



I E T F[®]

IETF 110 – Online
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BGP Color-Aware Routing (CAR) Problem Statement

draft-dskc-bess-bgp-car-problem-statement

D. Rao, Cisco Systems (dhrao@cisco.com) – Presenter
S. Agrawal, Cisco Systems
C. Filsfils, Cisco Systems
K. Talaulikar, Cisco Systems
B. Decraene, Orange
D. Steinberg, Steinberg Consulting
L. Jalil, Verizon
J. Guichard, Futurewei
W. Henderickx, Nokia

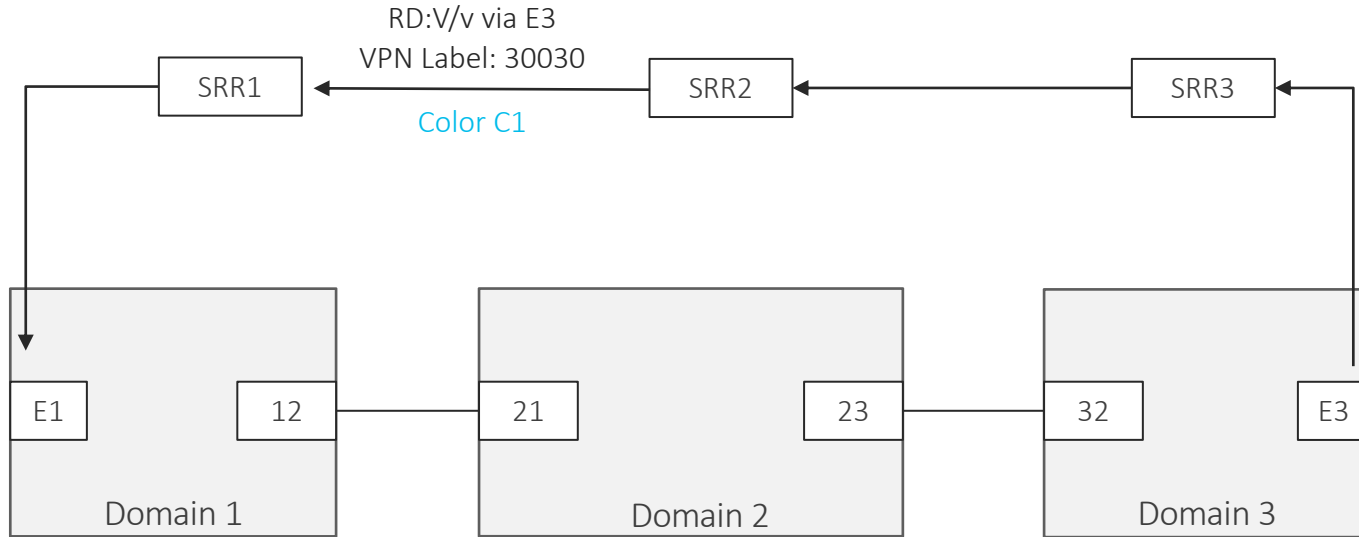
BGP Color-Aware Routing - Objective

- Define BGP based routing solution to establish end-to-end intent-aware paths across a multi-domain service provider network environment
 - Intent : Example – low-latency path between two PEs

Reminder – Deployed Solution

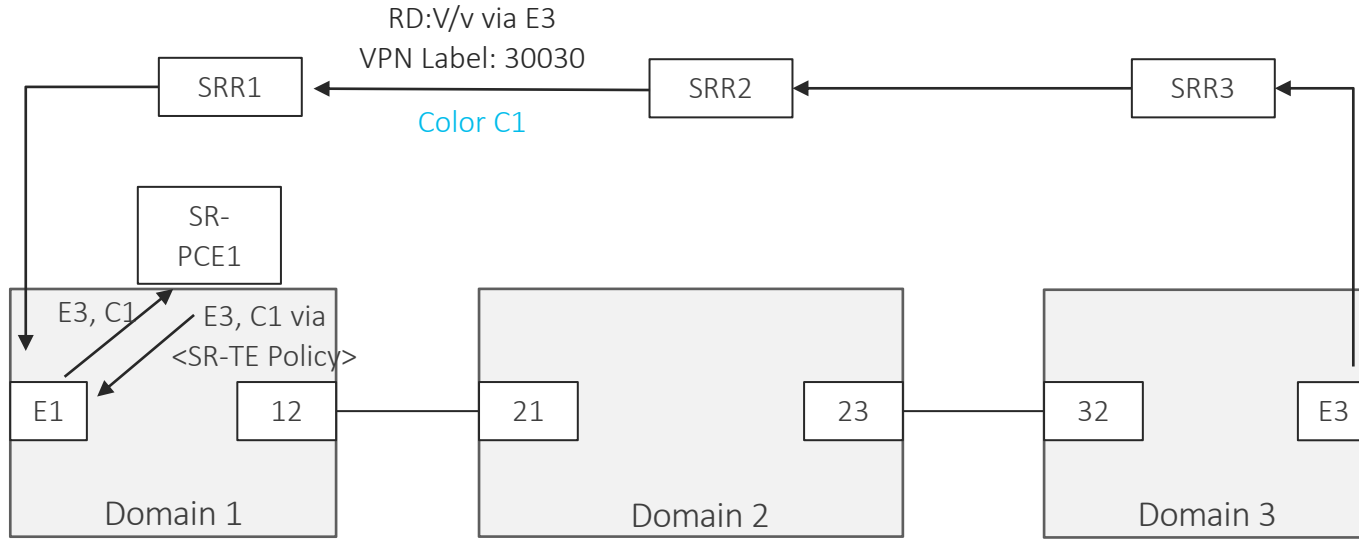
- SR-TE
 - ietf-spring-segment-routing-policy
 - Mature, widely deployed, multiple implementations
 - Defines notion of Color to represent intent

Colored Service Route Signaling from E3 to E1



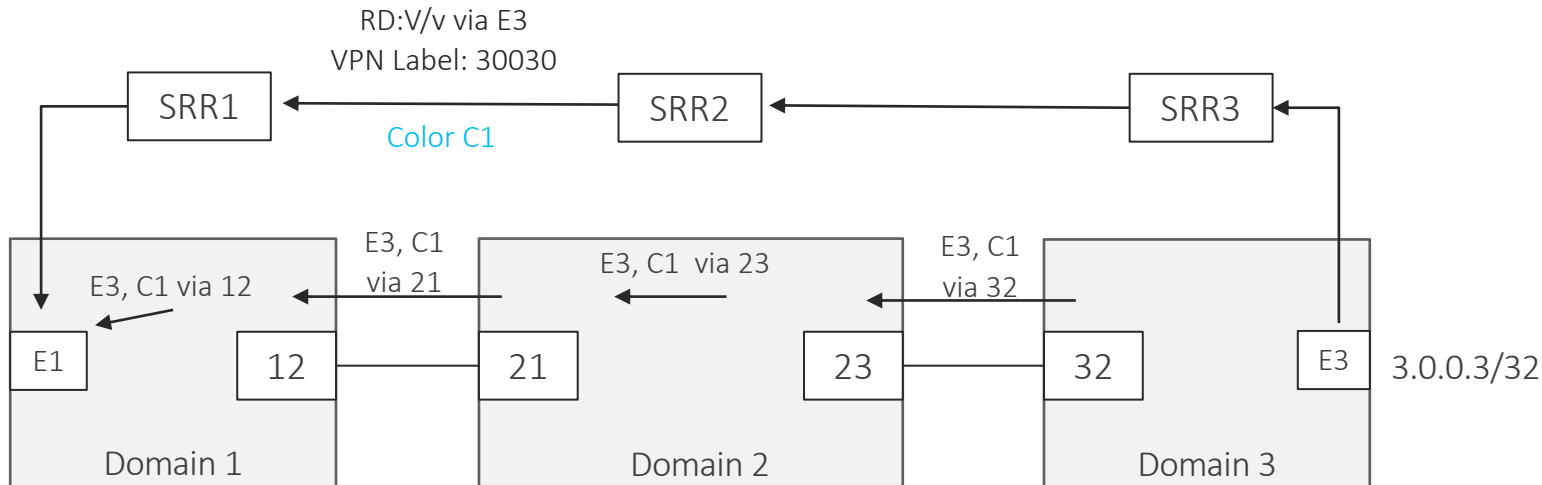
- Key point: E1 learns about the “intent” (here for underlay SLA) requested by a route via its **color**
- The VPN route is said to be “colored” (<> color-aware)
- Color is widely supported BGP Color Extended-Community

Automated Steering via SR-TE Color-Aware Path



- When E1 receives a Colored Service route from E3
- E1 requests its SR-PCE1 to compute the inter-domain path
- SR-PCE1 sends the SR Policy to E1 with label/SID stack
- E3, C1 is a SR-Policy Color-Aware Path in underlay that provides intent-aware path to E3

Automated Steering Evolution - BGP Color-Aware Route

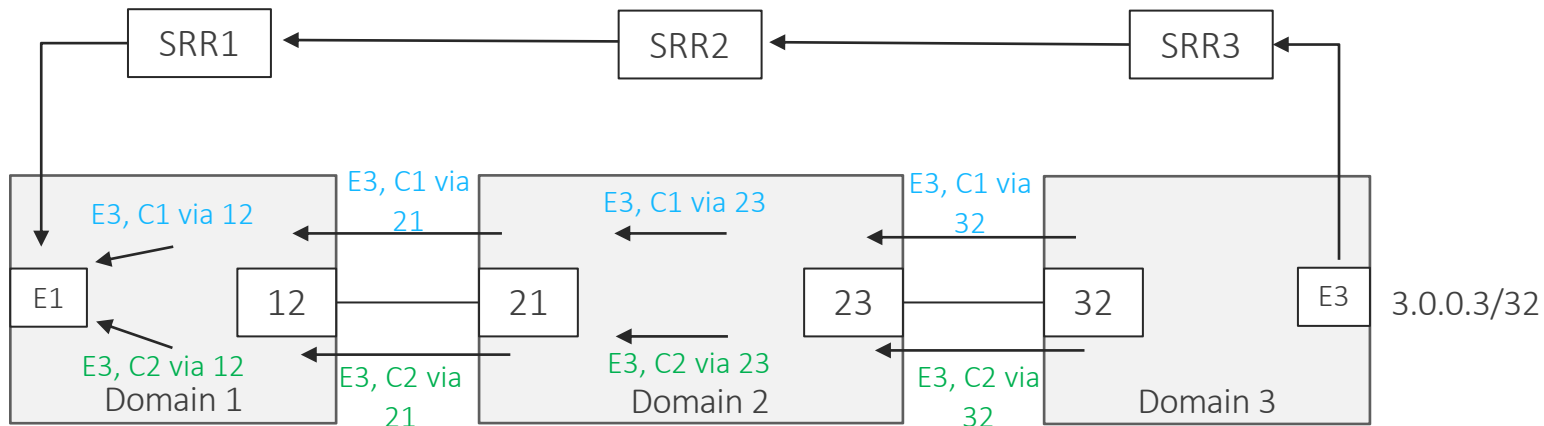


- E3, C1 is a Color-Aware BGP route in underlay that provides intent-aware path to E3

Multiple Intents with BGP Color-Aware Routes

RD:V/v via E3, VPN Label: 30030, Color C1

RD:W/w via E3, VPN Label: 30030, Color C2



Reference Deployment Design

- Well-known MPLS network reference deployment designs:
 - Seamless MPLS
 - Inter-AS option C
- Ultra-large-scale multi-domain network with around 300K nodes
 - Core, Metro, Aggregation, Access layers
- Multiple intents (1 best-effort and 4 intents for example)
 - Low-latency
 - Plane 1 & Plane 2
 - Avoidance (links/nodes/domains – for regulatory, security, quality, etc.)

Types of Intent bound to a Color

- Minimization of different metrics – link cost, latency
 - Minimization of different metric types, static and dynamic
- Exclusion/Inclusion of SRLG and/or Link Affinity
- In the inter-domain context, exclusion/inclusion of entire domains, and border routers
- Minimum MTU / number of hops / MSD
- Bandwidth management, to the extent possible
- Inclusion of one or several virtual network function chains
 - Localization of the virtual network function chains

Focus of Problem Statement Draft

- Crisp, technical analysis of intent use-cases and protocol requirements
- Consistency, co-existence, interworking with deployed SR-Policy based solution
 - Color to drive automated steering
- Widened problem scope
 - Intent-aware VPN service layer
 - NFV Integration

Problem Statement Draft Contd.

- Clarity on deployment requirements
 - E2E paths across domains with different technologies and encapsulations

- Clarity on Scale requirements and constraints
 - Data Plane (MPLS label space / FIB)
 - Control Plane (BGP) Filtering

Collaboration

- Collaboration & review with lead operators, vendors on analysis
 - Acknowledge many contributors in draft
- Recognize prior work
 - Seamless SR/Classful Transport
- Ongoing collaboration effort with SSR co-authors for consensus
 - Reached out through co-authors in Nov/Dec
 - Recognized prior publication on use-cases / illustrations
 - We published problem statement with analytical approach as contribution
 - SSR co-authors acknowledged feedback & split their document
 - Joint discussion progressing well for eventual partnership, new sets of documents

Next Steps

- Request review from Working Group