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**Global vpnid advertisement in BIER overlay
draft-pengzhang-bier-global-vpnid-00**

Abstract

This document specifies a method to achieve multipoint VPN interconnection through a BIER domain.

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](#).

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Table of Contents

1.	Terminology	2
2.	Problem statement	2
3.	Solution	3
3.1.	Advertisement	3
3.2.	Encapsulation	4
3.3.	Decapsulation	4
3.4.	Formats	4
4.	IANA Considerations	5
5.	Security Considerations	5
6.	Normative References	5
	Authors' Addresses	6

[1.](#) Terminology

This document uses terminologies defined in [[RFC8279](#)], [[RFC6513](#)], [[RFC6514](#)], [[I-D.ietf-bier-ml](#)].

[2.](#) Problem statement

BIER (Bit Indexed Explicit Replication) [[RFC8279](#)] introduces an architecture for the forwarding of multicast data packet. It provides optimal forwarding of multicast packet through a 'multicast domain'. It does not require explicitly building multicast distribution trees, nor does require intermediate nodes to maintain any per-flow state.

BIER MVPN [[I-D.ietf-bier-mvpn](#)] introduces a method which using BIER as multicast tunnels (P-tunnels) to carry multicast traffic across the BIER domain. The advertising method from [[RFC6513](#)] and [[RFC6514](#)] is general and flexible, but it is complicated in some situations at the same time because of the program of many parameters, like RD, RT, etc. In many situations which only interconnect different sites across a domain, the comprehensive MVPN configuration increases the network administrative complication.

In the other hand, BIER MVPN using upstream assigned label to indicate the corresponding multicast flow in a MVPN. The pair of ingress PE and upstream assigned labels increases label administration and flow forwarding complication.

[[I-D.zzhang-bess-mvpn-evpn-aggregation-label](#)] arises a discussion about using common label assigned by controller in MVPN. But in a

network without a controller, it is still a problem to achieve the multipoint interconnection without MVPN configuration.

So for the networks that need flow isolation across domain but do not need complicated configuration, this document specifies a method to achieve multipoint VPN interconnection across a BIER domain by advertising global vpn-id in BIER forwarding overlay, and defines encapsulation and forwarding functions to carry and execute the global vpn-id. It is similar as the usage of VNI-VSID in case of EVPN VXLAN/ NVGRE described in [[I-D.ietf-bier-evpn](#)].

3. Solution

The multipoint VPN here means some flows should be forwarded to multiple edge routers across a domain. In the simple multipoint interconnection situations that does not deploy MVPN configuration like RD, RT, etc., a global vpn-id is used to indicate the corresponding VPN. This global vpn-id is encapsulated between BIER header and actual data packet. The BIER forwarding function is also modified to execute this kind of packet.

3.1. Advertisement

BIER overlay protocols include BMLD [[I-D.ietf-bier-mld](#)], MVPN [[I-D.ietf-bier-mvpn](#)], and PIM [[I-D.ietf-bier-pim-signaling](#)], EVPN [[I-D.ietf-bier-evpn](#)]. Global vpn-id extension should be added in these BIER overlay protocols by a TLV format. When using BGP as BIER overlay protocol to advertise global vpn-id, specific VPN parameters like RD, RT defined in [[RFC6513](#)] and [[RFC6514](#)] need not be used.

A BIER domain edge router can belong to several VPNs. A unique global vpn-id is assigned to a particular VPN. An edge router belongs to several VPNs is assigned several global vpn-ids.

Edge routers belong to a same VPN should be assigned a same global vpn-id. The two edge routers which have same global vpn-id indicates that the two routers belong to a same particular VPN.

When BIER domain edge routers exchange BIER overlay information, the edge routers belong to one or more VPNs should advertise the corresponding global vpn-ids extension.

After a router receives global vpn-id extensions from the other edge routers, the router MUST store the edge routers which have same global vpn-ids with local VPNs.

The router SHOULD store the edge routers which have different global vpn-ids with local VPNs in order to increase converged efficiency that caused by configuration modification.

3.2. Encapsulation

After ingress router gathers the information of edge routers which have same global vpn-ids, ingress router generates forwarding items which include global vpn-id and BFR-ids of egress routers.

When ingress router encapsulates the data packet which should be sent to the egress routers according to a global vpn-id, the value of global vpn-id MUST be added between BIER header and actual data packet. The encapsulation function is the same as [\[RFC8296\]](#), the 'Proto' field in BIER header should be set to the value for a new type of global vpn-id.

The forwarding of intermediate routers is unchanged according to the forwarding function defined in [\[RFC8279\]](#).

3.3. Decapsulation

Finally the packet reaches egress routers. Egress router looks for the forwarding items indexed by the global vpn-id according to the 'Proto' field in BIER header. After decapsulation, egress router forwards data packet to corresponding local receivers.

3.4. Formats

[\[RFC2685\]](#) defines a globally unique VPN identifier to connect same VPN in different sites. The format of global vpn-id defined in [\[RFC2685\]](#) is 7 octets. But in actually deployment, a global vpn-id with 20 bits is enough to indicate the corresponding VPN. So the global vpn-id can be used as BIFT-ID defined in [\[RFC8296\]](#) directly.

When MLD protocol is used as BIER overlay, a new type of TLV is added in BMLD report messages.

When BGP protocol is used as BIER overlay, a new type of TLV is added in BGP update message.

When PIM protocol is used as BIER overlay, a new type of TLV is added in PIM join/ prune messages.

For the edge routers which act as ingress routers or egress routers, the corresponding global vpn-ids are carried in the new TLV. And the BFR-id of the router itself is also included in the TLV.

4. IANA Considerations

A new type which indicates the global vpn-id should be added in BIER 'Proto' assignment. A new type of global vpn-id extension should be added in each BIER overlay protocols, includes MLD, PIM, BGP.

5. Security Considerations

There is no further security requirements in this document.

6. Normative References

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