EVPN

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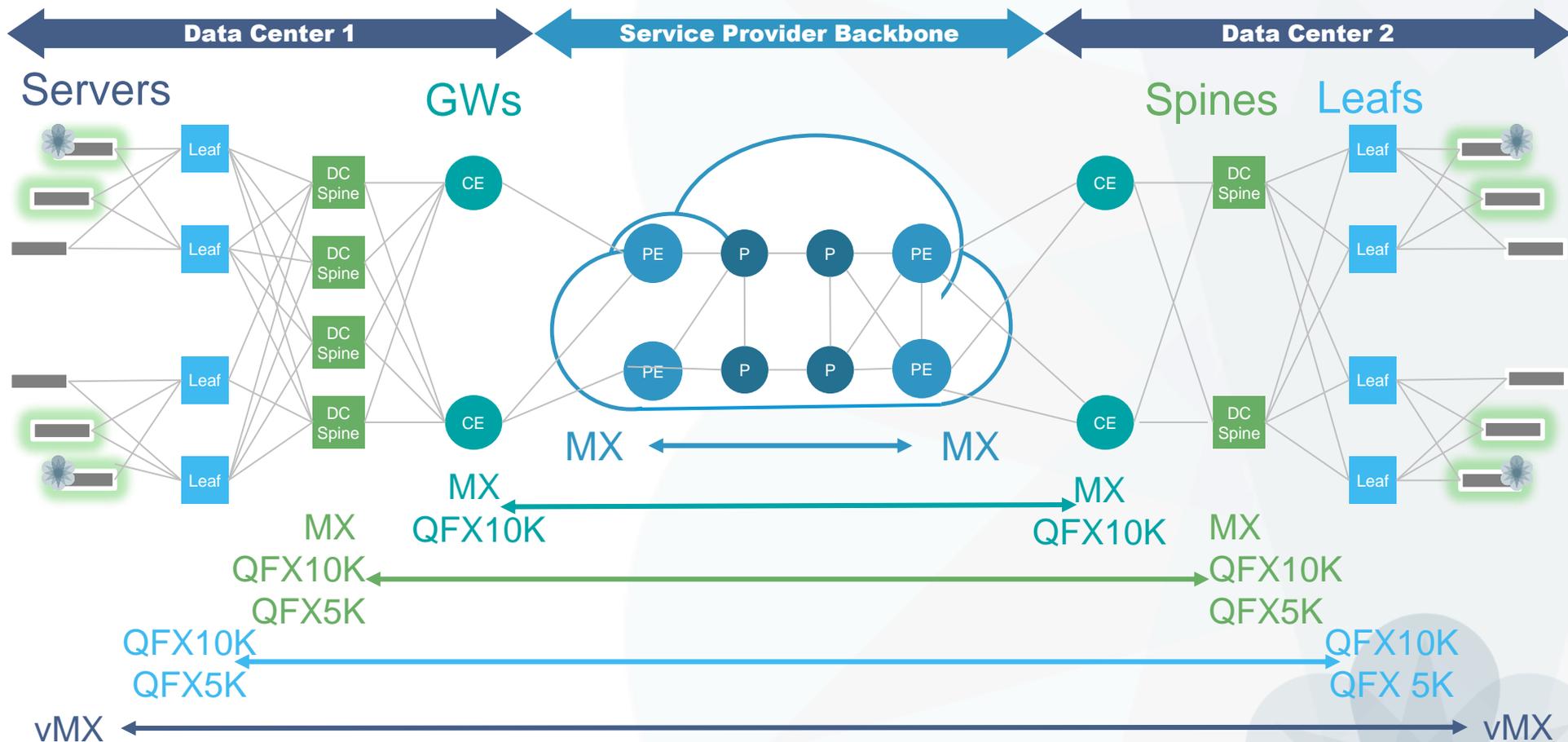
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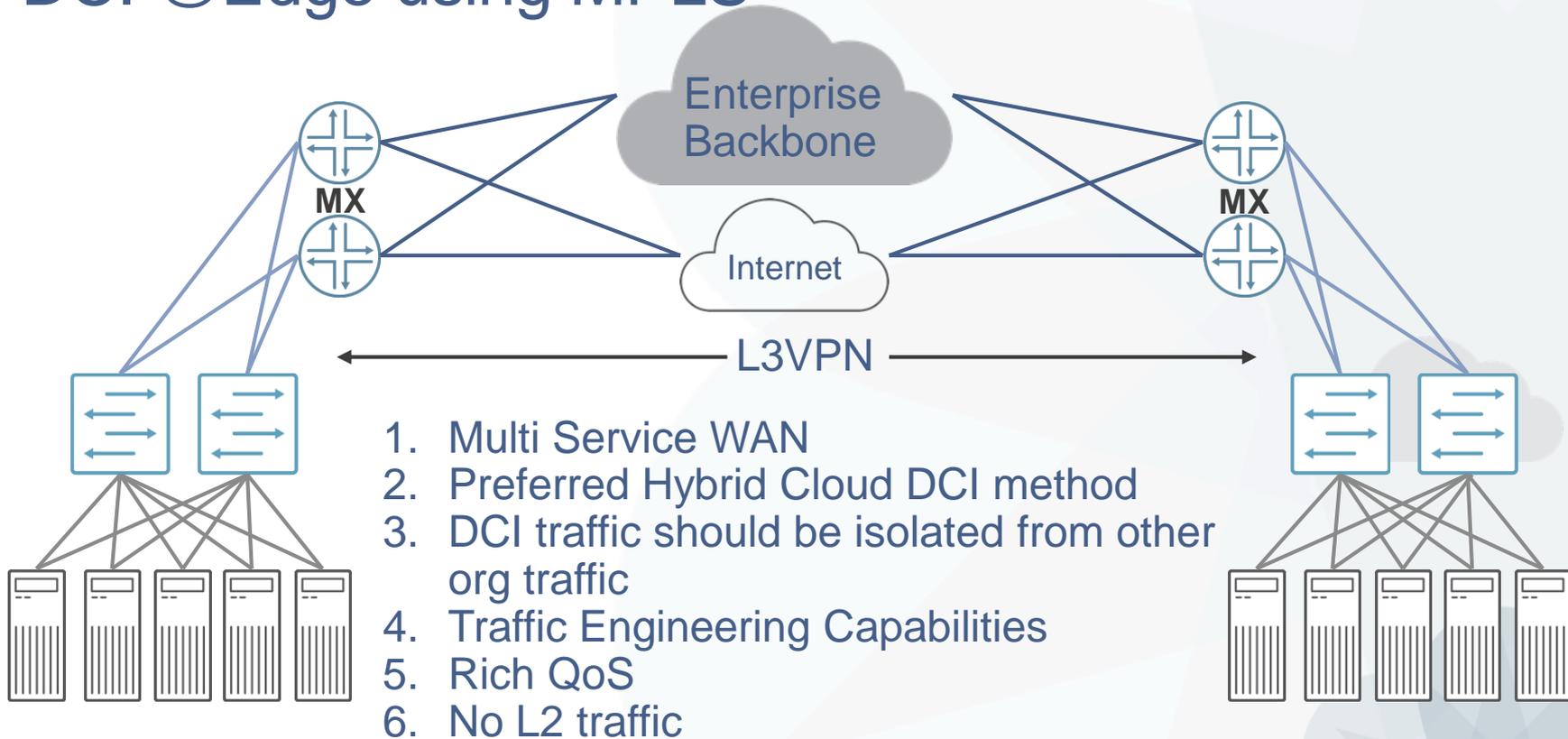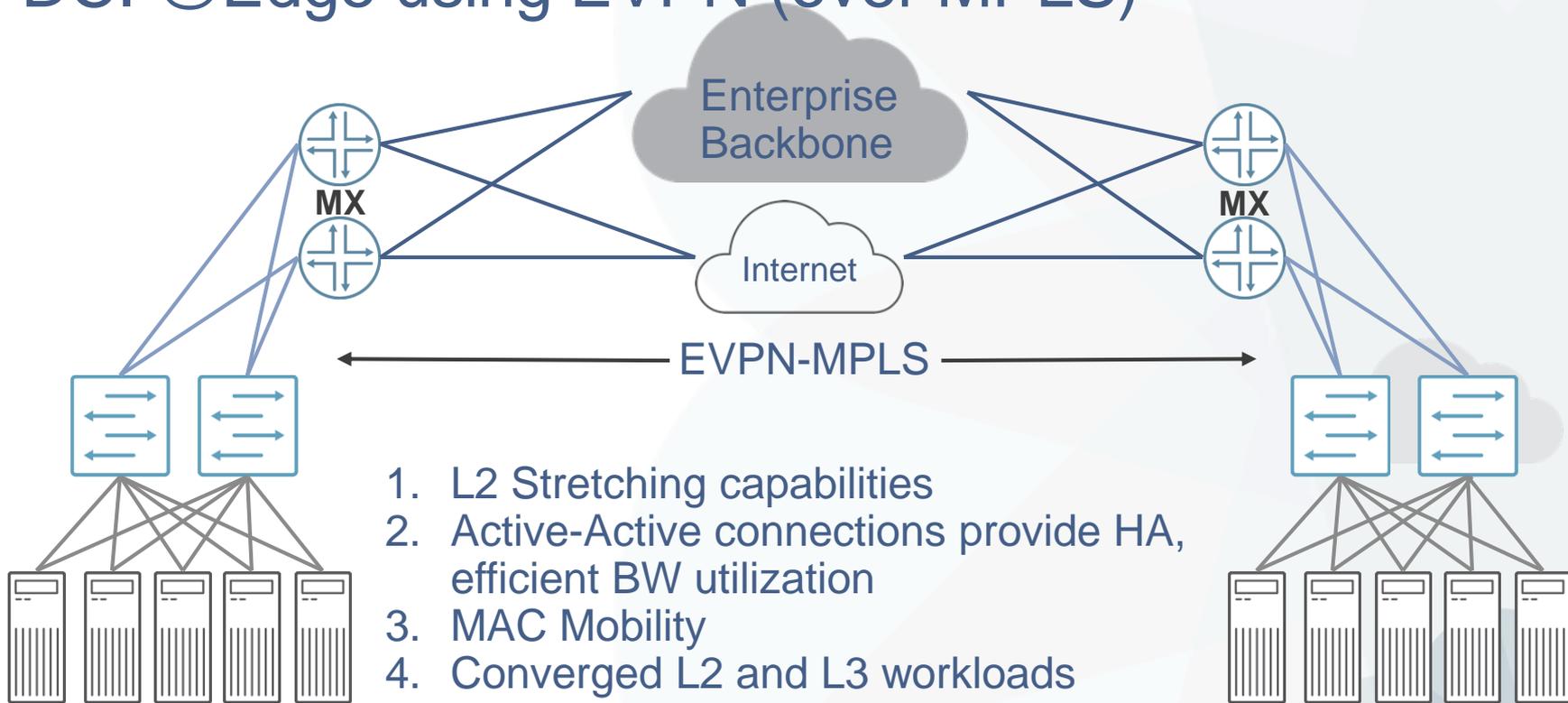
EVPN in Data Centers
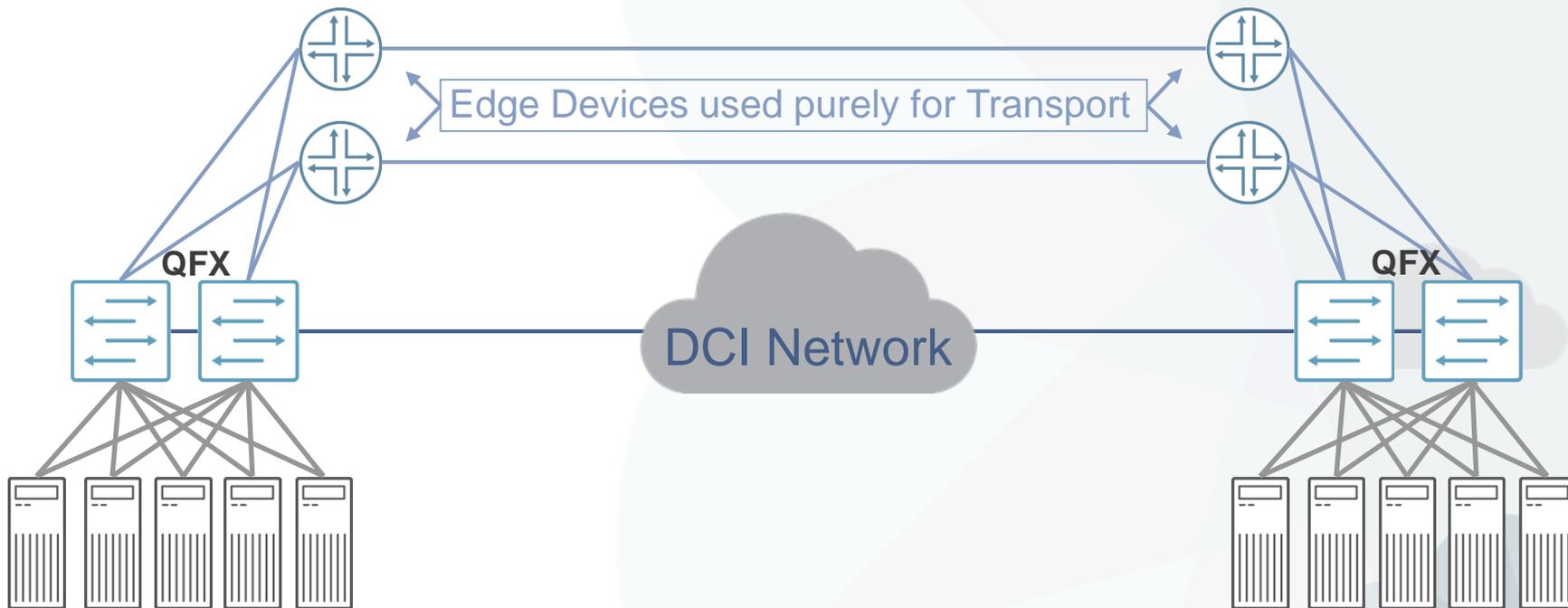
EVPN for DC Fabric & DCI

DCI @Edge using MPLS

Enterprise Backbone

Internet

MX

MX

← L3VPN →

1. Multi Service WAN
2. Preferred Hybrid Cloud DCI method
3. DCI traffic should be isolated from other org traffic
4. Traffic Engineering Capabilities
5. Rich QoS
6. No L2 traffic

DCI @Edge using EVPN (over MPLS)

Enterprise Backbone

MX

Internet

MX

EVPN-MPLS

1. L2 Stretching capabilities
2. Active-Active connections provide HA, efficient BW utilization
3. MAC Mobility
4. Converged L2 and L3 workloads

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DCI (Over the Top) for Enterprise (QFX, IP Overlays)

Edge Devices used purely for Transport

QFX

DCI Network

QFX

DCI using EVPN - VXLAN

IP Network

QFX

QFX

← EVPN VXLAN →

1. Cost effective (works on switching hardware)
2. NO L2 flood and learn limitations
3. SDN Capabilities
4. VPLS and EVPN are only two options when # of DCs > 2

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Advantages of EVPN DCI

- A/A Multi-homing with per flow Load Balancing

- BGP advantages apply

- No Flood and Learn. Hair pining is a problem with flood and learn.

- Large fan out support. With MLAG you can only fan out to up to 2 devices.

- MAC Mass Withdrawal for better convergence

- Reduced BUM traffic; possible to completely eliminate flooding

- Multi Service Technology for DCI WAN that has support for both L3 and L2 workloads
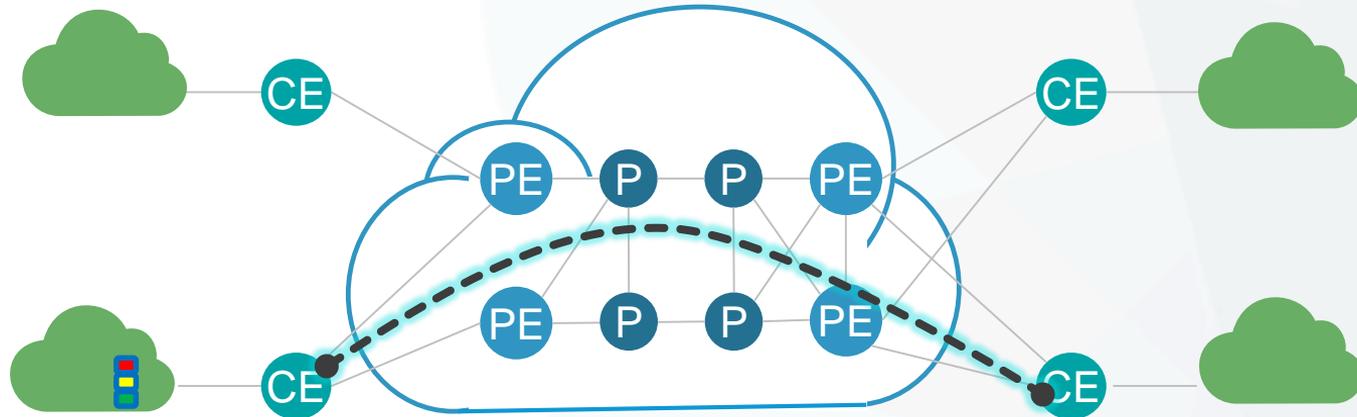
EVPN for the Business Edge/Metro
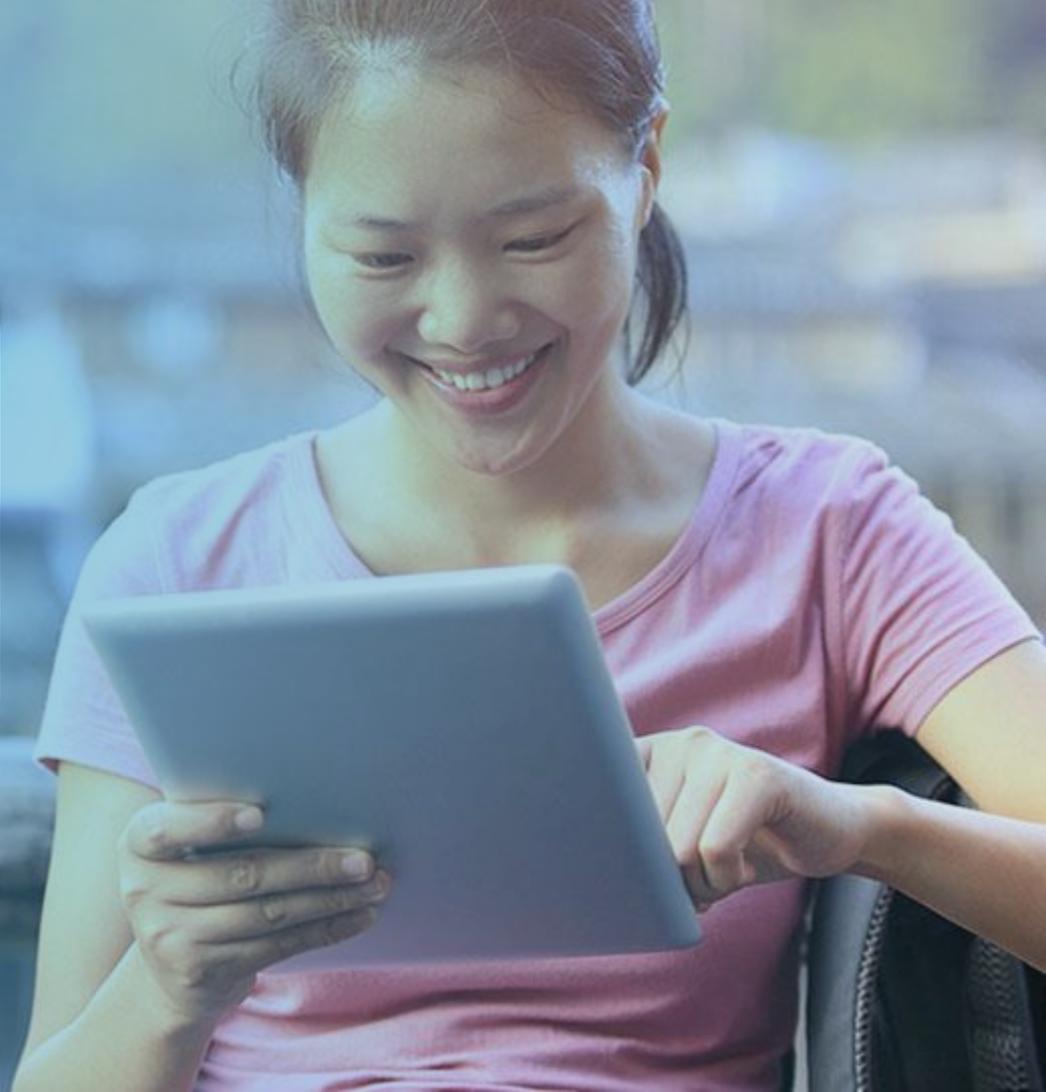
# Business VPN : E-Line (VPWS) Service Applications
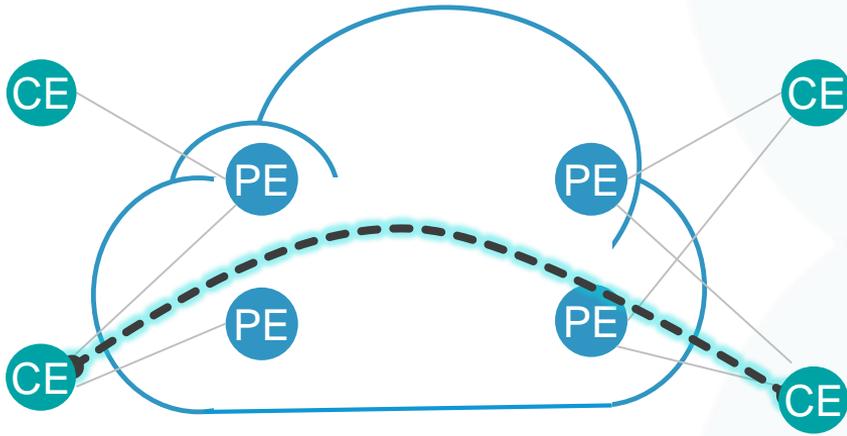
All EVPN Benefits apply

- Superior replacement for Martini/Kompella PWs
- **No MAC learning**
- Direct P2P connection
- VLAN Bundling with VPWS is ideal for wholesale services
- Superior convergence due to no-mac-learning

# Business VPN : E-Line (VPWS) Service

- Sub-second egress failure protection with CFM
- EVPN advantages : A/A MH, Aliasing, Flow based load balancing
- VLAN Based / VLAN Aware Bundle, VLAN Bundle

Termination of EVPN VPWS into L2, L3 Services using Flexible Cross Connect
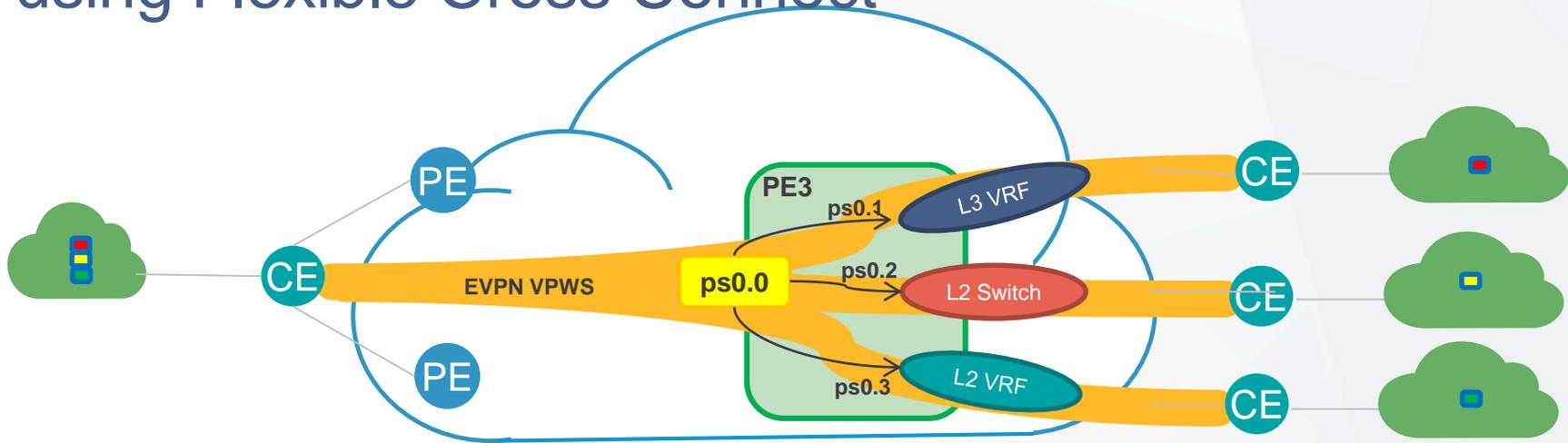
- EVPN VPWS with **Flexible Cross Connect** used as access PW.
- All-active or single active load-balancing in the access.
- Double VLAN lookup to demux traffic to desired service
- EVPN advantages : A/A MH, Aliasing, Flow based load balancing, Sub-second egress protection
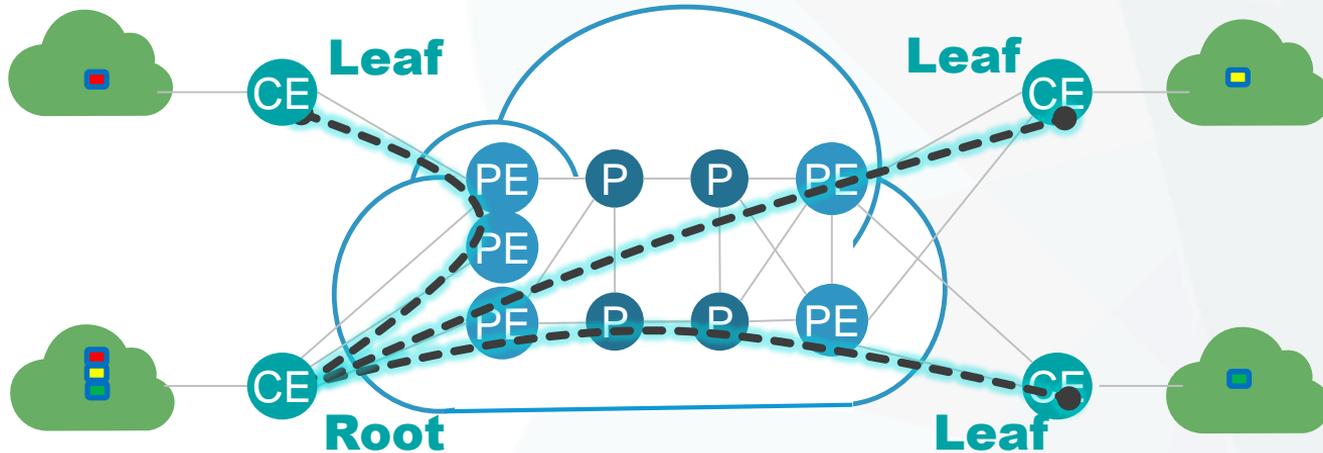
Business VPN : E-Tree Service Applications
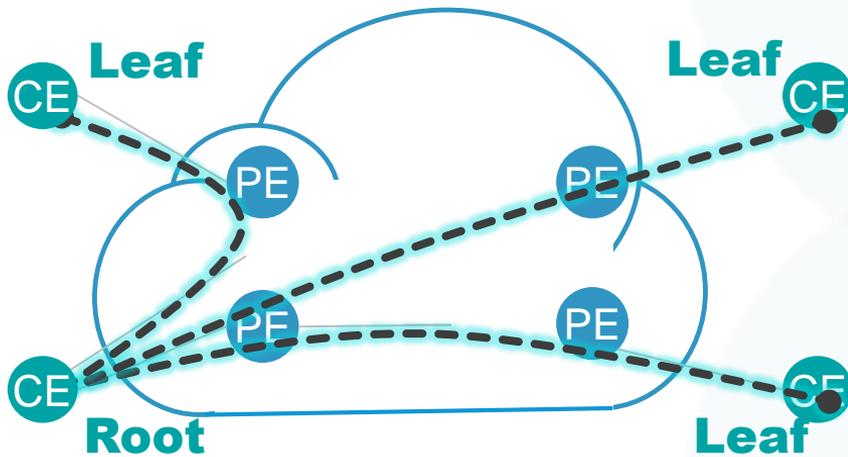

All EVPN Benefits apply

- Applications that need to disable 'any to any' communication
- Rooted point to multi point service
- Ideal for IP TV and other Multicast Applications
- Financial Applications
- L2 and L3 Services can be provided

# Business VPN : E-Tree Service

- Root or Leaf site per EVI on Port or VLAN basis
- Root or Leaf site per AC on VLAN basis only.
- BUM replication using P2MP LSPs planned for 2H 2017

# E-Tree : Ingress Filtering for Known Unicast
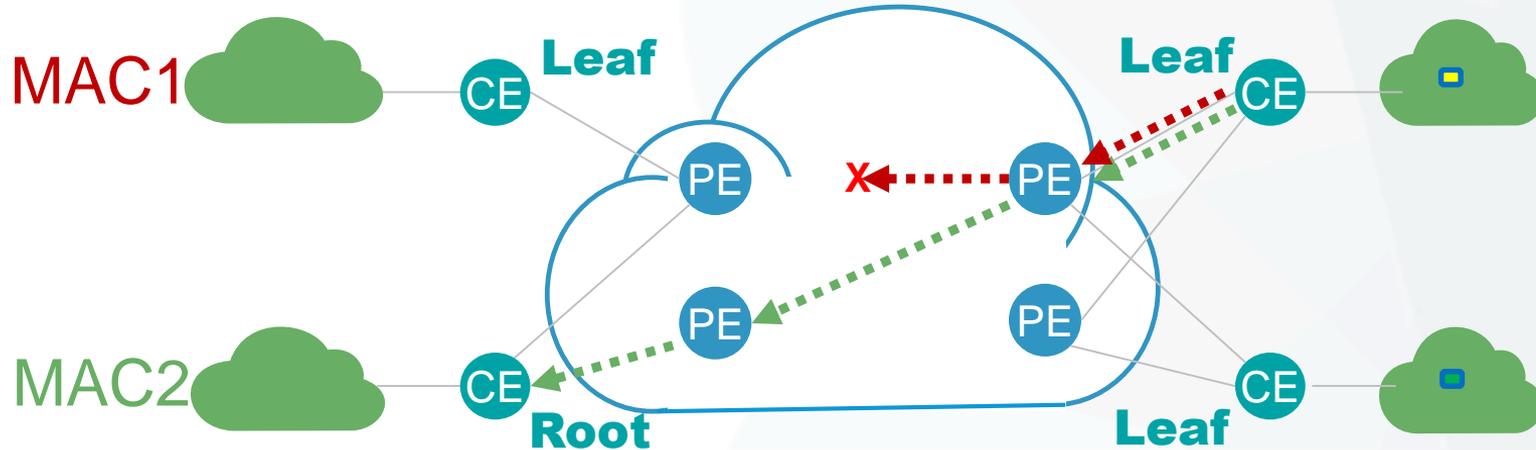
- Target MAC lookup yields forwarding adjacency and flag indicating if it is Root or Leaf
- Data for MAC1 is Ingress Filtered. Not forwarded to N/W
- Data for MAC2 is forwarded

E-Tree : Egress Filtering for BUM
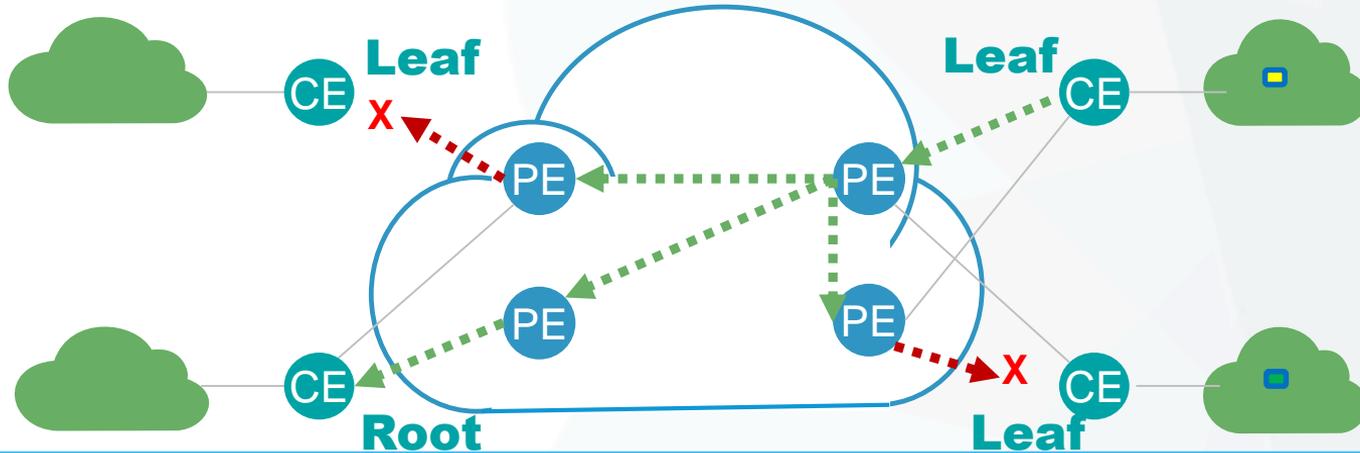
- Receiver checks Ext Comm of MPLS ESI label to identify whether originating ESI is root or leaf
- Root forwards traffic received from Leaf
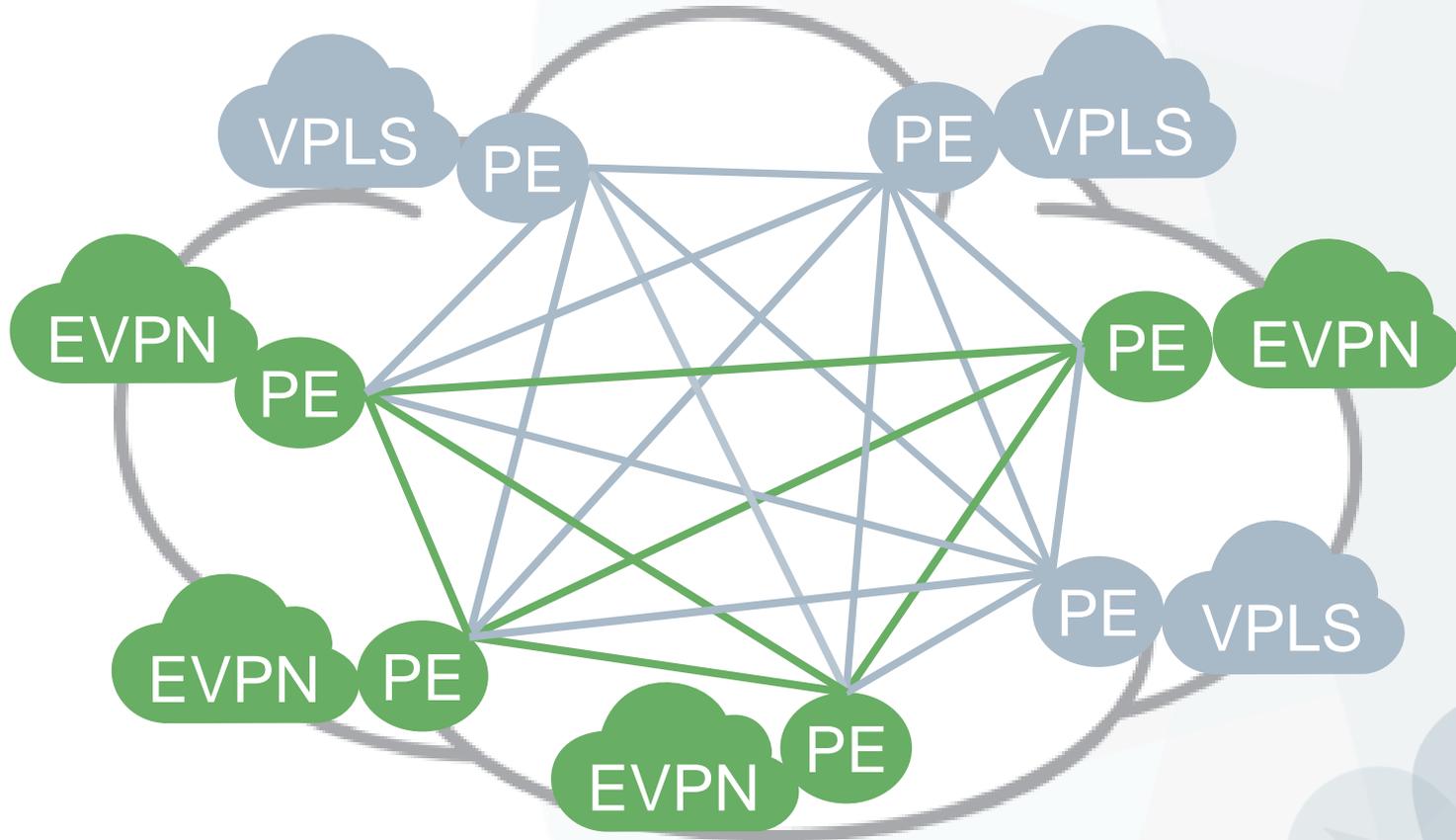- Leafs discard traffic received from Leaf
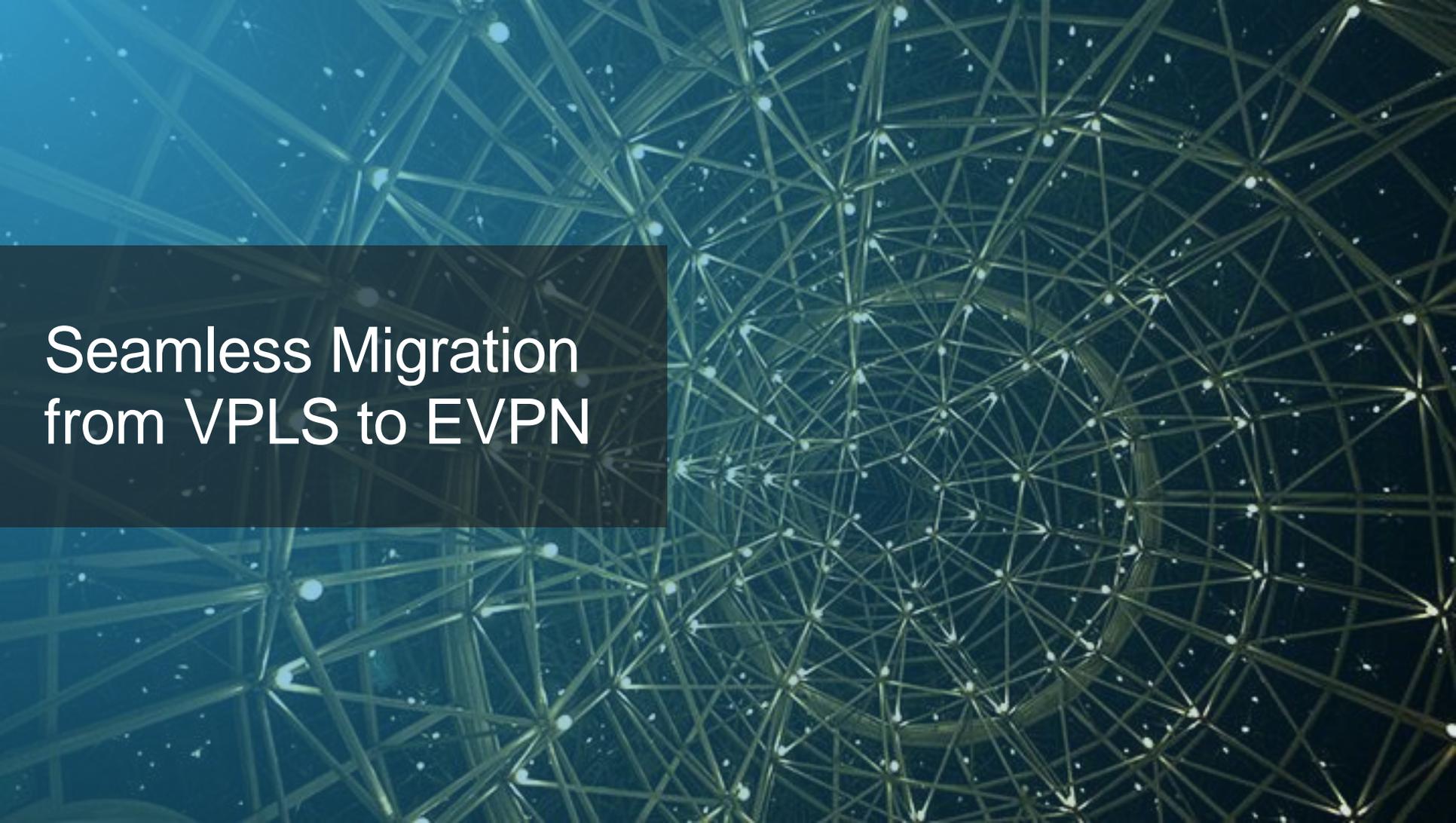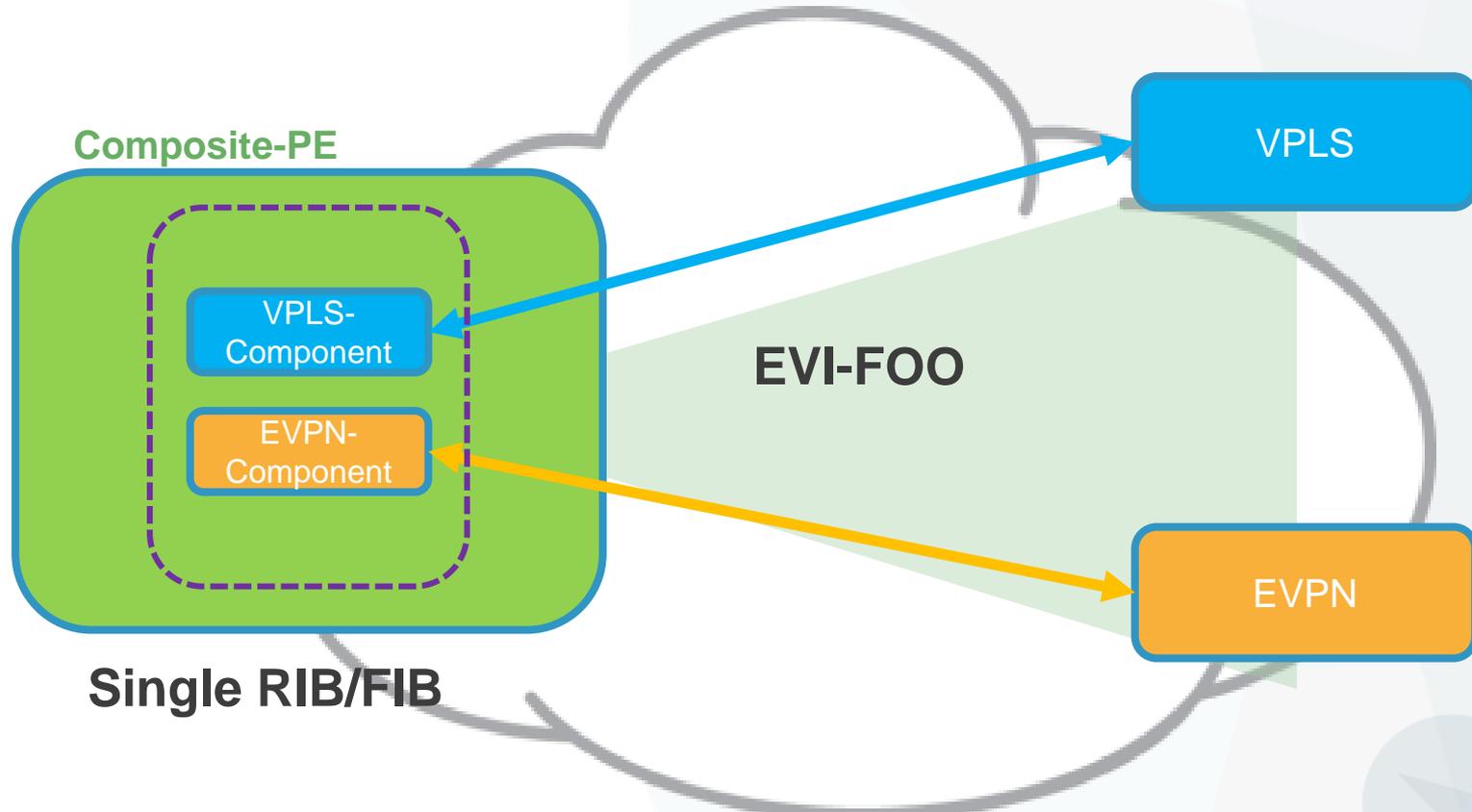
Seamless Migration
from VPLS to EVPN

Highlights

- Allow staged migration

- No change to existing VPLS or PBB-VPLS PEs (no software upgrade)

- Allows coexistence of PE nodes running VPLS and EVPN for the same VPN instance and single-homed segments

- Solution will support single-active redundancy of multi-homed networks and multi-homed devices for EVPN Pes

- For all-active redundancy support the VPN instance has to be confined to EVPN PE nodes only

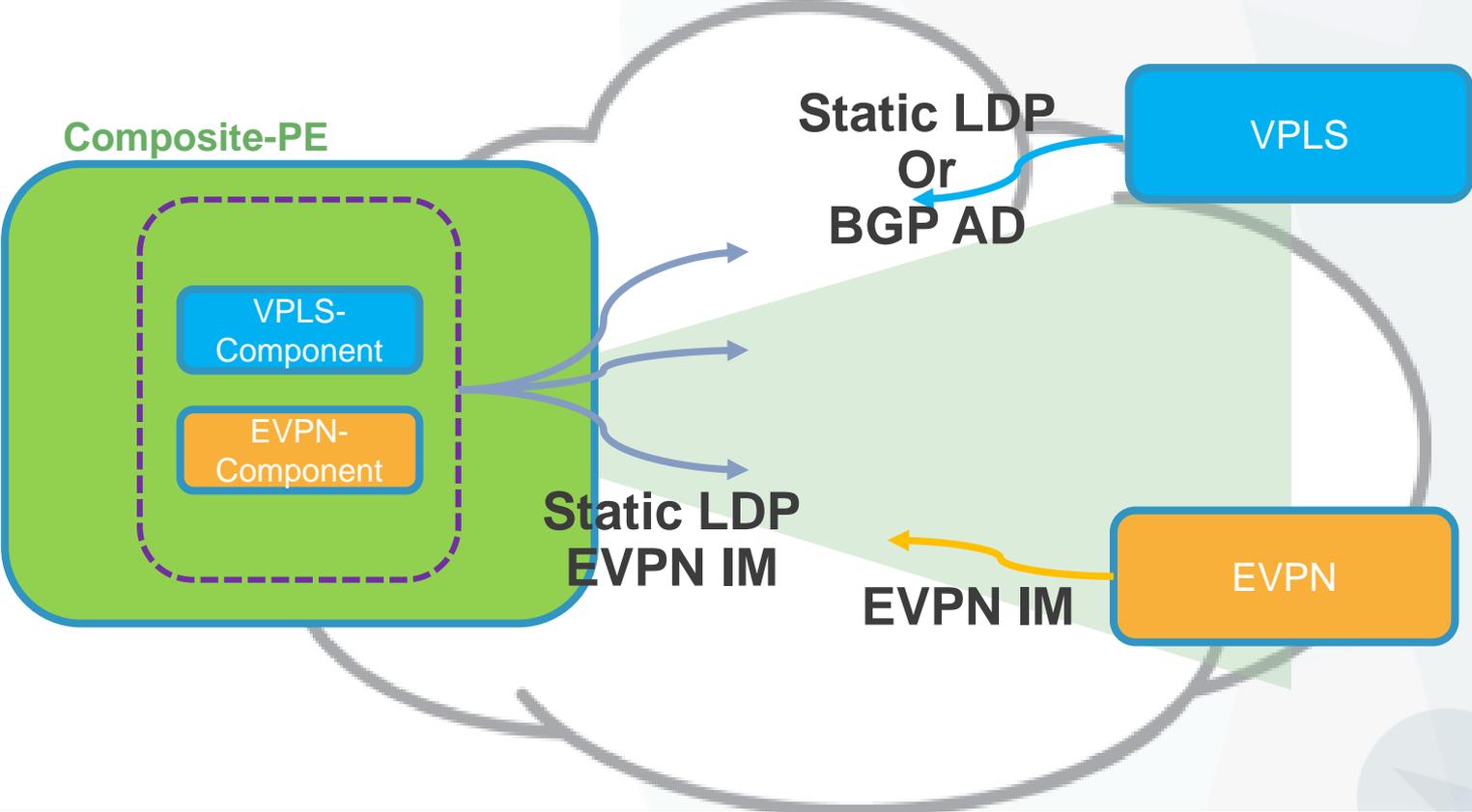- For active-standby redundancy support the VPN instance can span to VPLS and EVPN PE nodes
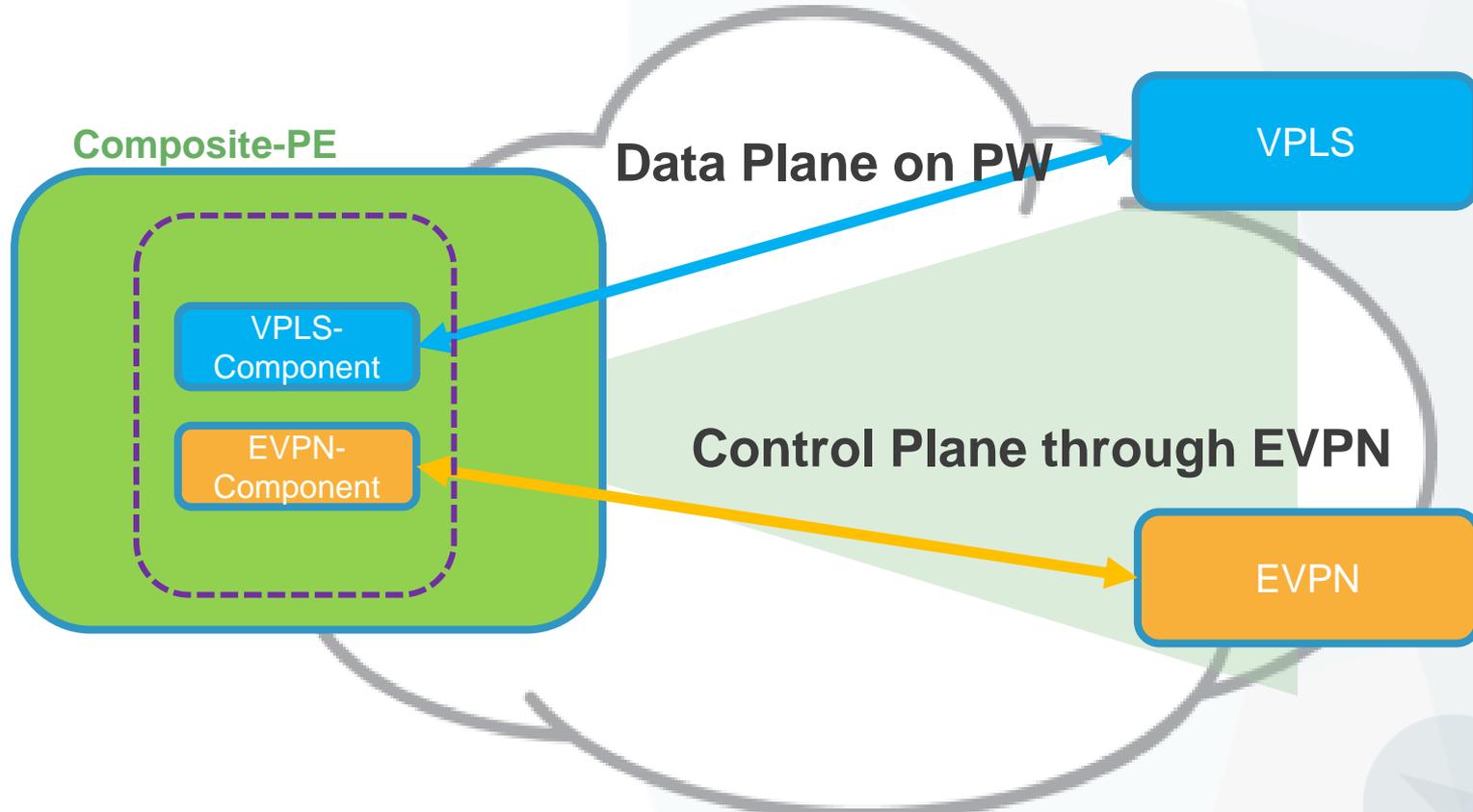
Seamless Migration & Integration of VPLS/EVPN

Interworking of different L2VPN flavors

Composite-PE

VPLS

EVI-FOO

VPLS-Component

EVPN-Component

EVPN

Single RIB/FIB

Control Plane Setup: Auto-discovery

Composite-PE

VPLS-Component

EVPN-Component

Static LDP Or BGP AD

VPLS

Static LDP EVPN IM

EVPN IM

EVPN

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Data plane Setup: MAC Learning

Composite-PE

VPLS-Component

EVPN-Component

VPLS

EVPN

Data Plane on PW

Control Plane through EVPN

Thank you