



ETHERNET VPN – Next Generation Ethernet Services in MPLS environments

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DISCOVER
OUR NETWORK

Agenda

- Some terms to know
- Backflip to VPLS and its limitations
- What has changed in the last years?
- General adoption in the datacenter
- Move it to MPLS
- How does it work?
- When will it be there?
- Questions

Some terms you should know

(yes, rename the things!)

MES

MPLS Edge Switch (formerly known as the PE)

EVI

Ethernet VPN Instance

ESI

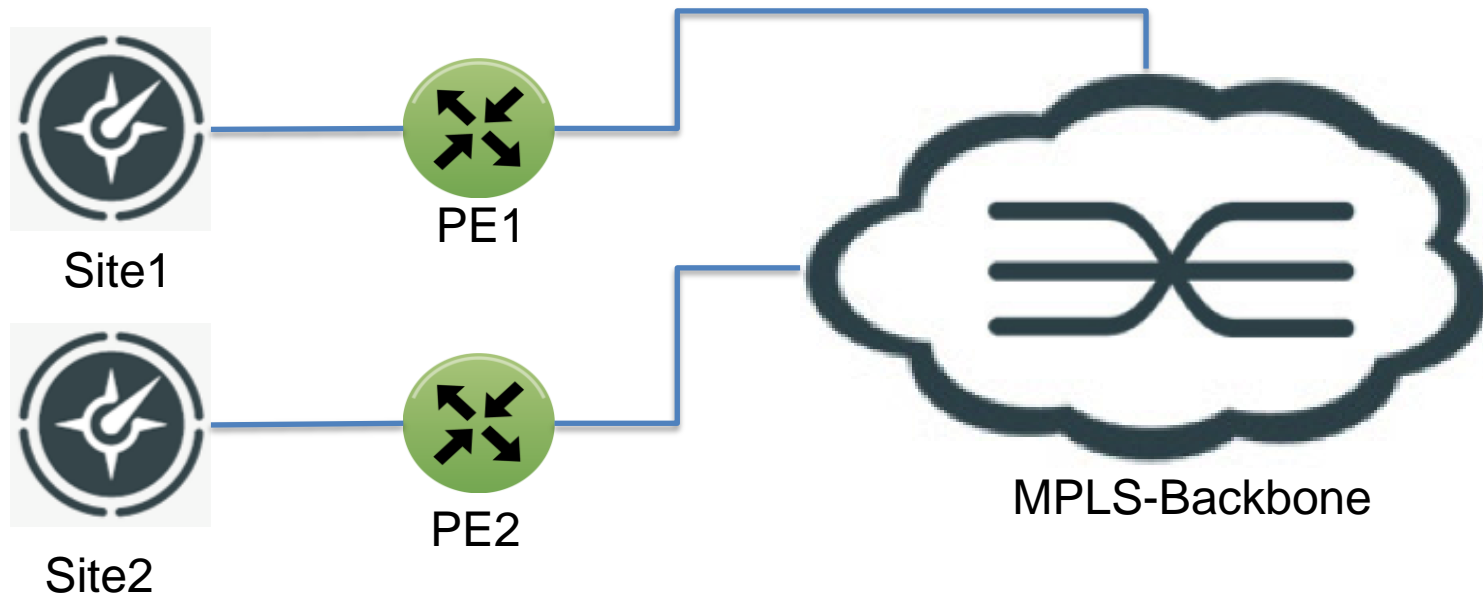
Ethernet Segment Identifier

EAD

Ethernet VPN Auto Discovery

Backflip to VPLS

Ethernet Switching in a MPLS backbone – A little case study



Backflip to VPLS

Characteristics

Signalling: BGP-based

Redundancy: only backbone

LSP creation: doesn't matter

Site to PE: Ethernet

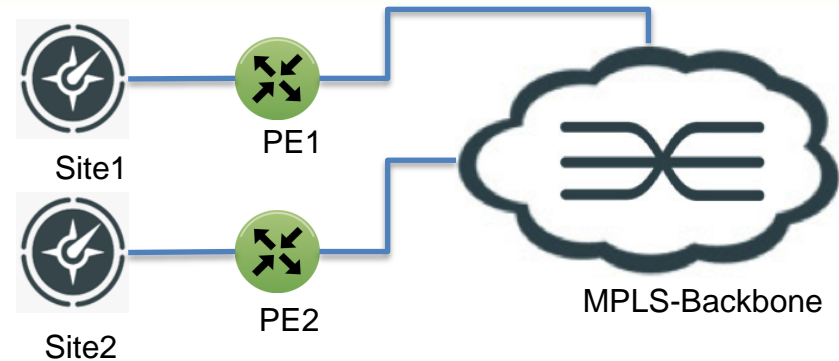
FDB population: data plane

Limitations

No standard for PE redundancy

No real control over mac-learning

PE is bottleneck



Backflip to VPLS

Solve the redundancy dilemma

Just a draft:

draft-ietf-l2vpn-vpls-multihoming-04

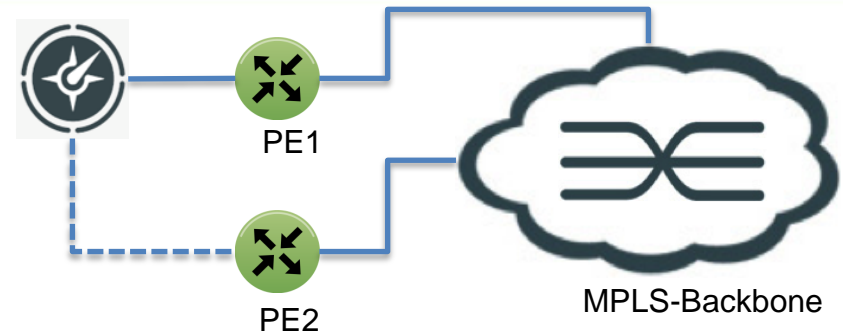
No wide adoption (Cisco doesn't like it)

How it works:

Both PE1 and PE2 inserts a route for the SiteID

Same mechanisms as for IP routes apply

But: if the slave PE also sees a route for „its“ SiteID,
it will not forward any traffic from that site



What has changed in the last years

Management driven problems in the network

Redundancy is nice – but why pay for double capacity, which can't be used?

I feel so locked in – if I want any kind of redundancy for my service, why stick to one vendor?

General adoption in the datacenter

Datacenter networks got much more complex

VLANs are no longer flexible enough

Every port in the datacenter must be available with any VLAN

4096 VLANs aren't enough anymore

East-West traffic has grown

Current solutions span just one datacenter!

Move it to MPLS

Why MPLS?

With MPLS we already have a technology to push data transparently from one place to another
MPLS connects are easily available, wavelenghts and dark fibers are not
Traffic engineering is well supported

The idea

Hey, we have some stackable switches, and they have local VLAN significance.
But it is not scalable. It's vendor locked.
And we have our great MPLS backbone.
But we can't put them together nicely.
Can't we join them?

YES – WE CAN!

May I present: Ethernet VPN

What it is

EthernetVPN will be a standard for Ethernet Based Services on MPLS backbones

What is different?

It is the first approach to solve the problems which appeared in the last decade.

It is a common standard in development by Alcatel-Lucent, Cisco and Juniper

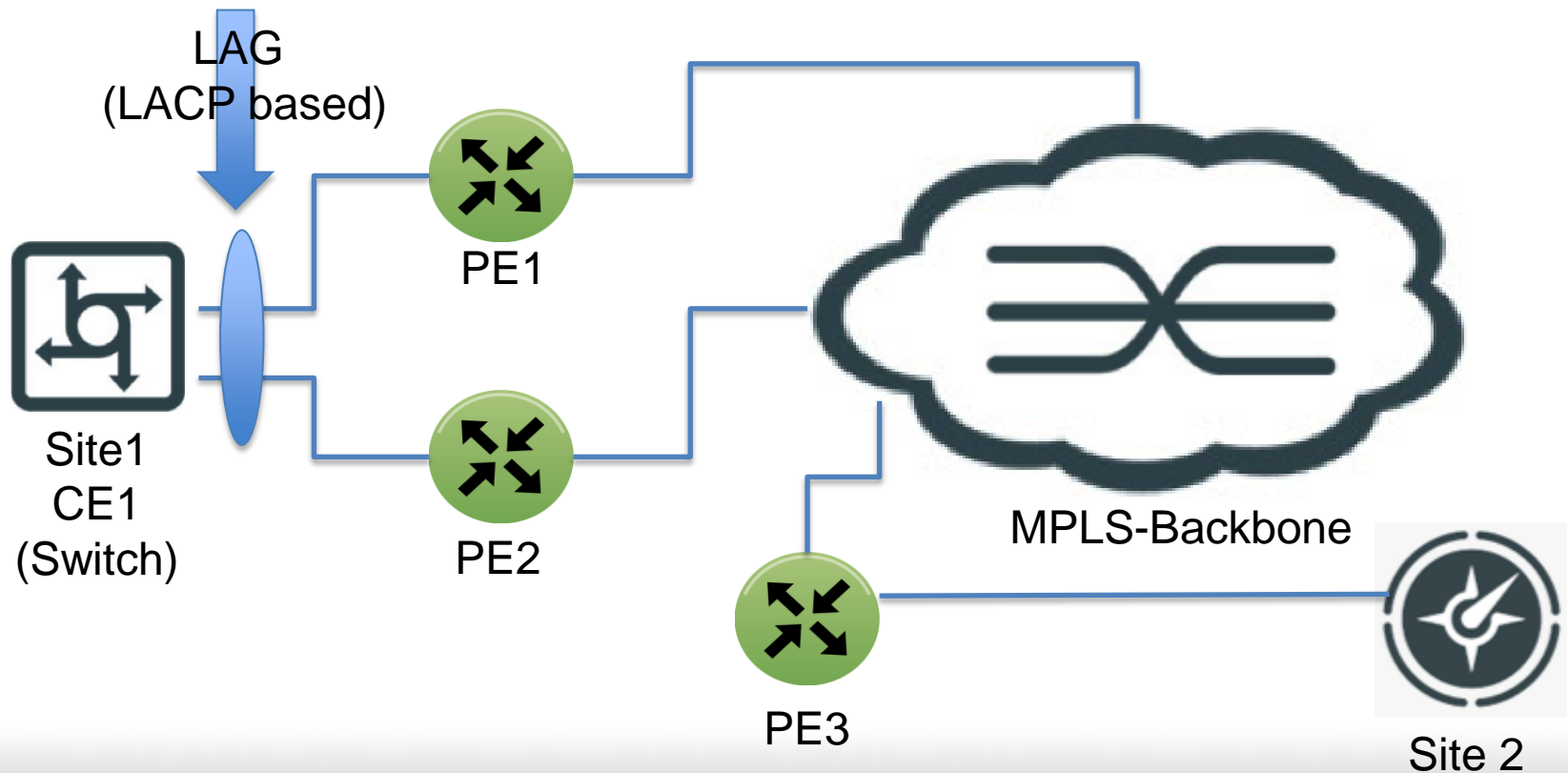
It creates the ability to have the advantages of a multichassis switch with common equipment

It currently only exists in the head of some crazy scientists (and maybe in a dark underground lab)

It enforces the paradigm of separation between data and control plane

How does it work

Case study - again



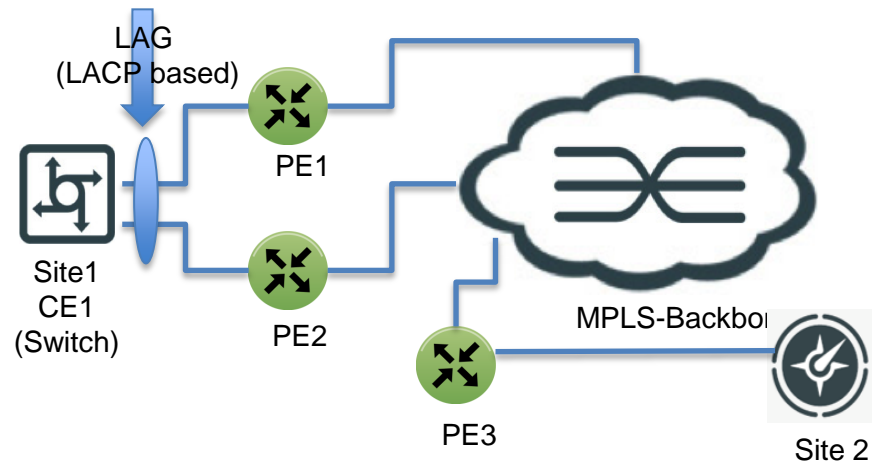
How does it work

Under the hood

Instead of announcing multiple routes for a site, In ethernetvpn there are two possible routes for a site: On a single homed site like site 2 the route for the site consists of the route target defining the common ethernet domain and a segment identifier of 0, declaring single-homedness.

When using a multihomed site, it get's a little bit trickier: Each link gets it's own segment identifier, and these segment identifiers are used for LACP.

Pseudowires are built full-mesh like with VPLS, but when sending traffic to a multihomed site, the entering CE does load balancing like using a local LAG onto the pseudowires.



How does it work

Separate all the planes!

or: MAC-routes

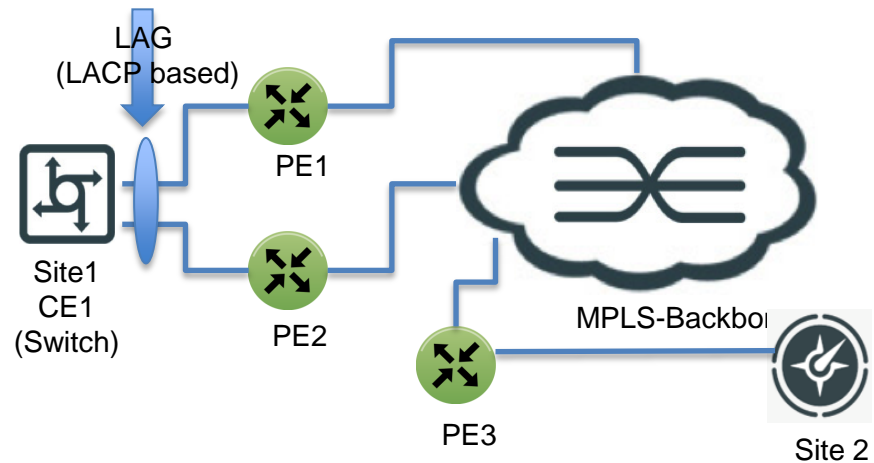
Instead of using the classic way of populating the FDB by looking which mac-adresses exists on wire, a different approach has been taken:

The mac-adresses which are associated are only learned be the CEs to which a site is connected.

(How it does that is at its own discretion).

It puts up a BGP E-VPN MAC Address Advertisement, which populates the FDB on the remote sites.

This creates very advanced filtering methods for mac addresses.



Questions and discussion

References

Sources and links

Latest draft:

<http://tools.ietf.org/html/draft-raggarwa-sajassi-l2vpn-evpn-04>

Requirements for evpn:

<http://tools.ietf.org/html/draft-sajassi-raggarwa-l2vpn-evpn-req-01>

PLNOG Slides from JNPR (2011):

http://www.data.proidea.org.pl/plnog/6edycja/materialy/prezentacje/Emil_Gagala.pdf