



DCI using TRILL

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draft-muks-trill-transport-over-mpls-01
draft-muks-trill-dci-00

Overview

- This Presentation covers providing Ethernet DCI service using TRILL.
- There are multiple technologies already available for DCI, e.g VPLS, BGP eVPN etc.
- This draft introduces a new DCI technology using TRILL VTSD / VPTS.
- This presentation also covers the key benefits provided by TRILL DCI with two use cases.

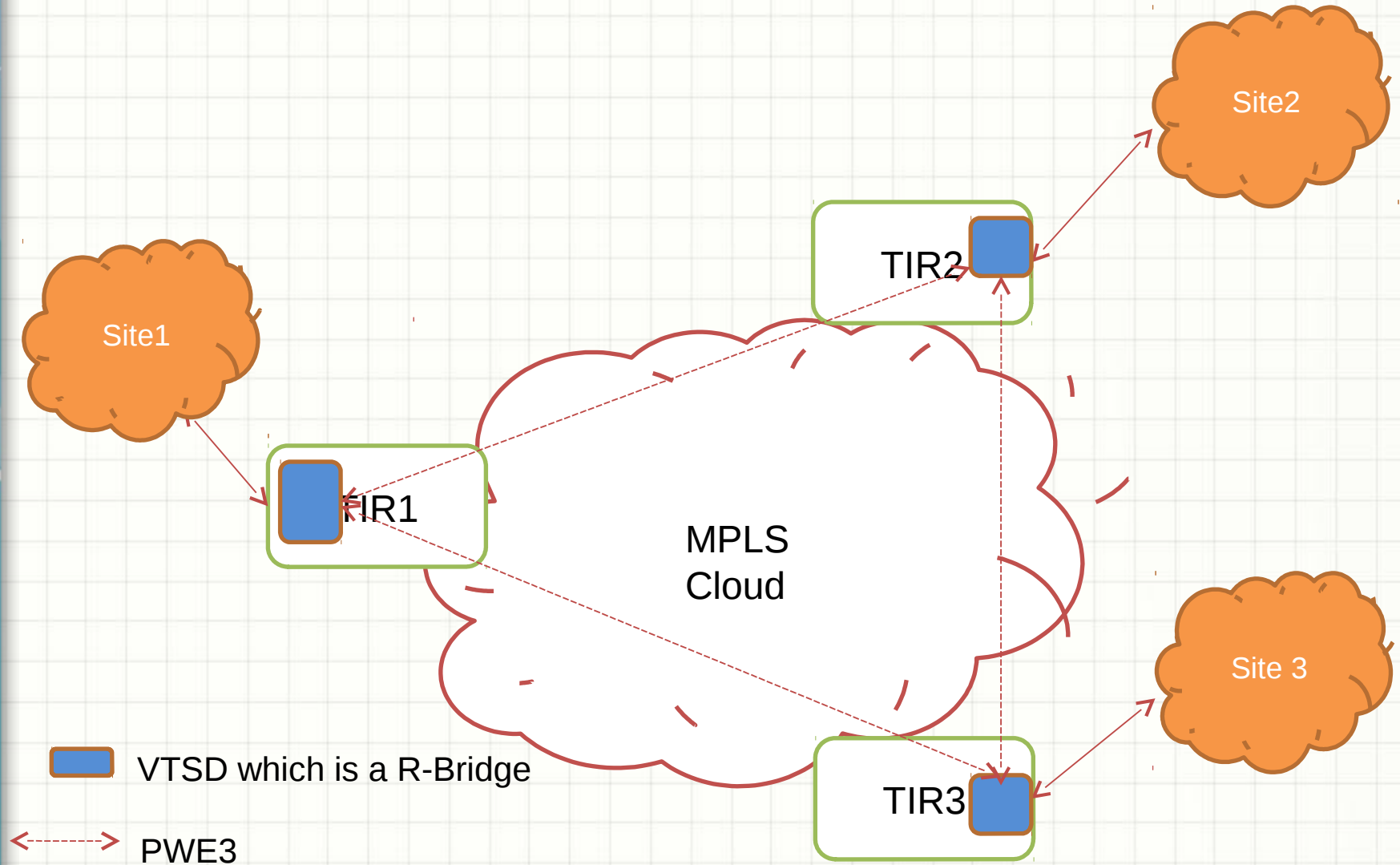


Key Terminologies and Introduction

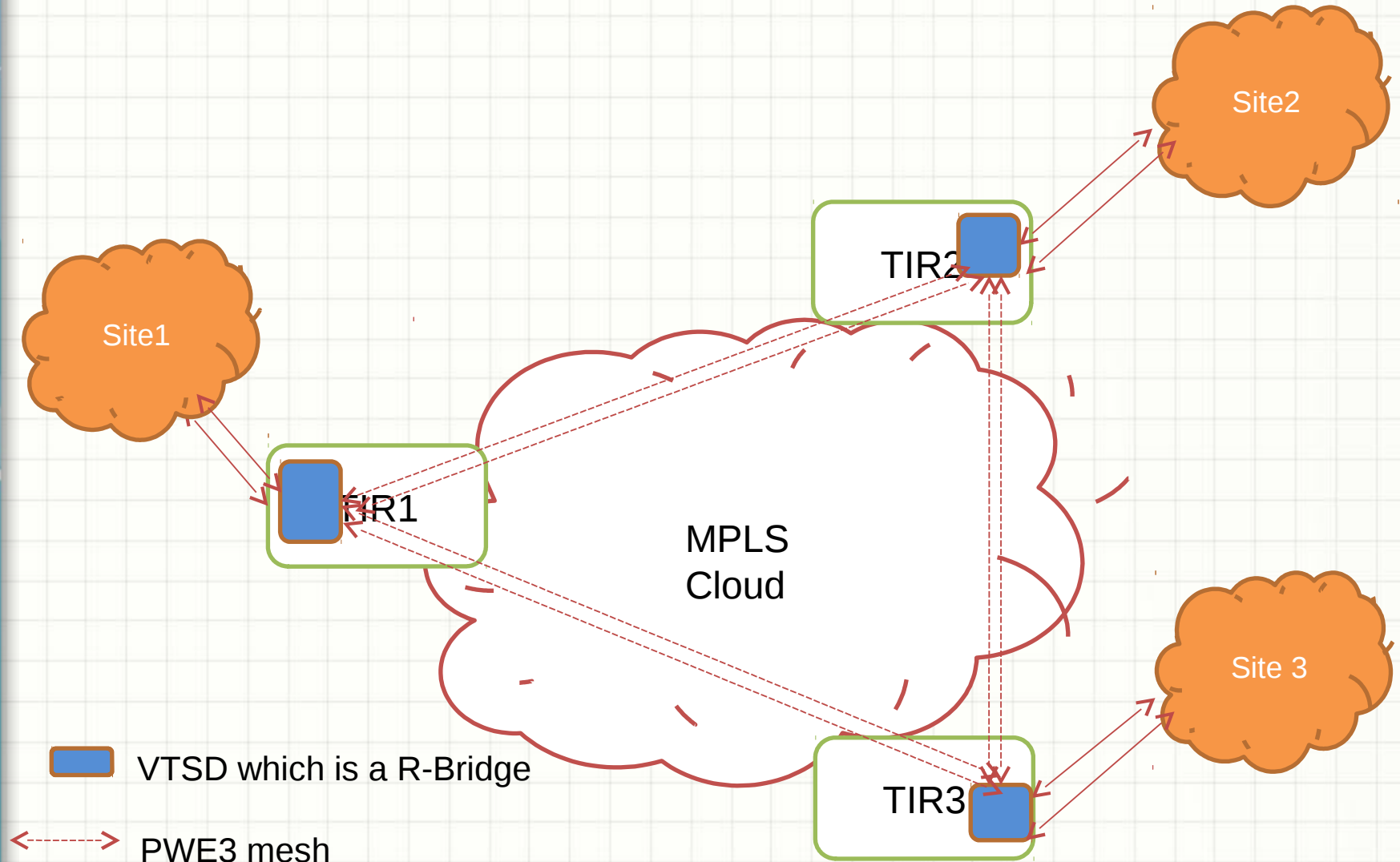
VTSD Introduction

- The **draft-muks-trill-transport-over-mpls-01** defines the VTSD.
- VTSD is logical RBridge inside the DCI/PE router which is connected to the Layer2 interface towards the DC and PW interface towards the MPLS core.
- Forms adjacency with
 - Other VTSD in the same VPLS domain.
 - RBridge in the TRILL sites.
- Split Horizon need not be employed in the core network as Rbridge takes care of loop free topology.
- VTSD should take care of segregating one customer traffic with other.
- It should be capable of performing all the operations a standard TRILL Switch should like,
 - Multiple Parallel links
 - Active-Active forwarding
 - Appointed Forwarder etc.

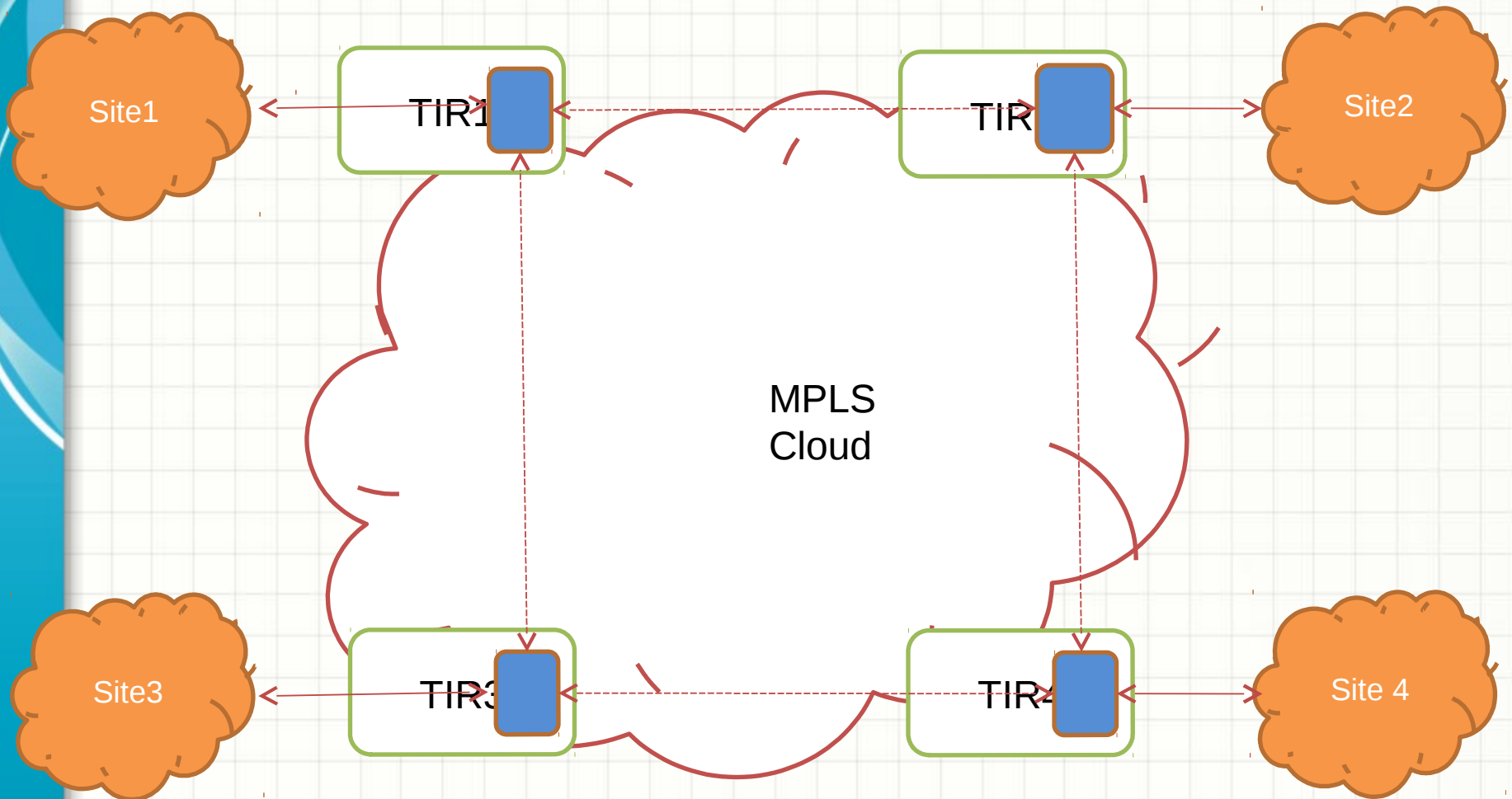
VPTS



Key Benefits: Parallel links

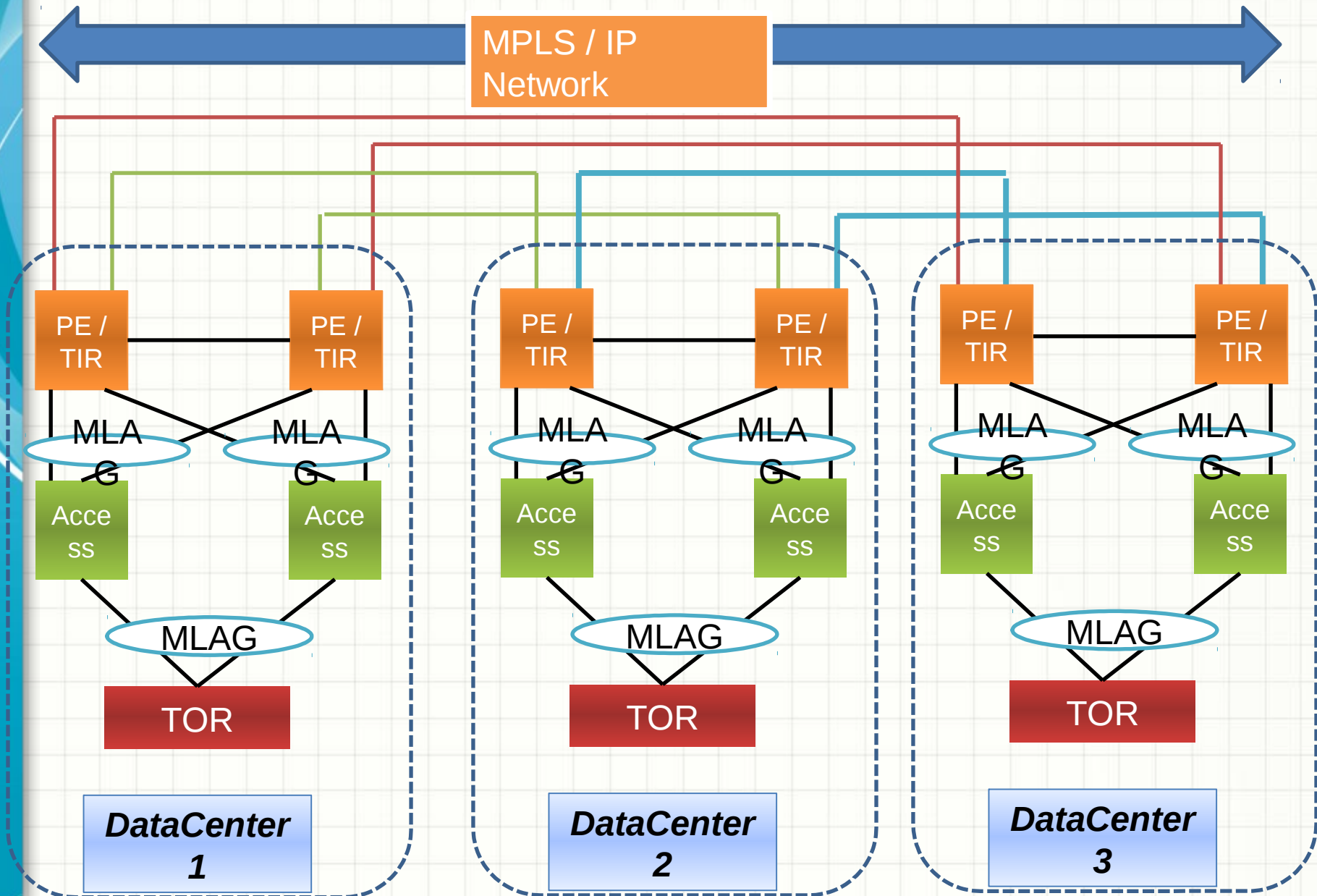


Key Benefits: Ring Topology Support



 VTSD which is a R-Bridge

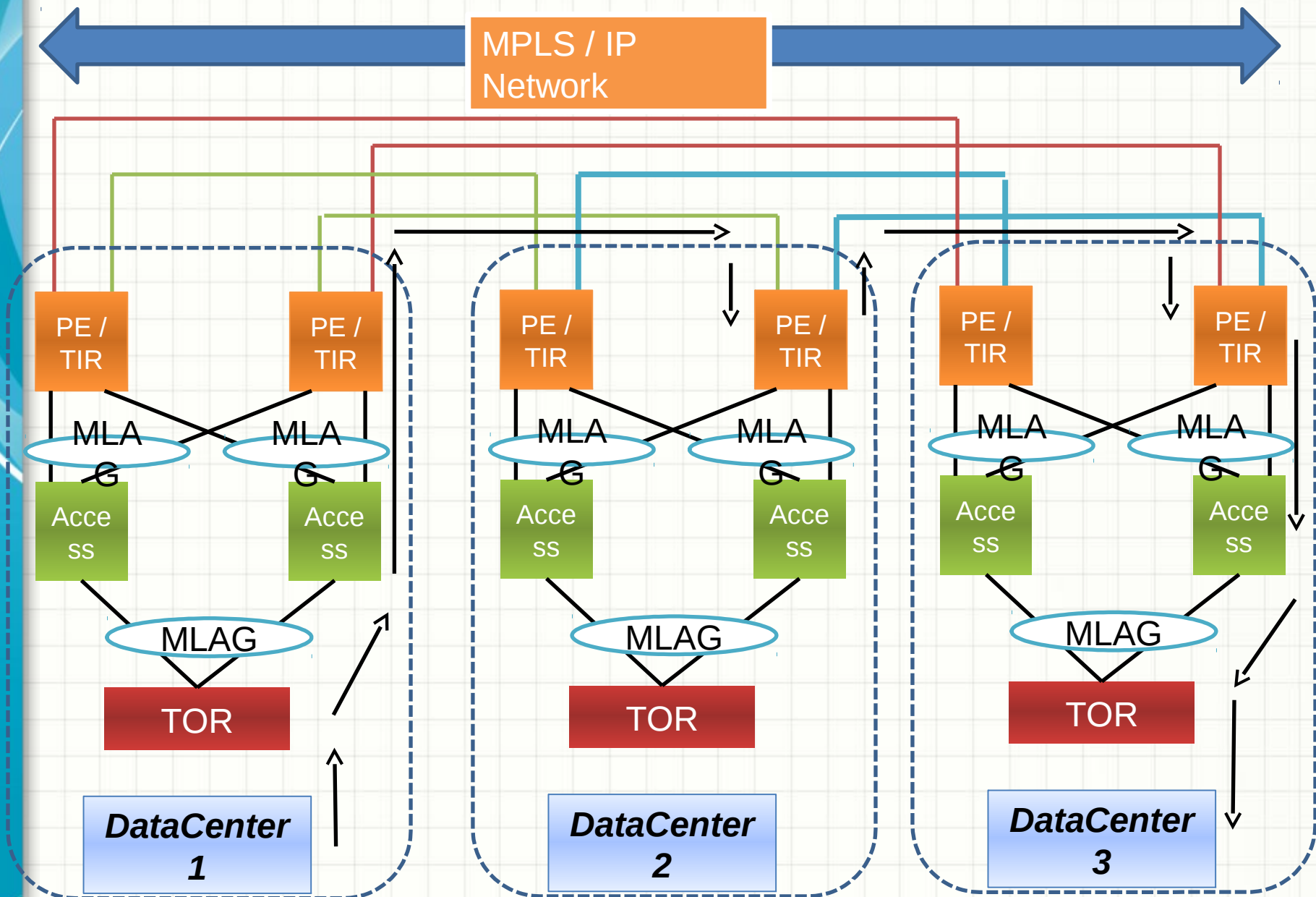
Use Case 1: DCI for Layer 2 Data Center



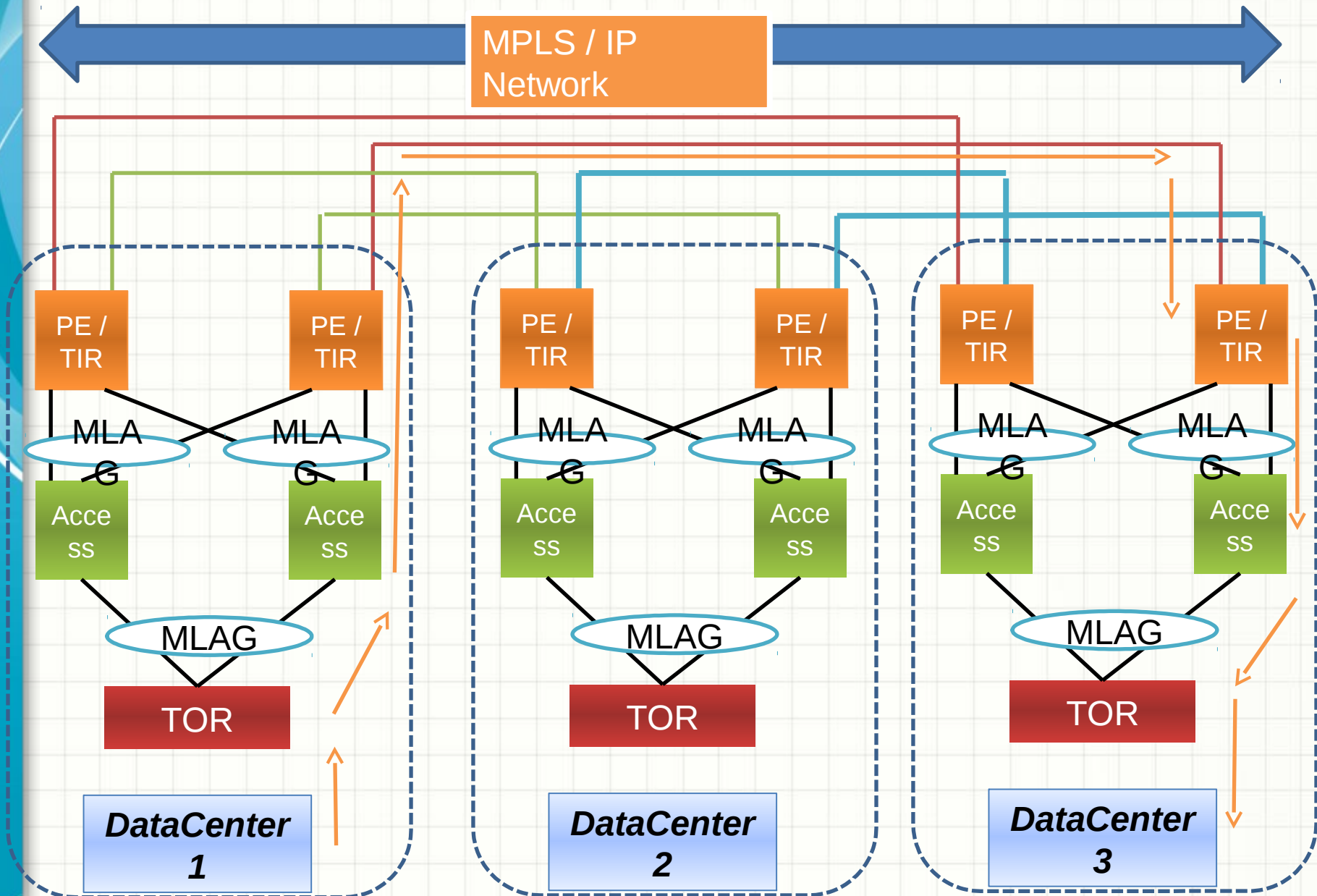
Datacenter Use Case Requirement

- Complete L2 active-active Mesh inside the DC from ToR to Core Switch
- The DCI layer is connected as a RING with redundant link between the PEs with MPLS Core.
- There is no MESH connectivity across the DCI layer. But there is a ring connectivity.
- Each Datacenter has two PE / TIR device to provide redundancy
- Each PE / TIR device in the DCI layer is connected to adjacent datacenter with 2 links, one link from each core to form a ring.
- This provides a full redundancy and provide assured traffic flow until there are 4 link failures in the MPLS core.

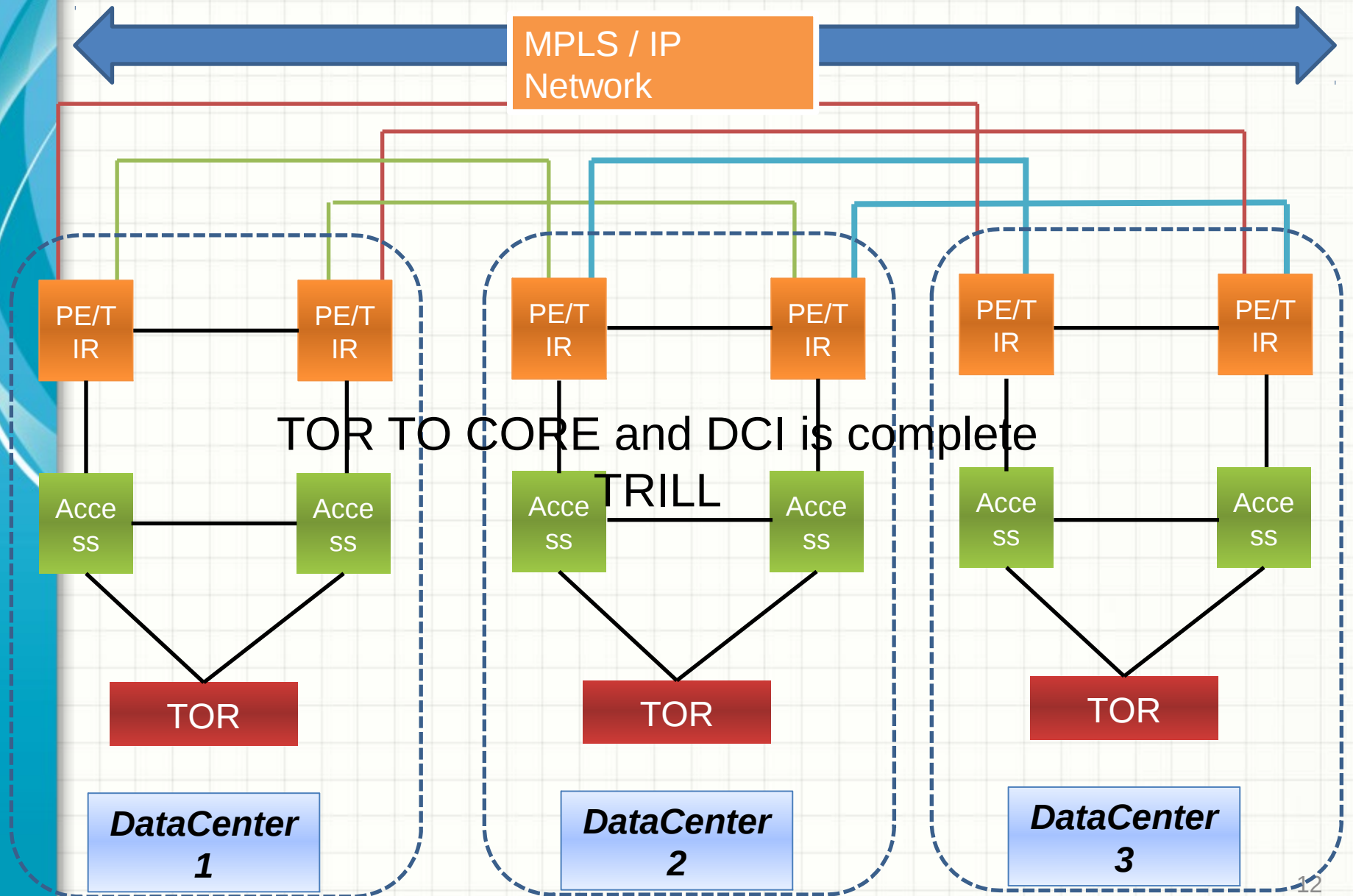
BUM traffic flow



Unicast Traffic flow



Use Case 2: Unified TRILL (DCI in TRILL Datacenter)



Key DCI requirement

- Multihoming with all-active forwarding
 - TRILL support multiple active parallel links between the TRILL R-Bridges / traditional L2 bridges.
 - For actively load balancing between Layer2 bridge and TRILL, TRILL can uses
 - AF mechanism (VLAN based)
 - TRILL Active-Active Access using draft-ietf-trill-centralized-replication and Pseudonode Nickname (draft-ietf-trill-pseudonode-nickname)
- Effectively scaling the bandwidth by adding more links
- BUM traffic optimization
 - TRILL forwards all the BUM traffic via the distribution tree.
 - This provides a mechanism to avoid flooding of all BUM traffic across the L2VPN boundaries.
 - These distribution trees can be pruned based on VLAN as well as multicast groups.

Key DCI requirement (Contd..)

- IP/MAC information exchanging
 - TRILL ESADI supports exchanging the MAC information.
 - draft-ietf-trill-arp-optimization-01 proposes exchanging IP address along with MAC via esadi.
- Control over MAC learning
 - TRILL ESADI supports exchanging the MAC information.
 - TRILL ESADI can be enhanced to apply some rules/filter over exchanging the MAC address
- Efficient usage of mesh in the core network
 - TRILL protocol by its nature, uses the mesh / parallel links efficiently.
- MAC mass-withdrawal
 - draft-hao-trill-address-flush-00 address this
- Always Use shortest Paths for Delivering Unicast Frames
 - TRILL protocol by its nature, uses the shortest path.

DCI Requirement with TRILL compliance

S.No	Description	TRILL DCI
1	Multihoming with all-active forwarding	Yes Can be done by introducing pseudo-nick name and draft-ietf-trill-centralized-replication
2	Efficiently distributing the traffic across all-active links	
3	Effectively scaling the bandwidth by adding more links (more than 2) in a multi-homing scenario	Yes
4	Delivery of BUM traffic optimization	Yes with Distribution tree and Pruning (VLAN and Multicast).
5	Autodiscovery of services	Missing Can be done by enhancing esadi
6	Delivering Layer 2 and Layer 3 services over the same interface (Integrated Routing and Bridging)	Two drafts already available draft-ietf-trill-arp-optimization-01 draft-ietf-trill-ia-appsubtlv-05
7	Multiple data plane encapsulation choices	Will be addressed in next version of the draft.
8	Load-balancing inside the core network	Yes
9	ARP/ND proxy	We Have to make use of below two drafts Two drafts already available draft-ietf-trill-arp-optimization-01 draft-ietf-trill-ia-appsubtlv-05

DCI Requirement with TRILL compliance (Contd...)

S.No	Description	TRILL DCI
11	Control plane learning of MAC	Yes
12	Virtualization and isolation of different instances	Yes
13	Split Horizon	No
14	Mesh in the core network	Not required
15	Efficient usage of links in the core network	Yes
16	BUM traffic handling	Via distribution tree with VLAN pruning/Mcast Pruning
17	MAC mobility	Need to check and propose a solution
18	MAC mass-withdrawal	draft-hao-trill-address-flush-00
19	Layer-3 ECMP – all links forwarding	Yes
20	Significantly larger Name-Space in the Overlay (16M segments)	Yes TRILL with fine grained labelling (Stacking two vlan tags 24 bits, 2 ²⁴ (16M) entries)
21	Extensive OAM Capabilities	Yes
22	Frames can reach from one PE to other PE Via another PE	YES
23	Always Use shortest Paths for Delivering Unicast Frames	YES
24	Can work in Ring topolgy without mesh / HUB and Spoke	Yes

Next Step

Need to identify micro-level gaps in TRILL to provide efficient DCI support.

The drafts needs more work. Comments welcome.