BGP Flow Specification Revision: What is needed?

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Agenda

- RFC5575 – BGP-FS
- BGP-FS version 1 - New Actions and Filters
- Why Revise RFC5575 – Action Conflicts + Security issues
- BGP-FS version 2
- Need feedback from Operators
RFC 5575

Created to stop spread DDoS in multiple AS

Format: RFC4760

- AFI: v4
- SAFI 133: IPv4
- SAFI 134: BGP/VPN

<table>
<thead>
<tr>
<th>MP-REACH NLRI (Type 14)</th>
<th>MP-UNREACH NLRI (Type 15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFI (2 octets)</td>
<td>AFI (2 octets)</td>
</tr>
<tr>
<td>SAFI (1 octets)</td>
<td>SAFI (1 octets)</td>
</tr>
<tr>
<td>length Next Hop (1 octet)</td>
<td>Withdrawn routes</td>
</tr>
<tr>
<td>Next Hop (variable)</td>
<td>Length in octets (1 or 2 bytes)</td>
</tr>
<tr>
<td>Reserved (1 octet, zero filled)</td>
<td>NLRI Values</td>
</tr>
<tr>
<td>Length in octets (1 or 2 bytes)</td>
<td></td>
</tr>
<tr>
<td>NLRI (variable, filters)</td>
<td></td>
</tr>
</tbody>
</table>
BGP-FS New AFI/SAFIs

**New AFI list**
- AFI: v4 (1)
- AFI: V6 (2)
- AFI: L2VPN (25)

**Same SAFIs**
- 133 – VPN
- 134 – BGP/VPN
Logical Storage of Rules

FS Policy Rule List

FS Rule

Match Filters in BGP NLRI SAFI 133, 1334

Actions in BGP Extended Communities

Modify
Forward

ECA = Event –Condition - Action
Flow-specification event = “packet reception”,
Condition – match filters in NLRI
Action – in Extended communities

Other ECAs
ACLs, I2RS Filter-Based RIB
Problems with RFC5575bis

- RFC5575 Unclear
  - Range comparisons, length comparison, revalidation
    - draft-loibl-bacher-idr-flowspec-clarification-00
  - Conflicting BGP-FS actions
    - redirect requires conflict resolution: for IP redirect, Path Redirect

- Desired upgrades to security
  - Lessen within an AS:
    - draft-ietf-idr-flowspec-oid
  - Additions for ROA, BGPsec

- Must have for V1
- Hold for V2
### New Actions

#### MP-REACH NLRI
- **AFI (2 octets)**
- **SAFI (1 octet)**
- **Length**
- **NextHop (1 octet)**
- **Next Hop (variable)**
- **Reserved (1 octet, zero filled)**
- **Length in octets (1 or 2 bytes)**
- **NLRI (variable, filters)**

#### MP-UNREACH NLRI
- **AFI (2 octets)**
- **SAFI (1 octet)**
- **Withdrawn routes**
- **Length in octets (1 or 2 bytes)**
- **NRLI Values**

### Actions in BGP

#### Extended Community
- **Traffic Byte Rate (0x8006)**
- **Traffic Action (0x8007)**
- **IP Redirect (0x8008), 0x8108, 0x8208**
- **v4 traffic marking (0x8009)**
- **v6 traffic marking (0x8009)**
- **Traffic Packet Rate (TBD)**
- **MPLS Push/Pop (TBD)**
- **Path Redirect (TBD)**
- **Interface Grouping (TBD)**

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*TBD are new IDR drafts*
<table>
<thead>
<tr>
<th>RFC5575</th>
<th>V6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>IP Destination Address</td>
</tr>
<tr>
<td>2:</td>
<td>IP Source Prefix</td>
</tr>
<tr>
<td>4:</td>
<td>Port (src or dst)</td>
</tr>
<tr>
<td>5:</td>
<td>Source Port</td>
</tr>
<tr>
<td>6:</td>
<td>Destination Port</td>
</tr>
<tr>
<td>7:</td>
<td>ICMP type</td>
</tr>
<tr>
<td>8:</td>
<td>ICMP code</td>
</tr>
<tr>
<td>9:</td>
<td>TCP Flags</td>
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<tr>
<td>10:</td>
<td>Packet Length</td>
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<td>11:</td>
<td>Traffic Class</td>
</tr>
<tr>
<td>12:</td>
<td>IPv4 Fragment</td>
</tr>
<tr>
<td>13:</td>
<td>IPv6 Flow ID</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>L2VPN</th>
<th>NVO3</th>
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</thead>
<tbody>
<tr>
<td>14:</td>
<td>Ethernet type</td>
</tr>
<tr>
<td>15:</td>
<td>Source MAC</td>
</tr>
<tr>
<td>16:</td>
<td>Destination MAC</td>
</tr>
<tr>
<td>17:</td>
<td>DSAP in LLC</td>
</tr>
<tr>
<td>18:</td>
<td>SSAP in LLC</td>
</tr>
<tr>
<td>19:</td>
<td>LLC control fields</td>
</tr>
<tr>
<td>20:</td>
<td>SNAP</td>
</tr>
<tr>
<td>21:</td>
<td>VLAN ID</td>
</tr>
<tr>
<td>22:</td>
<td>VLAN COS</td>
</tr>
<tr>
<td>23:</td>
<td>Inner VLAN ID</td>
</tr>
<tr>
<td>24:</td>
<td>Inner VLAN COS</td>
</tr>
<tr>
<td>25:</td>
<td>NV03: Inner/Outer</td>
</tr>
<tr>
<td>26:</td>
<td>VNID</td>
</tr>
<tr>
<td>27:</td>
<td>Flow ID</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MPLS</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>28:</td>
<td>MPLS Label</td>
</tr>
<tr>
<td>29:</td>
<td>MPLS EXP</td>
</tr>
</tbody>
</table>

New filters

BGP-FS v1

New Filters

V4 = RFC5575

Others = IDR drafts
Why Flowspec V2? - NFV/SDN control of pathways
  - Requires Ordering of the sequence

Existing RFC5575
  - Fixed order
  - Must have IPv4 destination

NFV/SDN
  - Filter Order set by user
  - Action Order set by user
  - Defaults = current BGP Flow Specification V1
# BGP Flow Specification v2 (proposed)

### MP-REACH NLRI (Type 14)
- AFI (2 octets)
- SAFI (1 octet)
- Length Next Hop (1 octet)
- Next Hop (variable)
- Reserved (1 octet, zero filled)
- Length in octets (2 bytes)

### Sub-TLVS
- Order (2 octets)
- Type (2 octets)
- Length (2 octets)
- Value (variable, filters)

### MP-UNREACH NLRI (Type 15)
- AFI (2 octets)
- SAFI (1 octet)
- Withdrawn routes
- Length in octets (1 or 2 bytes)

#### Sub-TLVS
- Order (2 octets)
- Type (2 octets)
- Length (2 octets)
- Value (variable, filters)

### BGP Wide Community Atom

#### Flow Spec TLVs
- Order (2 octets)
- Action type (2 octets)
- Action value (variable)

#### Action value
- RFC5575bis actions
- New Actions

- RFC5575 Filters + New Filters
- RFC5575 Filters +
- draft-hares-idr-flowspec-v2

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**Note:** The diagram visualizes the structure and components of the BGP Flow Specification v2, including the types of NLRI, TLVs, and actions. Each component is described in detail, with focus on the fields and their roles in the specification. The diagram also highlights the integration of RFC5575 Filters, new filters, and RFC5575bis actions, along with their respective tags.
Feedback Needed from NANOG Operators

- How many operators use BGP-FS for DDoS?
  - With in a Single Provider Network or multiple AS?
  - How urgent is RFC5575bis for errors?
  - Do you need filters and Actions?

- Do you want BGP-FS for NFV/SDN?
  - What need (now or future) is there for provider do have configured ordering of Filters or Actions?

- Do you want a Yang module to control?
  - Should standards allow both standalone + integration with FB-RIBS
Questions?