Architecture for Use of BGP as Central Controller

draft-cth-rtgwg-bgp-control-00

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Introduction

BGP (core part of network)

- has link state information, including TE [RFC7752], can compute optimal path
- controls redirection of traffic flows [RFC5575]
- distributes MPLS labels [RFC3107]
- has Route Reflector (RR) [RFC4456]

Using BGP as a controller

- is natural, beneficial and relatively simple to extend BGP to be a controller
- simplifies operations on network
- uses network resources efficiently
- can provide services with high quality

Building Blocks

TEDB(TED): maintains TE information such as bandwidth for every link in a network.

TEDB

CSPF

CSPF: Compute paths for tunnel such as SR or LSP tunnel, satisfying constraints using TEDB

SID/Label Database (SLDB): records and maintains status of every Segment Identifier (SID) and label for every node, interface/link and/or prefix in the network

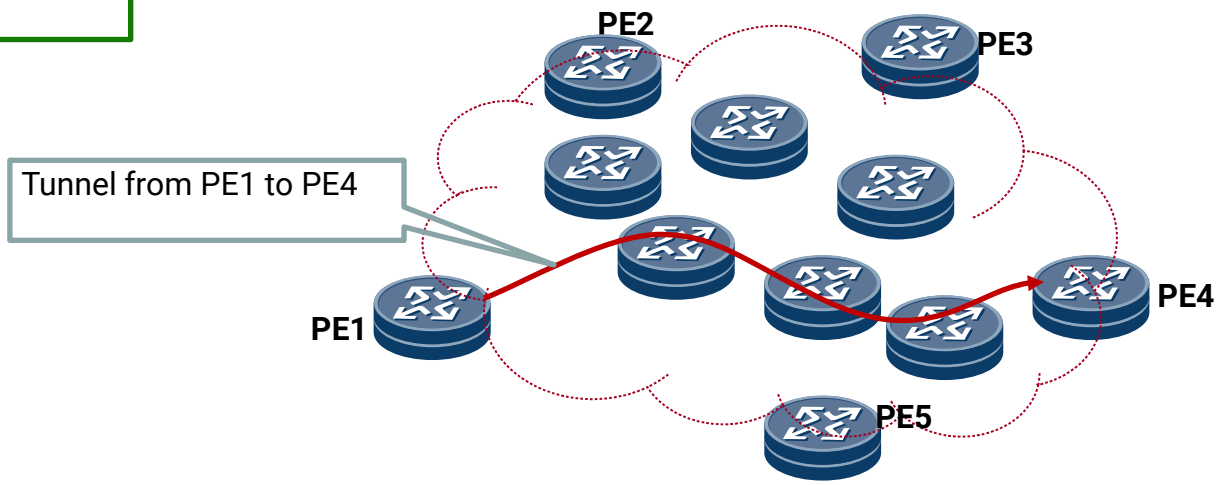
SLDB

TM

Tunnel Manager (TM):
1) receives request for an operation on a tunnel,
2) gets a path for tunnel,
3) reserves resources,
4) sets up tunnel along path

Tunnel and Path DB (TPDB): Stores information for every tunnel(Paths, TE resources reserved, SID/Labels assigned, parameters, status)

TPDB



Reference Architectures

One Controller

Controller Cluster

Hierarchical Controllers

One Controller

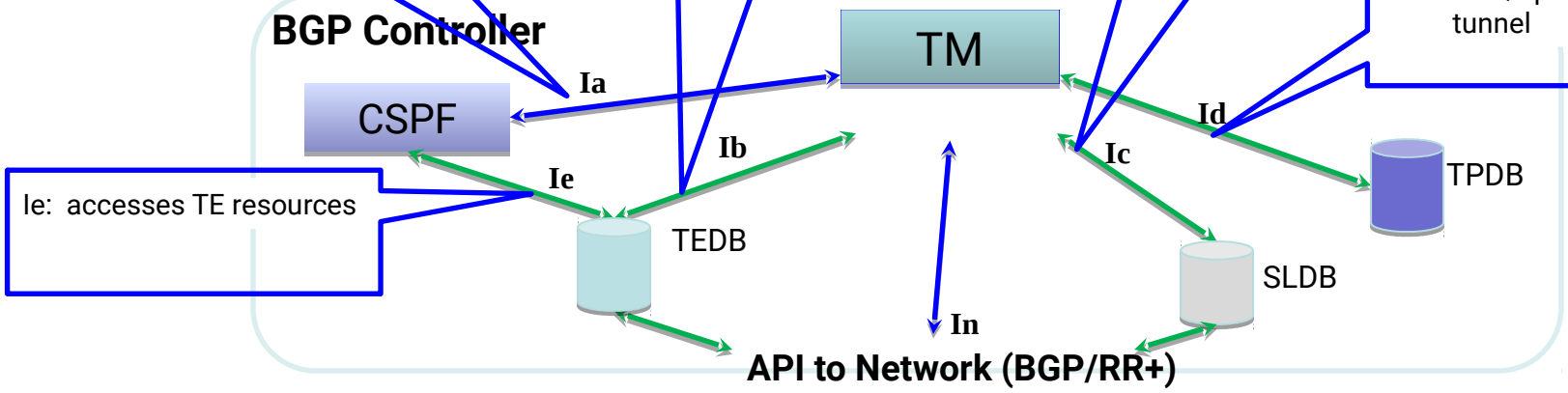
Ia: gets paths for tunnel from a source to a destination, satisfying constraints

Ib: Reserves/releases TE resources for tunnel

Ic: Reserves/releases labels for SID/Label

Id: stores/updates info for tunnel

Ie: accesses TE resources

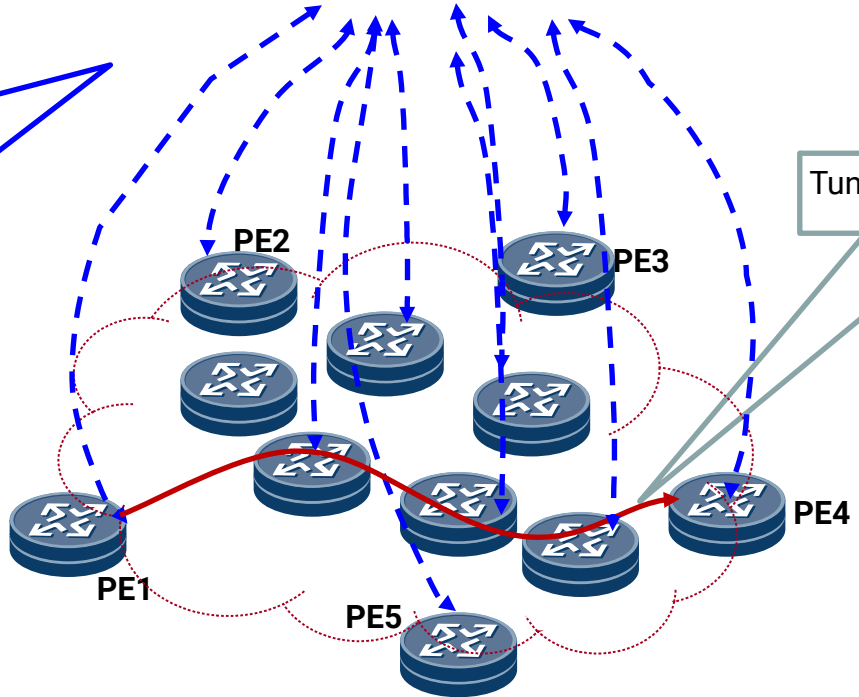


In: Creates/deletes tunnel along path

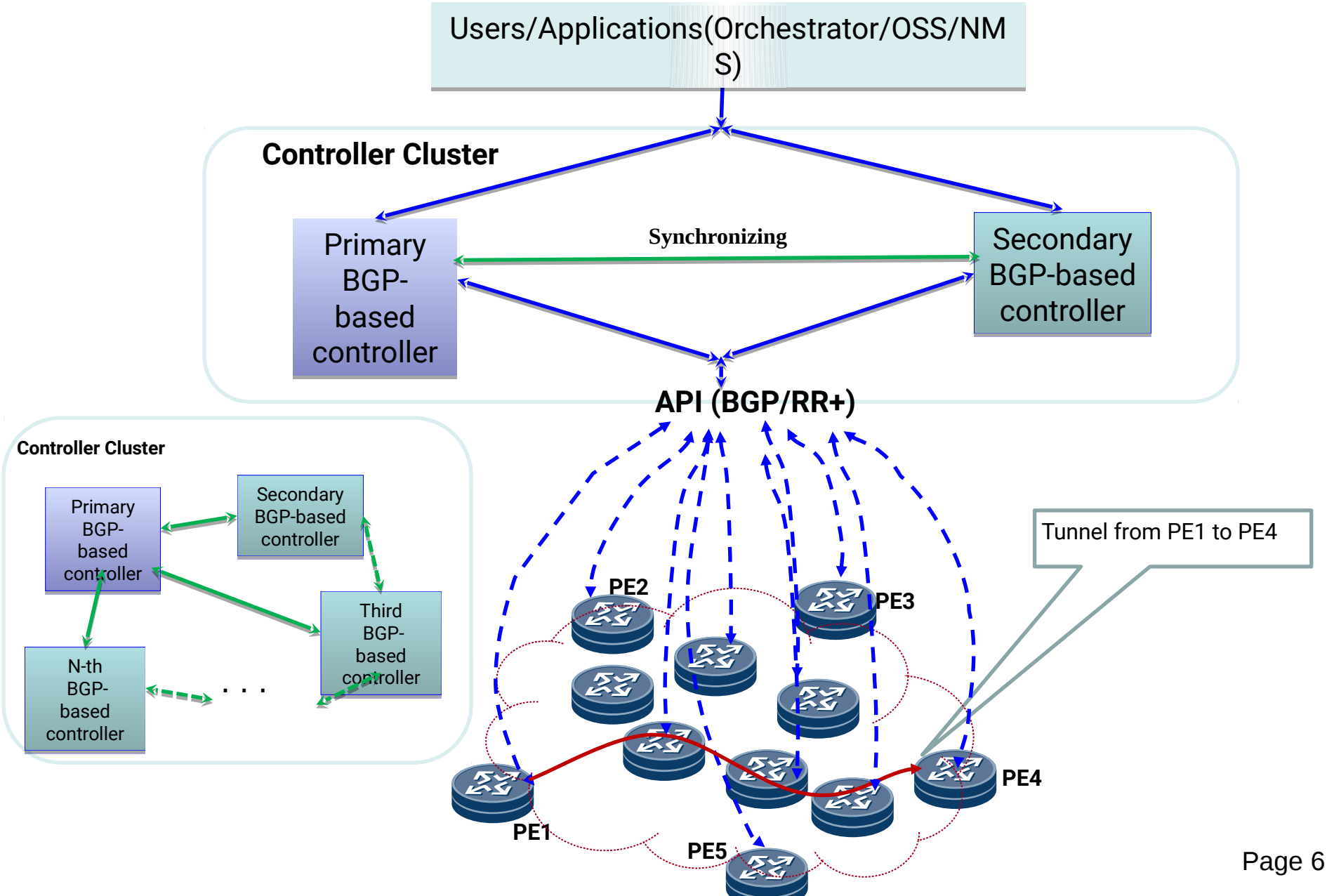
TEDB gets initial TE info of network

SLDB gets initial labels info of network

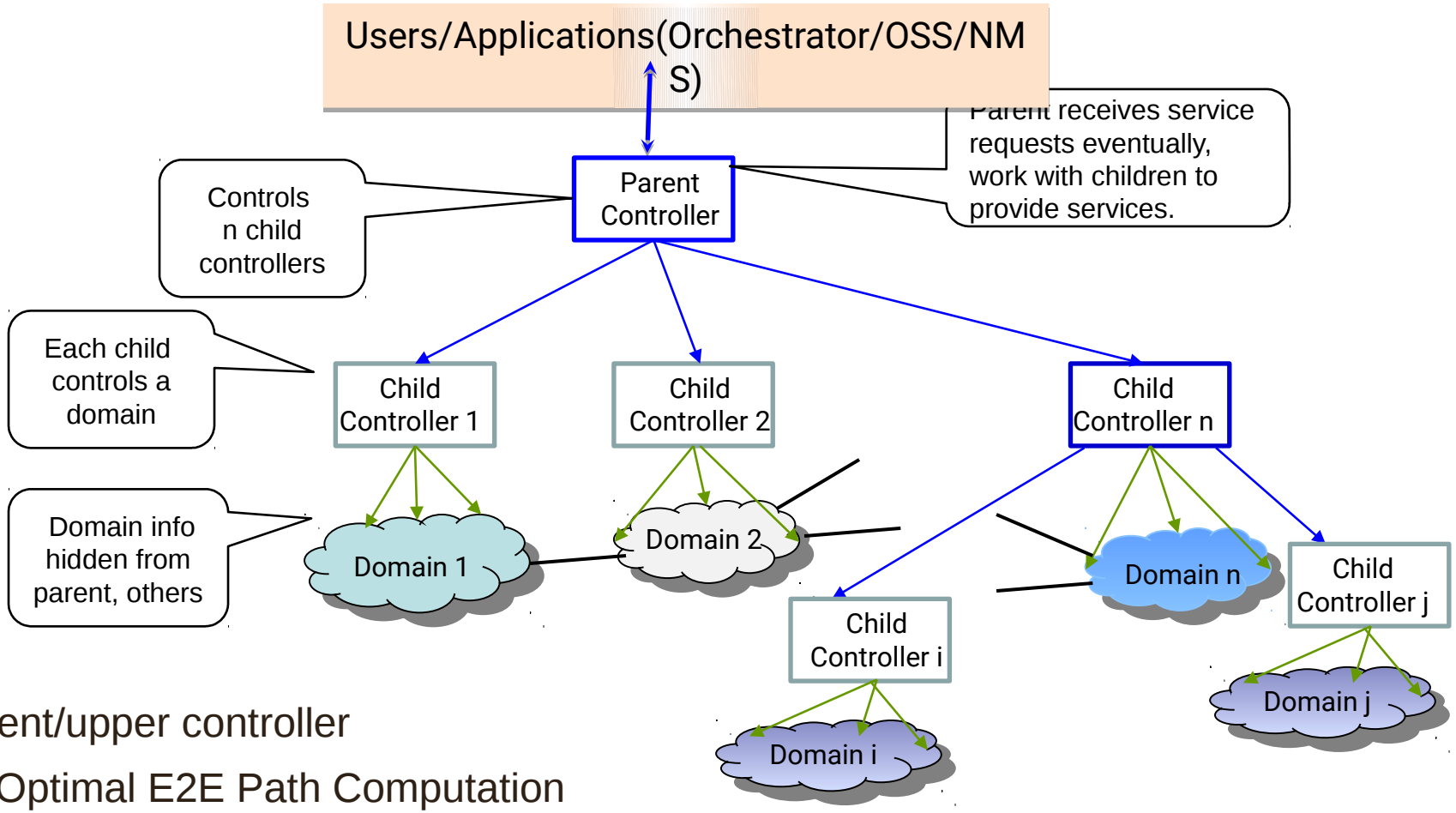
Tunnel from PE1 to PE4



Controller Cluster



Hierarchical Controllers



Parent/upper controller

- Optimal E2E Path Computation
- E2E Tunnel Creation/Deletion/Update

Next Step

Welcome Comments