

Packet Network Slicing using Segment Routing

draft-peng-teas-network-slicing-01

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Existing Identifiers Overview

REQ1:Dedicated Virtual Networks

REQ2:End-to-End Slicing

REQ3:Unified NSI

REQ4:Traffic Engineering

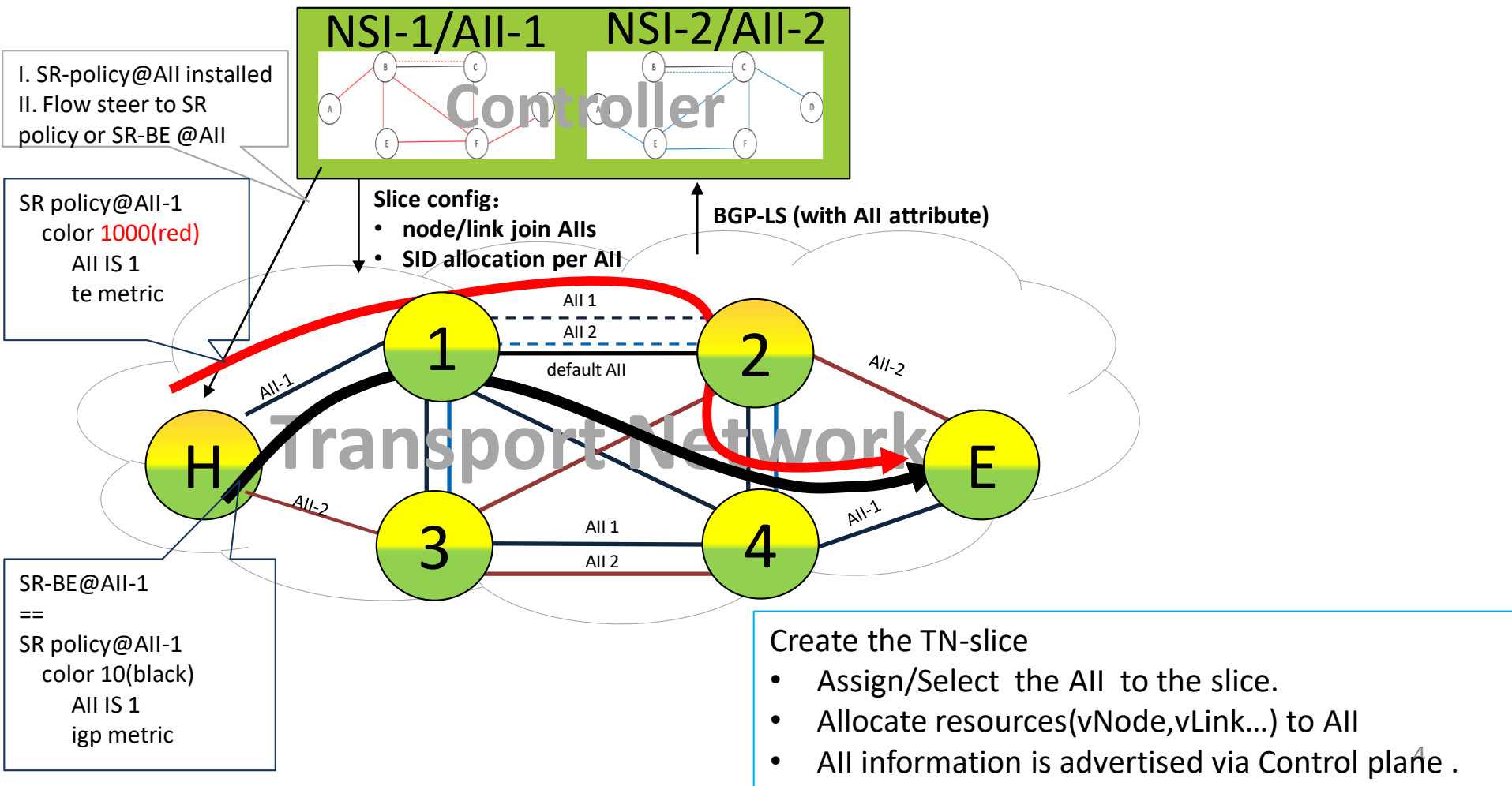
REQ5:Layer 2 / Layer 3 link resource partition

	REQ1	REQ2	REQ3	REQ4	REQ5
AG and EAG Bit		√	√		
Multi-Topology Identifier	√			√	
SR Policy Color			√	√	
Flex-algorithm Identifier	√			√	
All(Administrative Instance Identifier)	√	√	√	√	√

All Overview

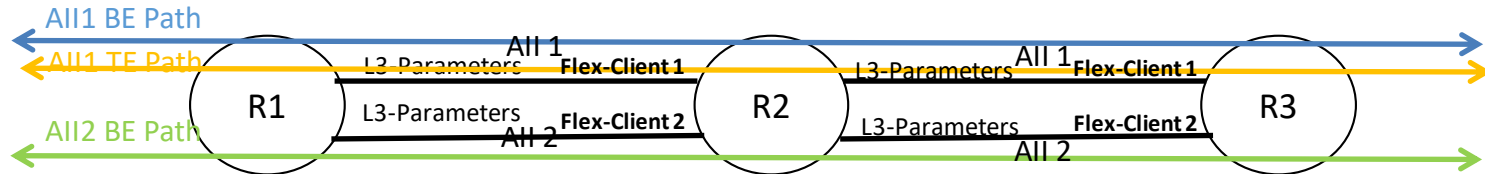
- **All** (Administrative Instance Identifier): Explicit virtual network identification , it could be used as a **TN-slice identifier**, it indicates the topology, computing, storage resources of the dedicated virtual network.
 - All is the identifier of the **dedicated Virtual Networks for the slice**.
 - Support the **End-to-End Slicing**.
 - **Identifier the Unified NSI** across multi-domain of TN .
 - **All is one of constraint criteria of the color template (draft-ietf-spring-segment-routing-policy) , and color template with All provides a more flexible control .**
 - Uniform Color template (Centralized and distributed, intra and inter domain) for overlay service mapping to underlay resource.
 - All meet the link requirements from 3GPP. It is **independent** of the existing domain partition of the network, i.e., any intra- or inter-domain link, and it is also **independent** of the existing underlay frame or routing technologies (IGP, BGP, Segment Routing, Flex-E, etc.), i.e., any L2 or L3 link is the candidate resource.
- There is no modification to the forwarding table(dataplane).

All as a TN-slice Identifier

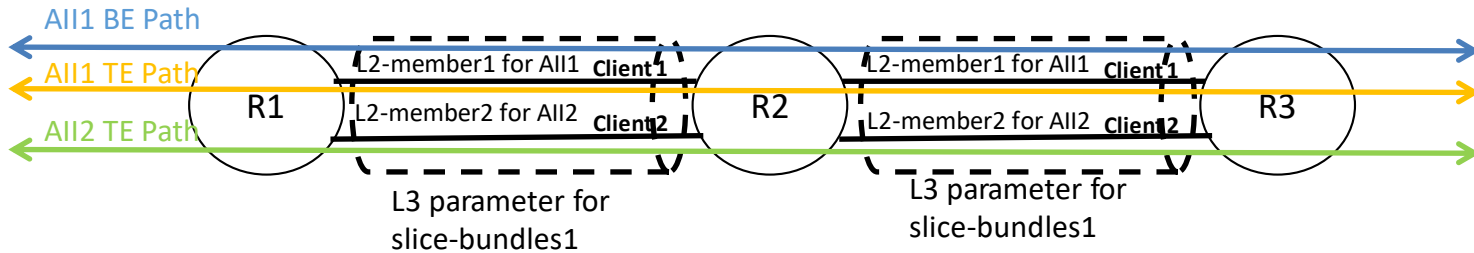


All as a Set of TN-slice Resource Identifiers

■ L3 Interface Slice Isolation



■ L2 Interface Slice Isolation



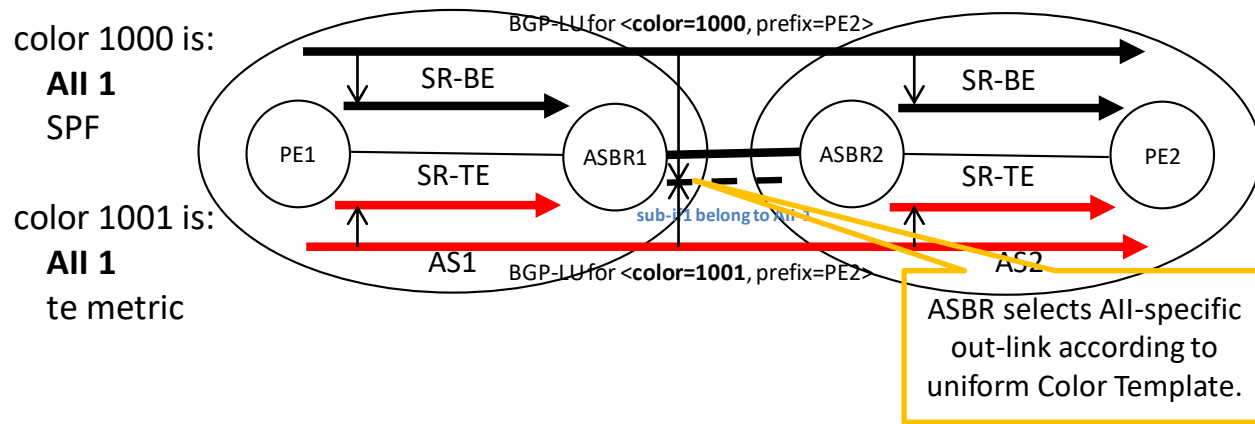
- L2 Bundle members share the same IGP instance.
- L2 Bundle members could be any interface type.
- Control-plane packets will always be forwarded over the same path.
- Data-plane packets will be forwarded on the specific L2-bundle member.

■ Resource Isolation

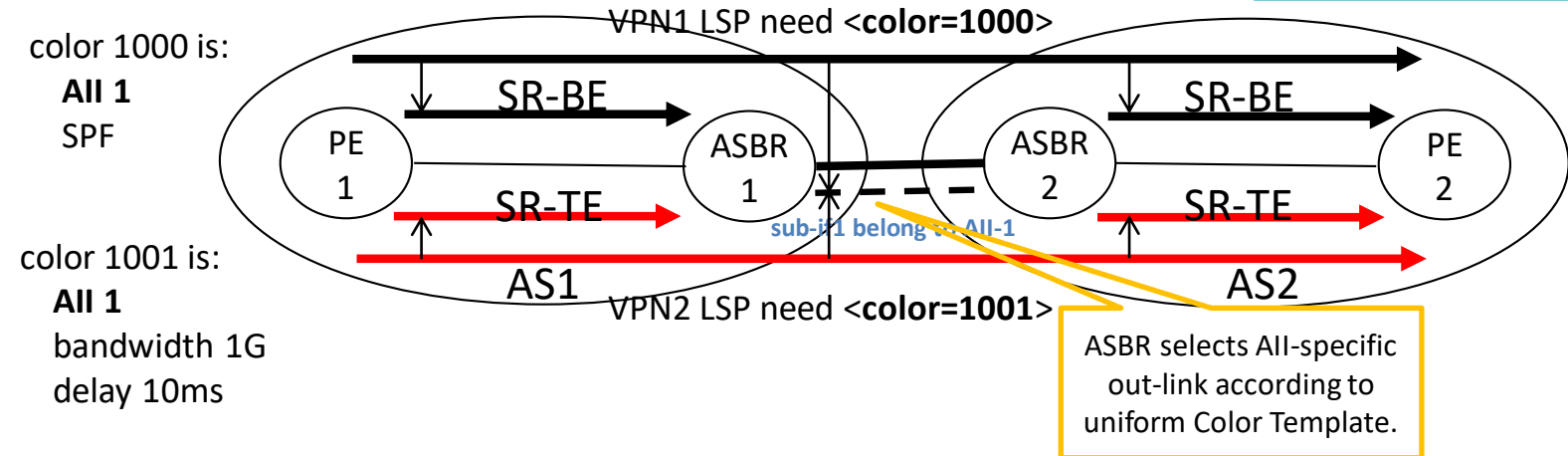
- SIDs are allocated per All, and the resource (such as bandwidth) is allocated to All.
- All is one of constraint criteria of the Color Template (draft-ietf-spring-segment-routing-policy), and color template with All and other traditional criteria, such as bandwidth, delay, affinity, provide a more flexible control.

All for Multi-Domain Deployment

Option C: Colored BGP-LU without SDN

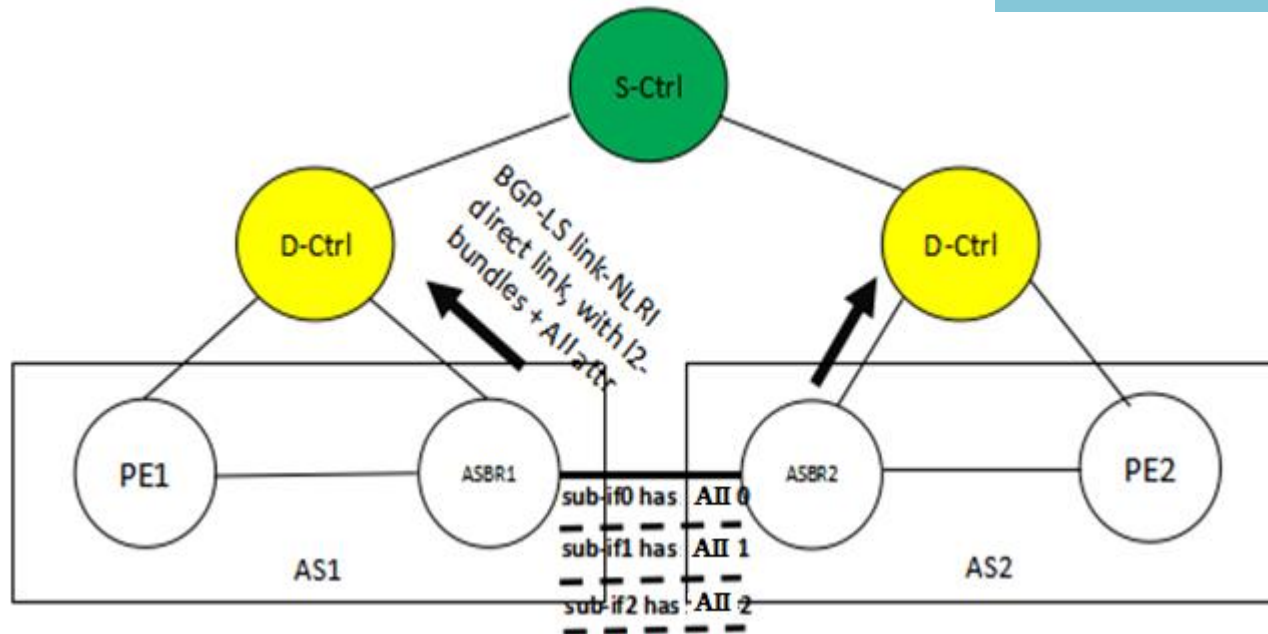


Option B Inter-domain



All for Multi-Domain Deployment Cont.

E2E SR-TE with SDN Controller

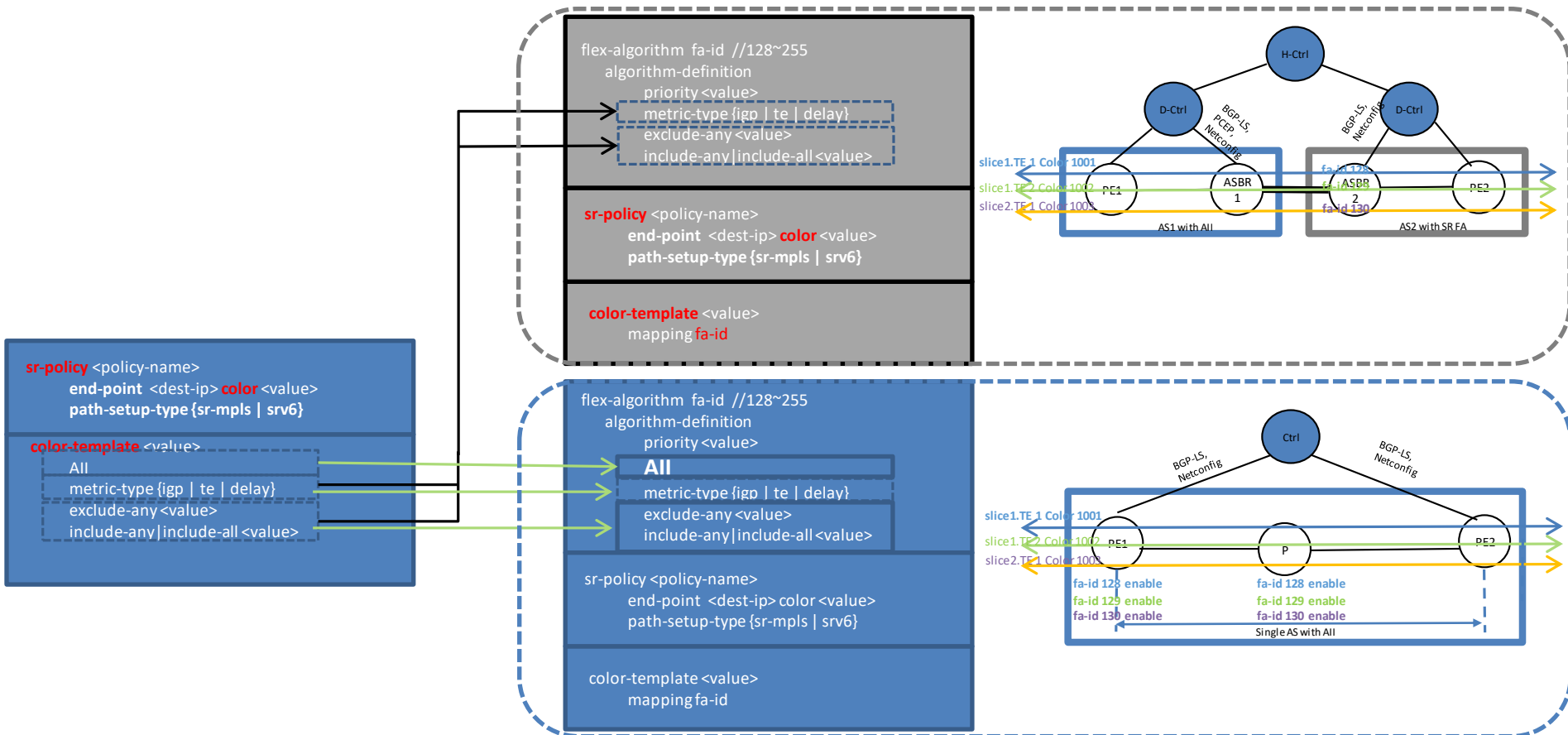


- BGP-LS advertised link-state NLRI containing All information.
- For the inter-domain link, BGP-LS can advertise DIRECT protocol type, or firstly put inter-domain interconnections to IGP instance, then always import data from IGP protocol source.
- Controller supports computation of E2E TE path based on TE-DB with All attribute.

Combined with SR Flex-algorithm

Scenario 1:

For inter-AS case, SDN controller can create VN for All-AS based on All, and VN for FA-AS based on FA respectively. SDN controller computes E2E segment lists, each containing multiple ASes and based on different technologies.



Scenario 2:

For a single All-AS, we can continue to apply SR FA to optimize label stack depth. In this case, a new criteria All is added in FAD, same as adding All to Color Template. 8

Next Step

- Comments welcome.

Thanks!