Data Center Interconnect Solution for EVPN Overlay networks

draft-rabadan-l2vpn-dci-evpn-overlay-01

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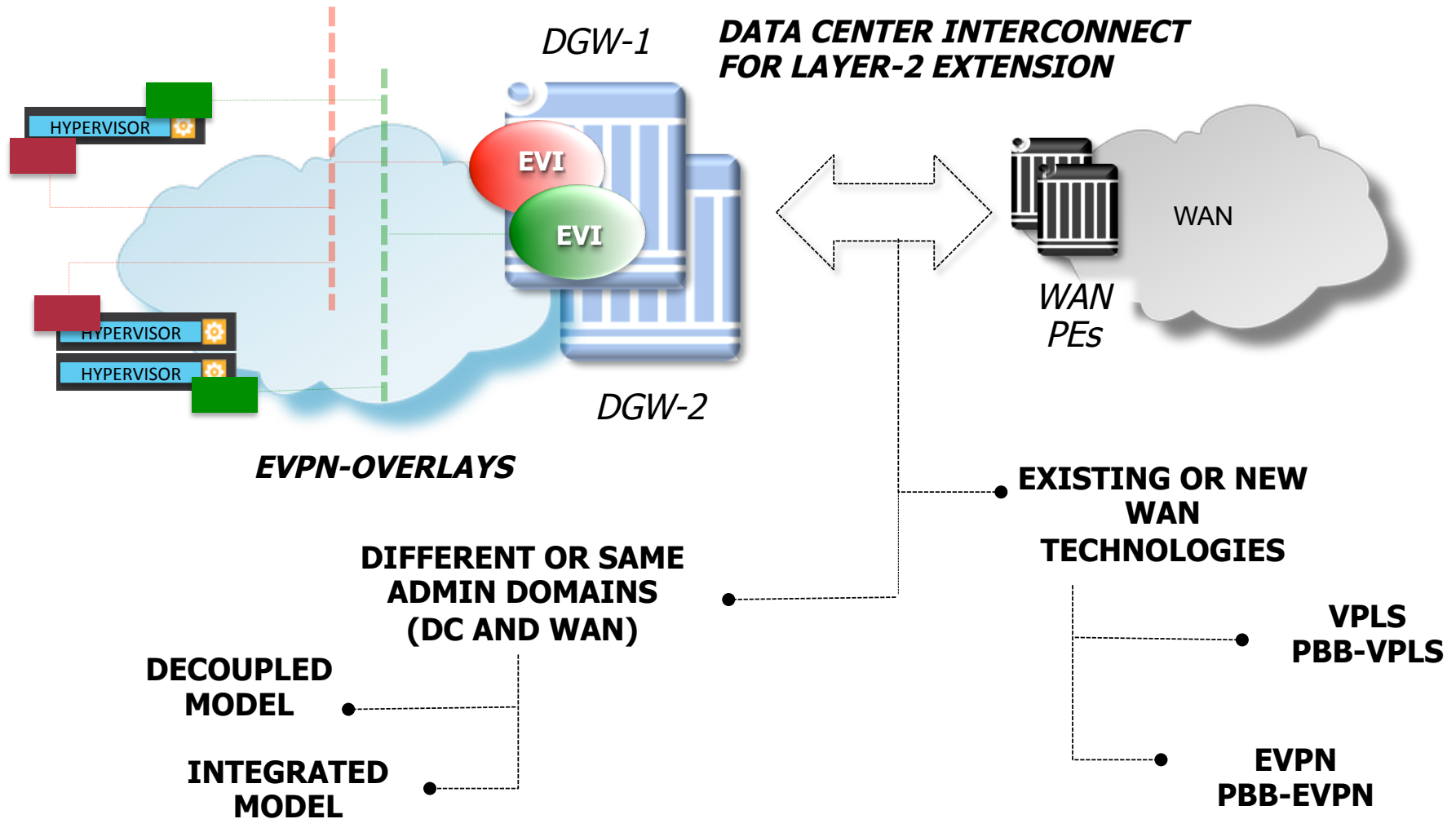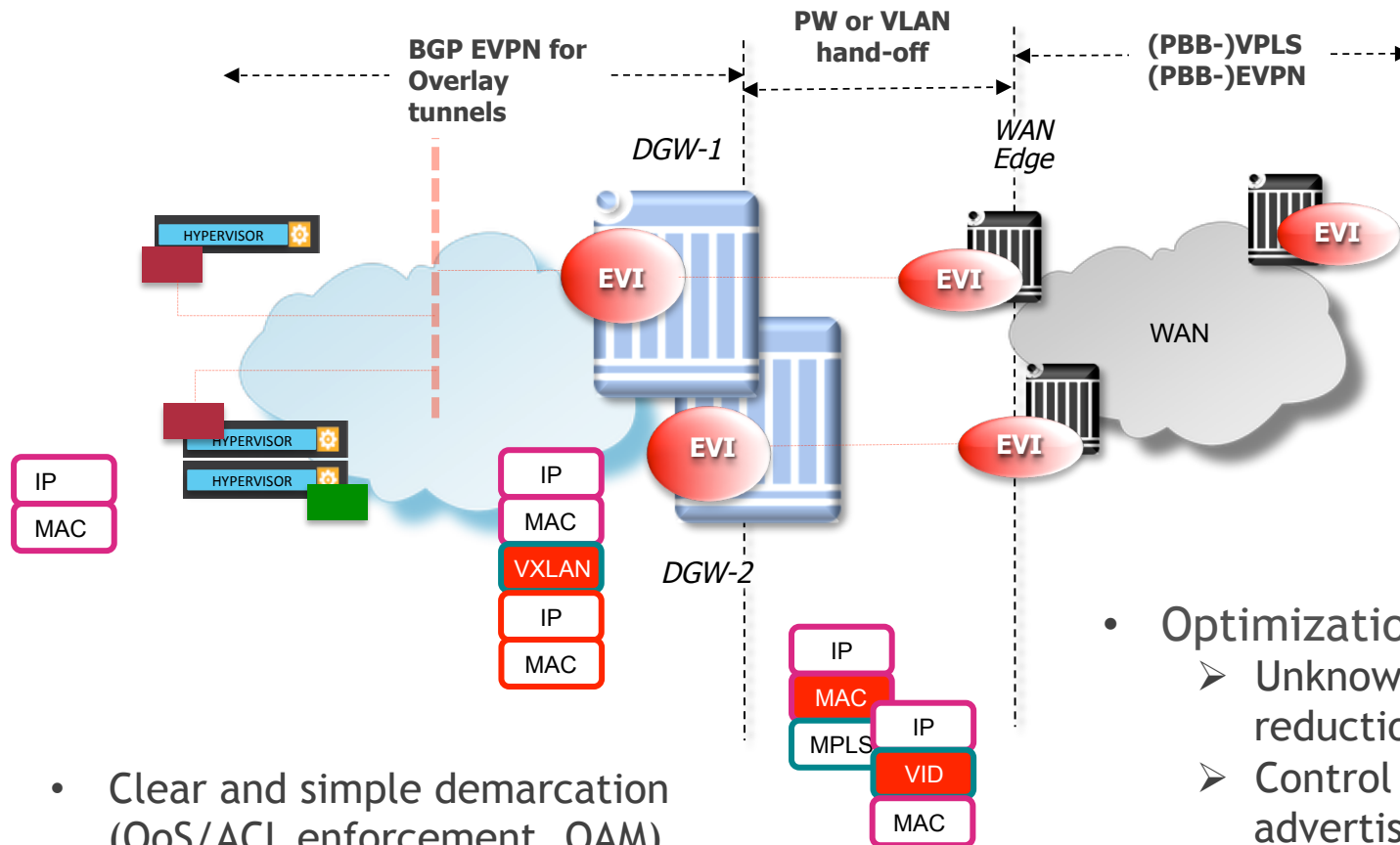
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The issue we want to address...

DGW-1

DATA CENTER INTERCONNECT FOR LAYER-2 EXTENSION

HYPERVISOR

EVI

EVI

WAN

HYPERVISOR

HYPERVISOR

WAN PEs

DGW-2

EVPN-OVERLAYS

EXISTING OR NEW WAN TECHNOLOGIES

DIFFERENT OR SAME ADMIN DOMAINS (DC AND WAN)

VPLS PBB-VPLS

DECOUPLED MODEL

INTEGRATED MODEL

EVPN PBB-EVPN

Interconnect requirements (Dec-M)

BGP EVPN for Overlay tunnels

PW or VLAN hand-off

(PBB-)VPLS (PBB-)EVPN

DGW-1

WAN Edge

HYPERVISOR

EVI

EVI

EVI

WAN

EVI

IP

MAC

HYPERVISOR

HYPERVISOR

IP

MAC

VXLAN

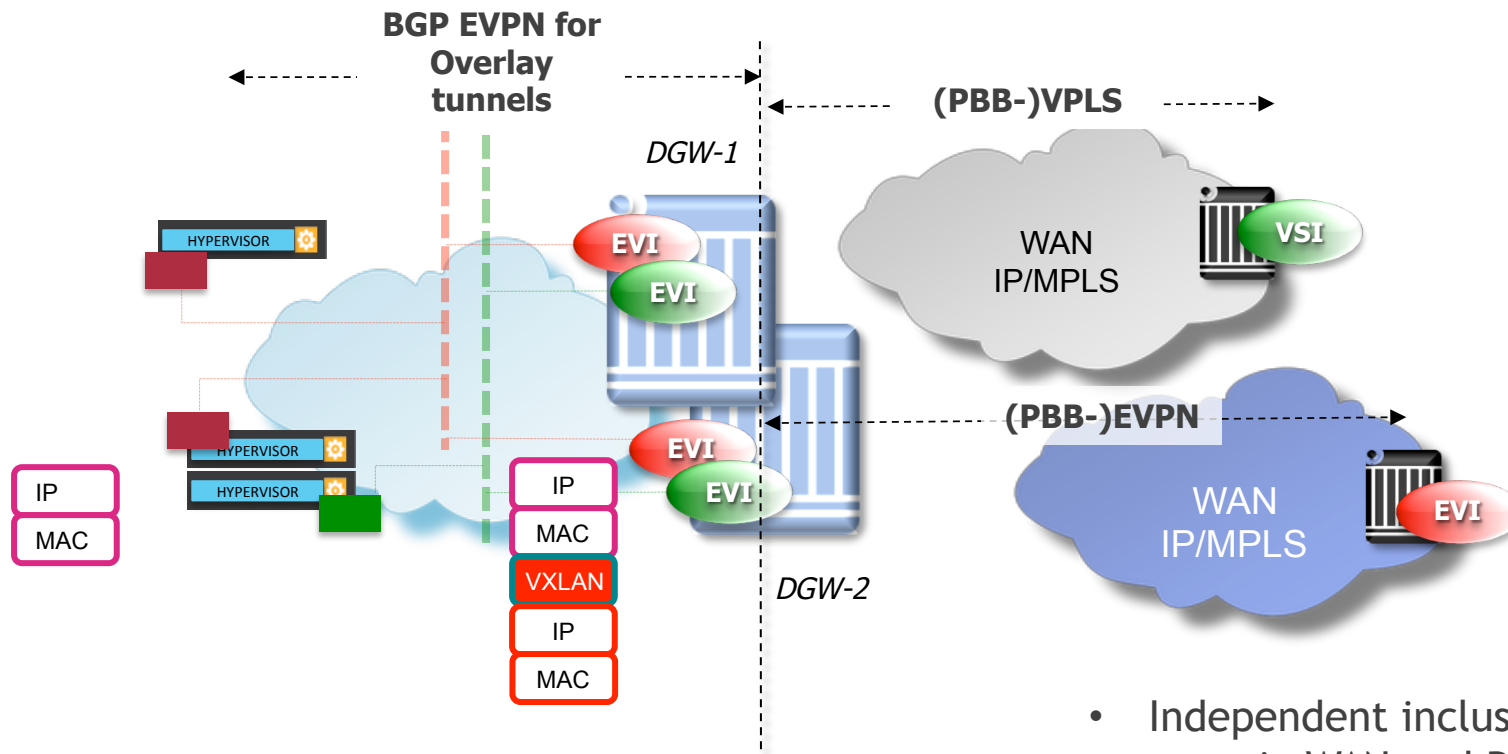IP

MAC

DGW-2

EVI

EVI

IP

MAC

IP

MPLS

VID

MAC

- Clear and simple demarcation (QoS/ACL enforcement, OAM)
- Minimum or no control plane interaction between DGWs and WAN PEs
- Multi-homing required

- Optimizations on the DC GW:
  - Unknown-flooding reduction
  - Control of the MAC advertisements to the DC
  - ARP-flooding control
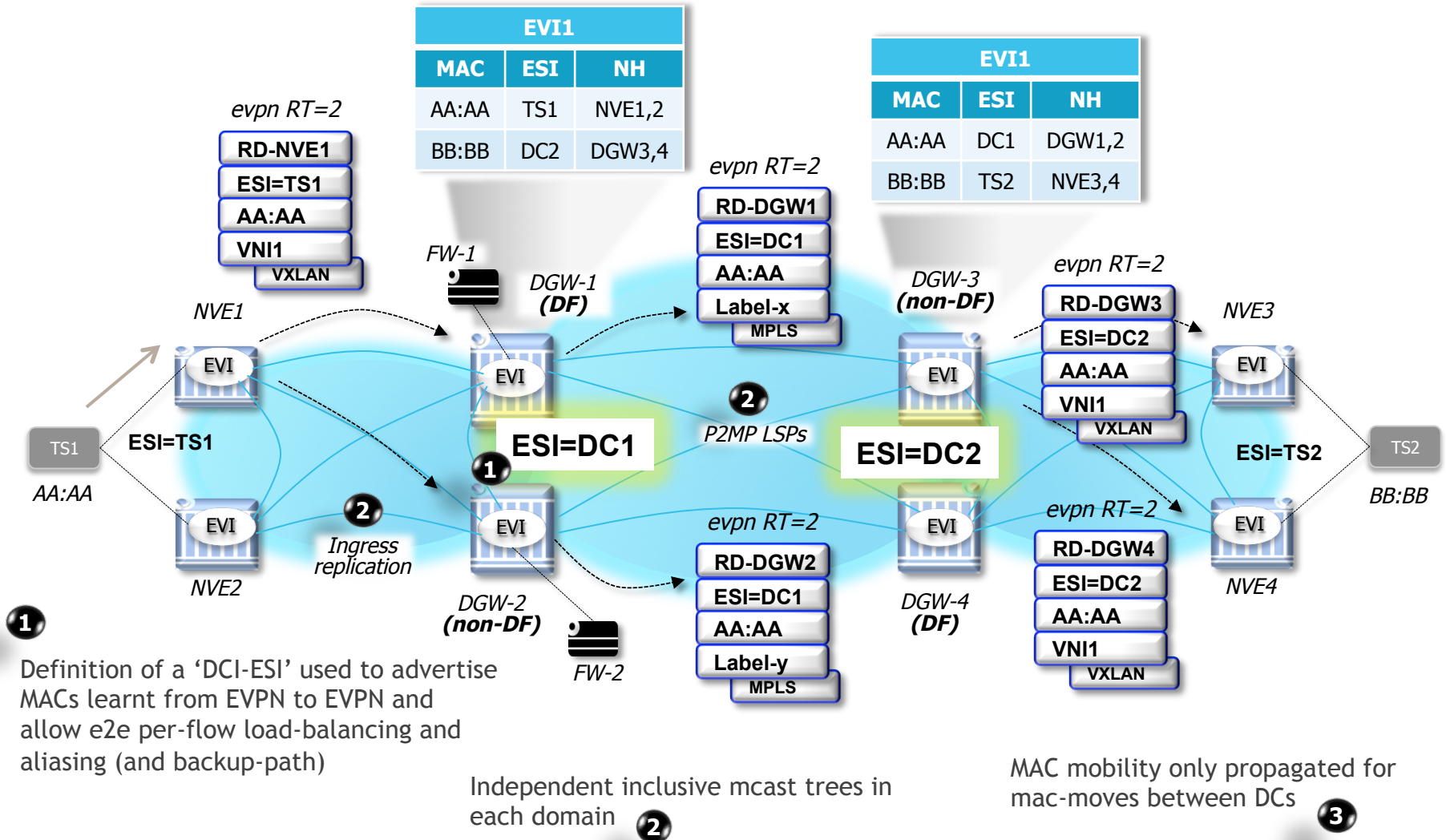
Interconnect requirements (Int-M)

BGP EVPN for Overlay tunnels

DGW-1

HYPERVISOR

EVI

EVI

WAN IP/MPLS

VSI

(PBB-)VPLS

HYPERVISOR

HYPERVISOR

IP

MAC

IP

MAC

VXLAN

IP

MAC

EVI

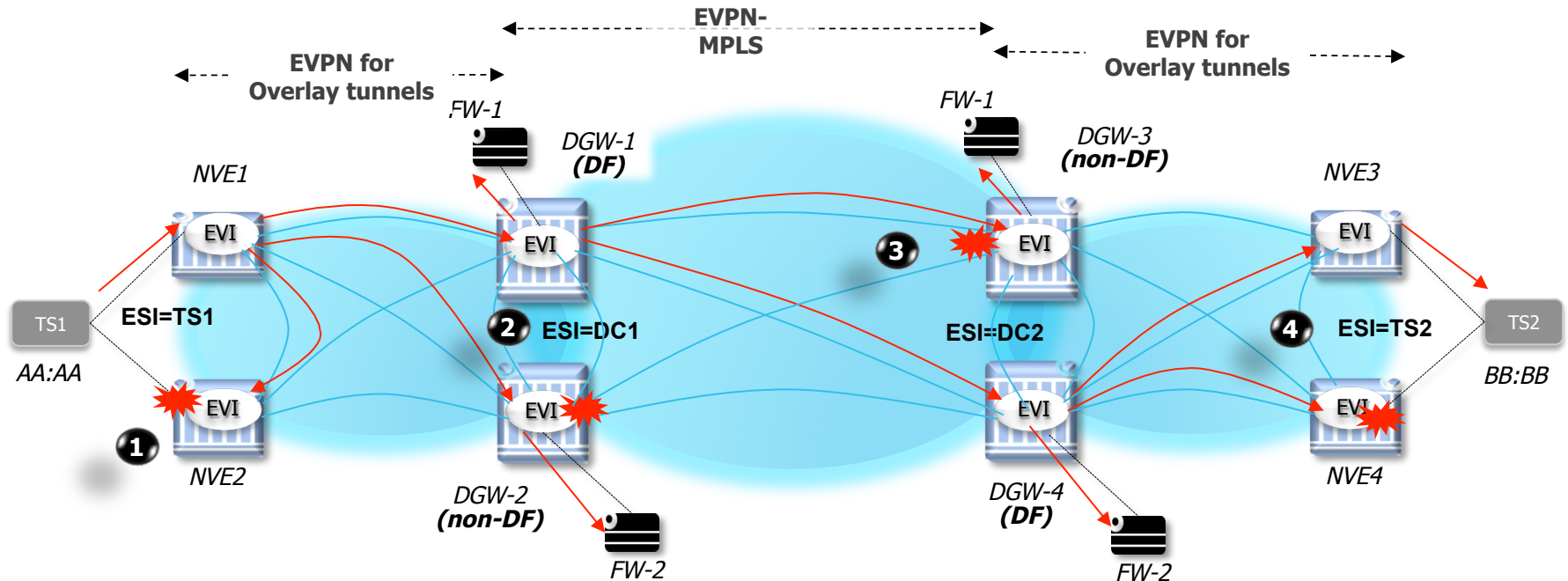EVI

DGW-2

(PBB-)EVPN

WAN IP/MPLS

EVI

- Data Plane AND Control plane gateway function on DGWs

- Multi-homing required:
  - ➤ Per-service load balancing
  - ➤ Per-flow load balancing - only (PBB-)EVPN

- Independent inclusive multicast trees in WAN and DC

- If EVPN in the WAN the following end-to-end features:
  - ➤ MAC mobility, protection
  - ➤ Proxy-ARP

DGW Control Plane EVPN extensions proposed to address the e2e EVPN model

EVI1		
MAC	**ESI**	**NH**
AA:AA	TS1	NVE1,2
BB:BB	DC2	DGW3,4

EVI1		
MAC	**ESI**	**NH**
AA:AA	DC1	DGW1,2
BB:BB	TS2	NVE3,4

evpn RT=2

RD-NVE1
ESI=TS1
AA:AA
VNI1
VXLAN

evpn RT=2

RD-DGW1
ESI=DC1
AA:AA
Label-x
MPLS

evpn RT=2

RD-DGW3
ESI=DC2
AA:AA
VNI1
VXLAN

evpn RT=2

RD-DGW2
ESI=DC1
AA:AA
Label-y
MPLS

evpn RT=2

RD-DGW4
ESI=DC2
AA:AA
VNI1
VXLAN

FW-1

NVE1

DGW-1
(DF)

DGW-3
(non-DF)

NVE3

EVI

EVI

EVI

EVI

ESI=TS1

ESI=DC1

P2MP LSPs

ESI=DC2

ESI=TS2

TS1

TS2

AA:AA

BB:BB

EVI

EVI

EVI

EVI

Ingress replication

NVE2

DGW-2
(non-DF)

DGW-4
(DF)

NVE4

FW-2

① Definition of a 'DCI-ESI' used to advertise MACs learnt from EVPN to EVPN and allow e2e per-flow load-balancing and aliasing (and backup-path)

② Independent inclusive mcast trees in each domain

③ MAC mobility only propagated for mac-moves between DCs

DGW Data Plane EVPN extensions for B/U/M traffic in e2e all-active EVPN: no need for ESI label

(1) (4)
No change in the EVPN procedures
for split-horizon at the NVEs

(3)
Non-DF will ONLY forward to local ACs
DF will never forward to WAN SHG or non-DF

(2)
Non-DF will ONLY forward to local ACs
DF will never forward to DC SHG or non-DF

NEXT STEPS

• More feedback from WG