IP/IPVPN services with IEEE 802.1aq SPB networks

draft-unbehagen-spb-ip-ipvpn-00.txt

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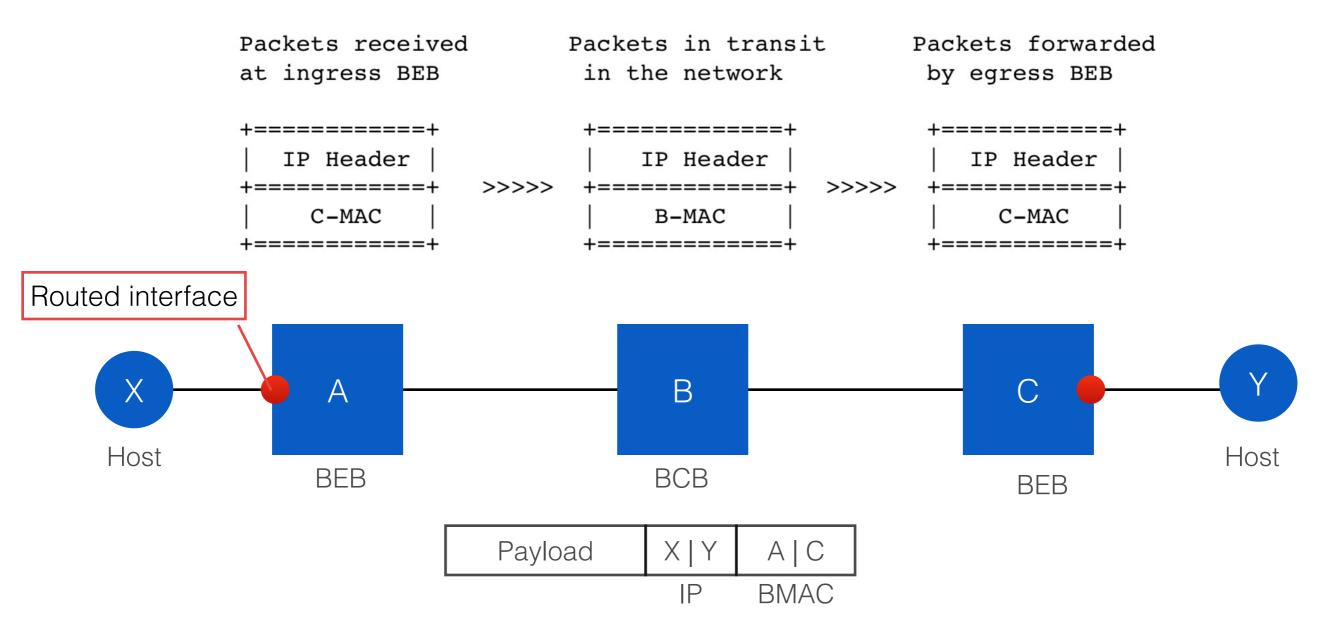Peter Ashwood-Smith
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Abstract

This document describes a compact method of using a IEEE 802.1aq Shortest Path Backbone Bridging (SPB) network to natively enable and carry IP and IPVPN services on native Ethernet links.

Further this documents the extensions to SPB's control protocol, IS-IS, required to allow it to be a single mechanism for providing all these services types. On its own SPB provides virtual Ethernet networks; utilizing IS-IS to create loop free Ethernet topologies that forward Ethernet traffic using a standard Ethernet header.

This document shows how the same SPB network can also be leveraged to provide IP based services.
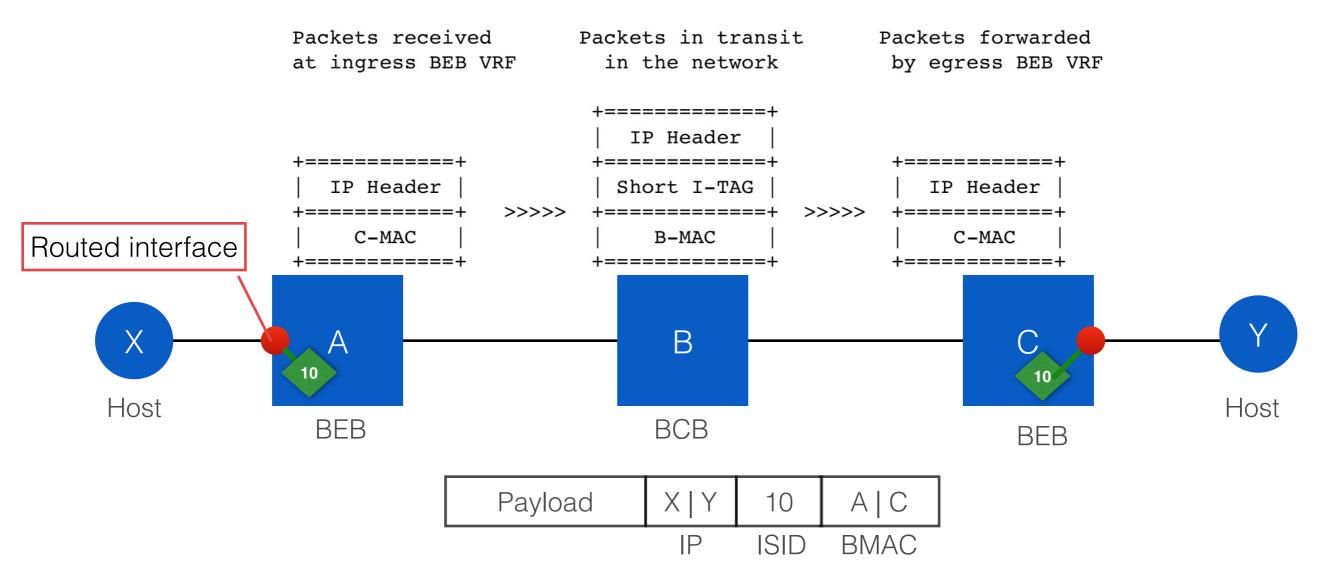
IP forwarding with SPB

- Forwarding of a IP packet directly on a BMAC
  - In order to provide IP services a BEB may be extended with a routable interface function. Where the IP reachable info is carried across the network using normal IS-IS tlv's and then mapped to the remote BMAC destination address.

```
Packets received          Packets in transit        Packets forwarded
at ingress BEB            in the network            by egress BEB


+============+            +============+            +============+
|  IP Header |            |  IP Header |            |  IP Header |
+============+   >>>>>     +============+   >>>>>    +============+
|   C-MAC    |            |   B-MAC    |            |   C-MAC    |
+============+            +============+            +============+
```

Routed interface

X — A — B — C — Y

Host   BEB   BCB   BEB   Host

Payload	X|Y	A|C
	IP	BMAC

IPVPN forwarding with SPB

- Forwarding of a IP packet directly on a BMAC can be extended to a VRF with a ISID
  - In order to provide IP services a BEB may be extended with a routable interface function into a VRF identified by a ISID value. Where the IP reachable info is carried across the network using normal IS-IS tlv's as a sub-tlv to a new IPVPN ISID tlv to handle overlapping routes and then mapped to the remote BMAC destination address.

```
  Packets received              Packets in transit           Packets forwarded
  at ingress BEB VRF              in the network              by egress BEB VRF

                                +=============+
                                |  IP Header  |
  +=============+               +=============+               +=============+
  |  IP Header  |               | Short I-TAG |               |  IP Header  |
  +=============+    >>>>>       +=============+    >>>>>       +=============+
  |    C-MAC    |               |    B-MAC    |               |    C-MAC    |
  +=============+               +=============+               +=============+
```

Routed interface

| X | A | B | C | Y |

Host   BEB   BCB   BEB   Host

Payload	X | Y	10	A | C
	IP	ISID	BMAC

Applicability

- Deployed today in campus, data center and multi-tenant environments

- Useful in IP/Ethernet environments that need simple way of providing VPN services.

- Extends MPLS core services to edge or operate on its own in small scale networks

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