

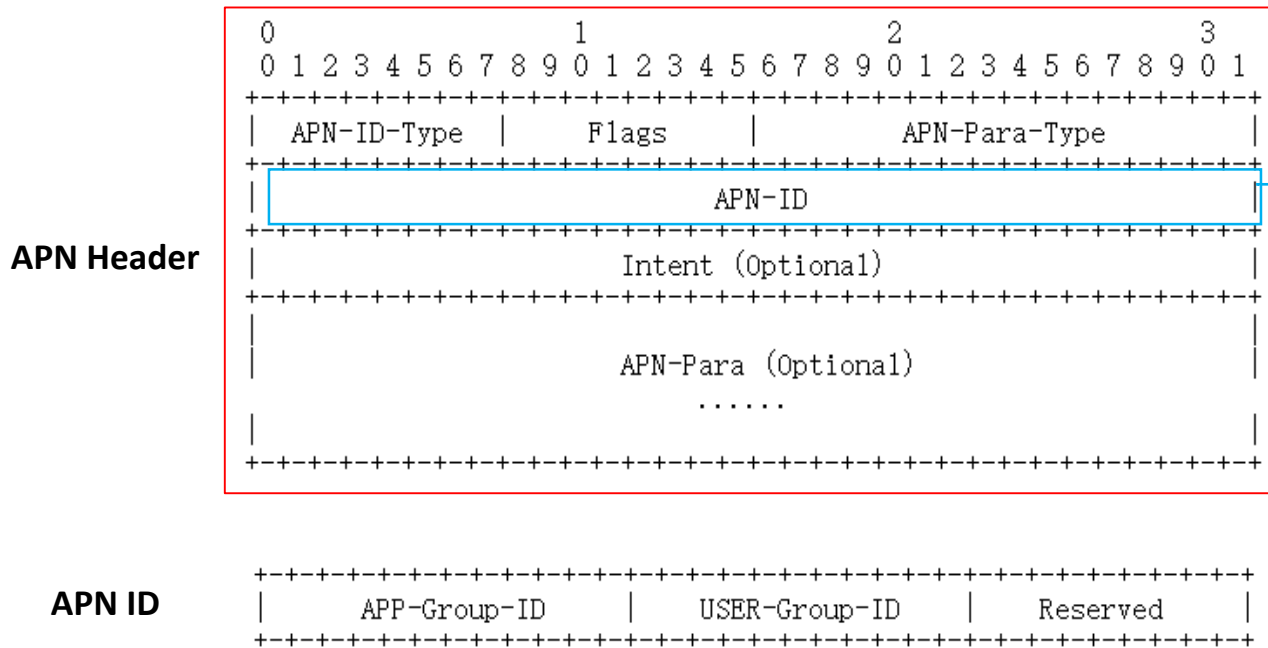
Dissemination of BGP Flow Specification Rules for APN

<https://datatracker.ietf.org/doc/html/draft-peng-idr-apn-bgp-flowspec-00>

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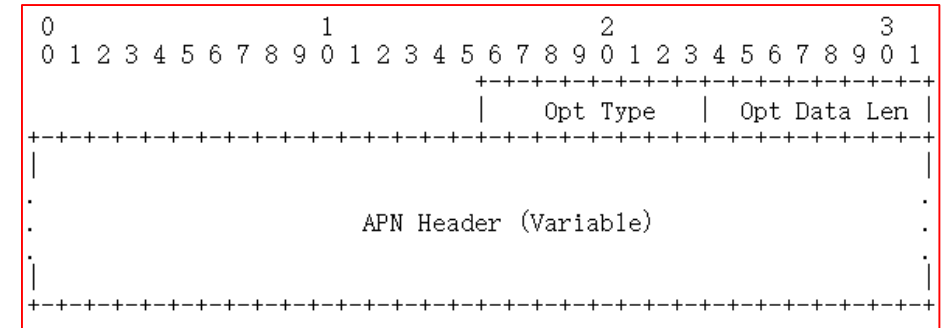
Brief Introduction of APN

- **Application-aware Networking (APN)** convey the **APN Header** with data packets in the network **to make the network aware of fine-grained service requirements at appropriate level.**
- **The APN Header carries APN attribute that is composed of APN ID and APN parameters.**
- **IPv6 extension header can be used to carry the APN Header.**

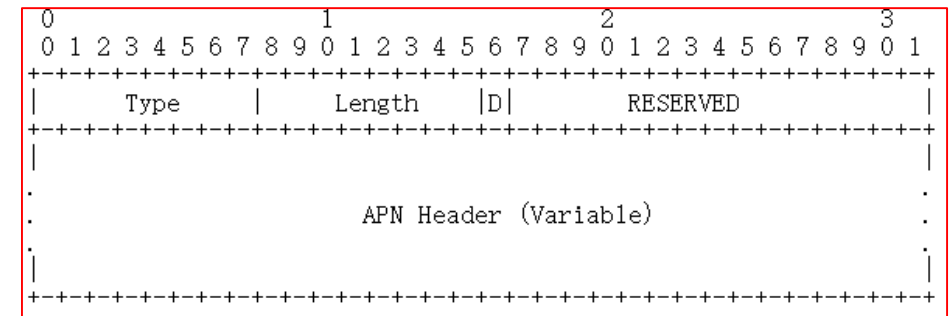


IANA is requested to create the following registry on the **Application-Aware Networking (APN) Attribute webpage:**

- Name: **APN ID Types** (0, 1, 2, 3, ... 255)
- Name: **APN Parameter Types** (0, 1, 2, 3, ... 15)



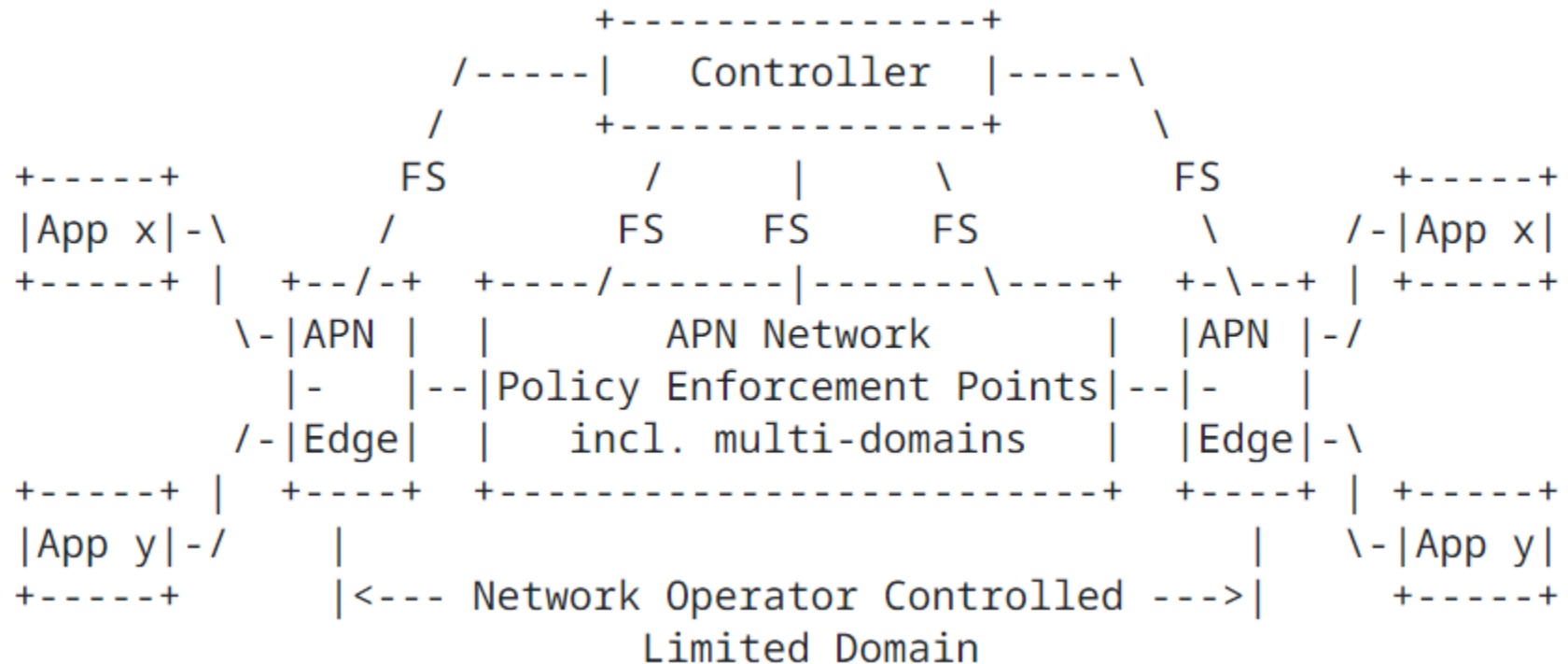
The APN Option carried in IPv6 HBH and DOH (Option Type: 0x13)



The Optional APN SRH TLV (SRH TLV Type: 0x13)

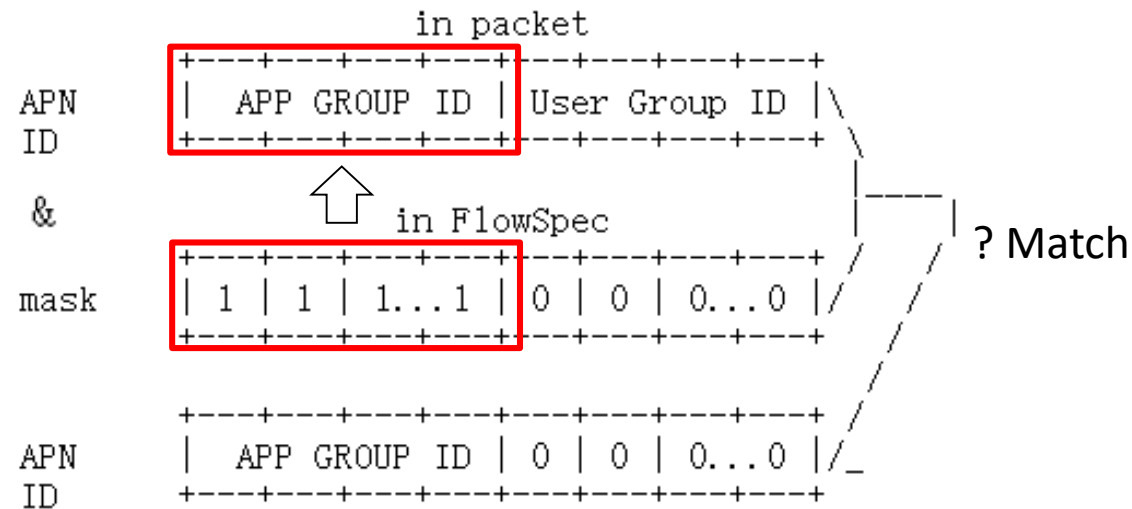
Flow Specs for APN

- The Controller is used to set up BGP connection with the policy enforcement points in an APN domain.



A new component type for APN

- Flowspec component - APN ID – Type TBD1
 - Encoding: <type (1 octet) = TBD, length (1 octet), mask (variable), APN ID (variable)>
 - The mask is used to indicate the bits of the APN ID carried in the packet which are used to match the APN ID in the FS component
- Example
 - The APN ID in the packet contains two parts, i.e. APP Group ID (0x300A) and User Group ID (0x0C08).
 - In the Flow Spec, the mask is 0xFFFF0000 and the APN ID is 0x300A0000.
 - Processing the match of the APN ID component is done by using the mask (0xFFFF0000) to indicate the bits of the APN ID carried in the packet to be matched against the one carried in the Flow Spec (0x300A0000). The result of this example is a successful match.



Ordering of multiple FS rules

Background

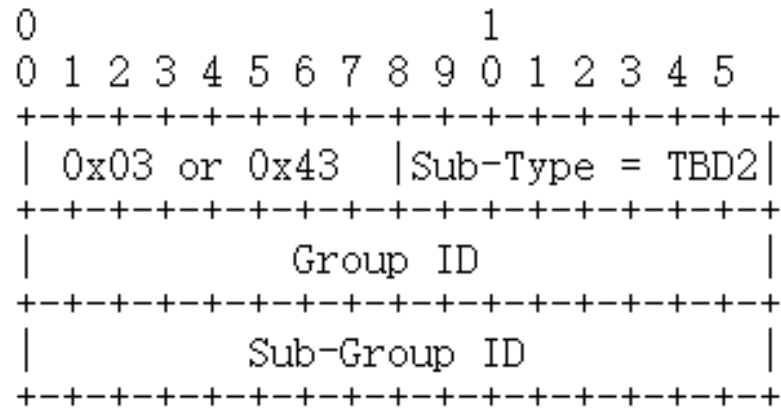
- More than one Flow Specification rule may match a particular traffic flow at a node.
- Take APN as an example
 1. There can be other co-existing Flow Spec rules rather than only APN Flow Spec rules.
 2. The different parts of the APN ID can be determined by the different Flow Spec rules.

Goal & Requirements

- To **specify a grouping mechanism** for the Flow Specification rules to be matched in a desired order as well as the actions being applied to a particular traffic flow.
- This ordering function is such that it does not depend on the arrival order of the Flow Specification via BGP and thus is consistent in the network [[RFC8955](#)].

Grouping Identifier Opaque Extend Community Sub-Type TBD2

- Define a **Grouping Identifier Opaque Extend Community** [RFC4360] (**Sub-Type = TBD2**)
 - carrying both **Group ID** (2 octets) and **Sub-group ID** (2 octets)
 - indicating the grouping of the Flow Spec rules it accompanies
- The encoding format of the Grouping Identifier Opaque Extend Community



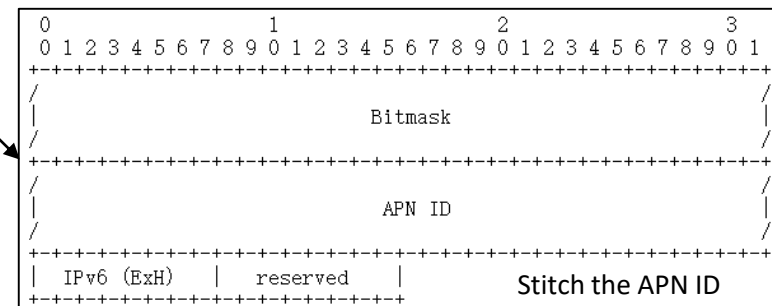
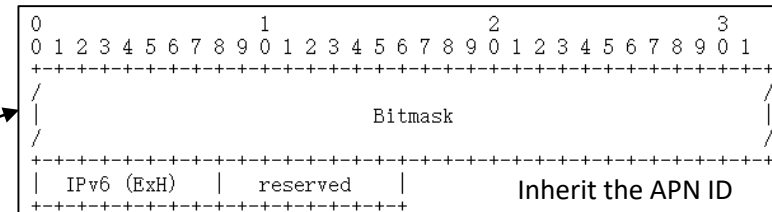
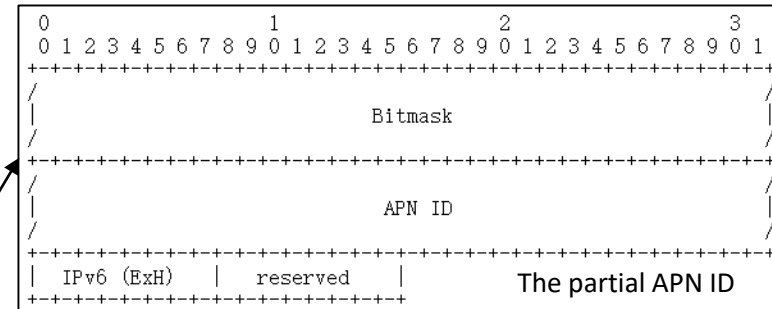
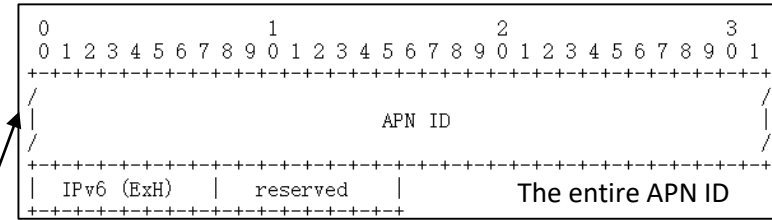
Usage Principles

- Within a sub-group, the order is the same as the previously defined
 - If the traffic-action Extended Community is carried
 - ✓ the Terminal Action (T, bit 47) is not set, when one condition in this sub-group is matched, the evaluation of any subsequent flow specifications within this sub-group stops;
 - ✓ if T is set, then the evaluation continues;
 - If T is not carried, when one condition in this sub-group is matched, the evaluation of any subsequent flow specifications within this sub-group stops;
- Between sub-groups
 - The sub-group is ordered with Sub-group ID, when the evaluation in one sub-group stops or finishes, it will start the evaluation in the following sub-group if there is any sub-group left.
- Between groups
 - The group is ordered with Group ID, if at least one condition in this group is matched, when the evaluation of the flow specifications within the group reaches the end, the evaluation stops and the evaluation of the following group(s) will not start.

Traffic Filtering Actions

- The proposed Extended Community instructs to create the APN ID and encapsulate it in the indicated outer tunnel header of a transiting IP packet.
- In this case, the tunnel encapsulation header is IPv6, possibly followed by an extension header (ExH).

| Community Oxttss Sub-Type | action | encoding |
|---------------------------|--|--|
| TBD3 | traffic-marking-apn (Section 7.1) | 4/16-octet APN ID 1-octet IPv6 (ExH) Type 1-octet Reserved |
| TBD4 | traffic-marking-apn- partial (Section 7.2) | 4/16-octet Bitmask 4/16-octet APN ID 1-octet IPv6 (ExH) Type 1-octet Reserved |
| TBD5 | inherit-apn (Section 7.3) | 4/16-octet Bitmask 1-octet IPv6 (ExH) Type 1-octet Reserved |
| TBD6 | stitch-apn (Section 7.2) | 4/16-octet Bitmask 4/16-octet APN ID 1-octet IPv6 (ExH) Type 1-octet Reserved |



Next steps

- Comments and suggestions to refine the draft and proposals are welcomed!

Thank you for your attention!