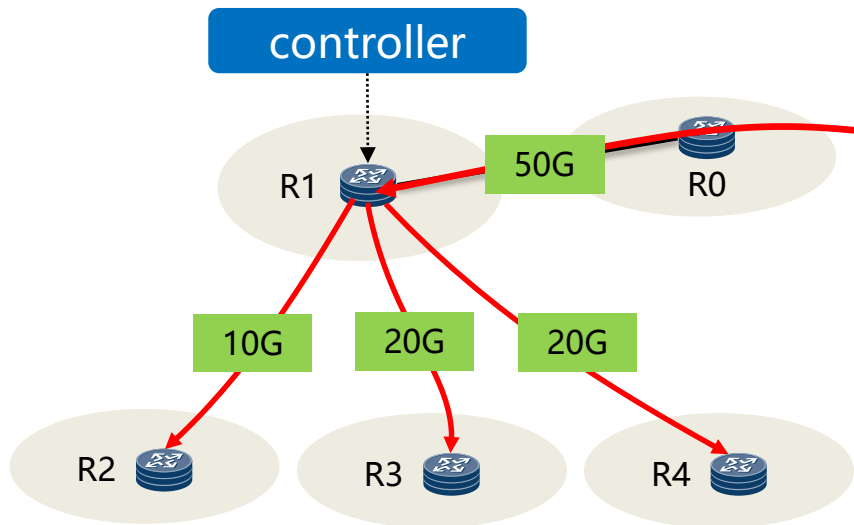draft-wu-idr-flowspec-redirect-group-00

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Motivation & Problem Statement

- BGP Flow Specification allows flow routes that carry traffic policies to steer traffic.

- In some scenarios, we need to steer traffic to a load balancing group, either ECMP or UCMP.

- For the 50G traffic to R1 from R0, we may want to steer traffic to R2, R3 and R4 in a 1:2:2 ratio

- The ratio could be changing according to network running status

- Routers may be deployed in IP, MPLS or SRv6 networks

- Current set of mechanisms can hardly support neither ECMP of SRv6 tunnels nor UCMP of either types.

Redirect Load Balancing Group Community

- New Type of BGP Wide Community

- Extension to "BGP Community Container Attribute" [draft-ietf-idr-wide-bgp-communities]

- General formats comply with "BGP Community Container Attribute"

- New Community Value: **Redirect Load Balancing Group (TBD)**, require IANA reregistration

- **MUST** contain only 1 Parameter TLV(subtype 3)

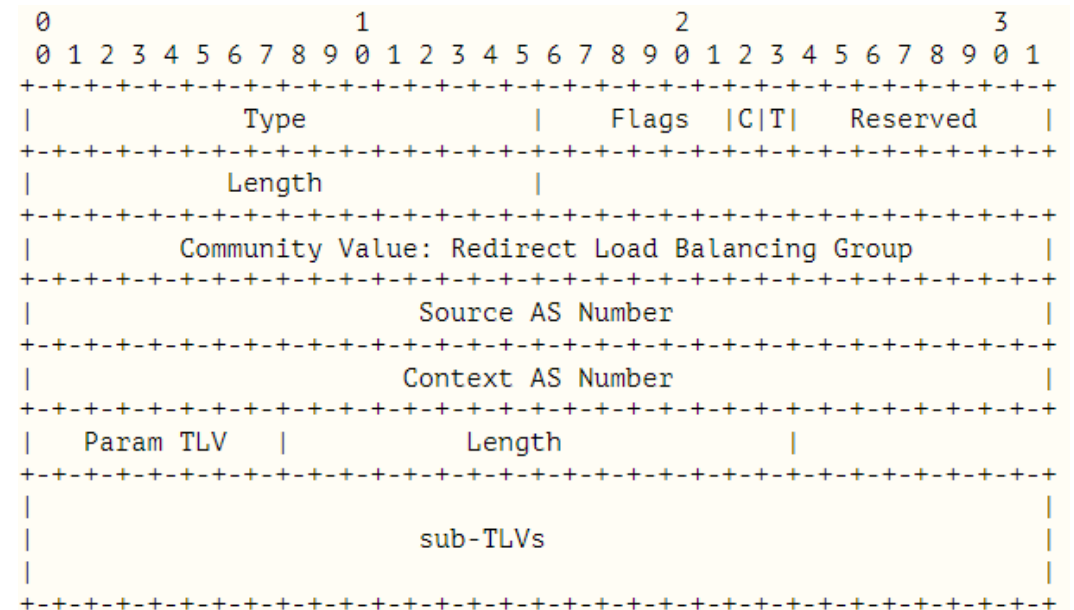- Parameter TLV contains a list of atoms, each represents a redirection action

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Type            |   Flags  |C|T|    Reserved       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|           Length          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Community Value: Redirect Load Balancing Group          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Source AS Number                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Context AS Number                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Param TLV   |            Length              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
|                         sub-TLVs                              |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 1: Redirect Load Balancing Group Community Format

Atom (Param Sub-TLV) Formats

- Comply with wide community atom format

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    Type: 8     |    Length: 23             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Flag(2)              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     IPv6(16)                        |
~                                                     ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Color(4)                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Weight(1)  |
+-+-+-+-+-+-+-+-+
```
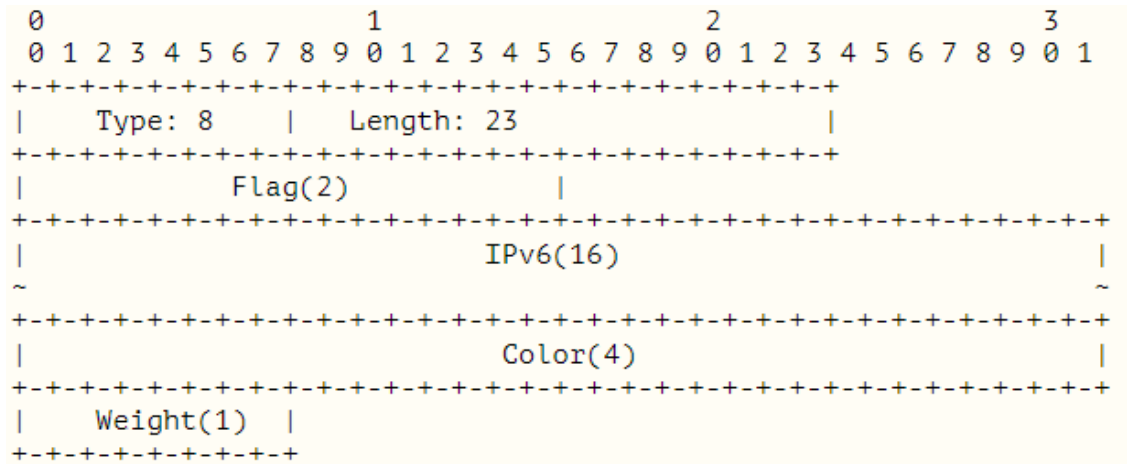
Figure 10: Atom Type 8: IPv6 Prefix with Color and Weight

- **Type**: Used exclusively within Redirect Load Balancing Group Community
- **Length**: fixed for each atom
- **Flag**: 2 octets, reserved for future use, MUST be set to 0
- **IPv6**: 16-octet IPv6 address or SRv6 tunnel Endpoint for redirection
- **Color**: 4 octets, SRv6 tunnel Color for redirection
- **Weight**: 1 octet, values from 1~255, load balancing weight

Supported Atoms: redirection actions

```
Type 1: IPv4 Prefix Only                     (unweighted IPv4 address)
Type 2: IPv4 Prefix with Weight              (weighted IPv4 address)
Type 3: IPv4 Prefix with Color               (unweighted SR-TE tunnel)
Type 4: IPv4 Prefix with Color and Weight    (weighted SR-TE tunnel)
Type 5: IPv6 Prefix Only                      (unweighted IPv6 address)
Type 6: IPv6 Prefix with Weight              (weighted IPv6 address)
Type 7: IPv6 Prefix with Color               (unweighted SRv6 tunnel)
Type 8: IPv6 Prefix with Color and Weight    (weighted SRv6 tunnel)
```

- In principle, sub-TLVs may be combined in any mode
- Supported combinations depend on the specific implementation
- ECMP: "Redirect Group" contains more than 1 atoms, not all atoms are of a weighted type
- UCMP: "Redirect Group" contains more than 1 atoms, all atoms are of a weighted type

Next step

- Welcome more comments and discussion

Thank you!