BGP Color-Aware Routing (CAR)

draft-ietf-idr-car-02

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Context

• Adopted by WG at IETF 114
• Broad multi-vendor support, two interoperable implementations
• Draft updated to address adoption issues, clarifications
• Preparation for WGLC
  – Draft updates
  – Implementation report
Draft Updates - CAR SRv6 support

• Service steering over BGP CAR SRv6 multi-domain paths
  • Cases as per RFC 9252

• Routed Service SID
  • SRv6 Locator or Summary IPv6 prefix reachability via BGP CAR (E)
  • Routable prefixes, IPv6 longest-prefix match forwarding
  • BGP specific or IGP-FlexAlgo shared per-intent locators
  • Advertisement from BRs (redistribution from IGP-FlexAlgo), or from PE

• Non-routed Service SID
  • SR-Policy redistributed into BGP CAR (E, C)
CAR SRv6 Deployment Designs

• Routed SID
  • Use of widely deployed BGP routing designs

  • Hop-by-hop routing based
    • PE, BR and P routers learn and install eBGP CAR SRv6 locator/summary routes
    • No intra-domain encapsulation needed
    • Recursive resolution via IGP-FlexAlgo to eBGP next-hop

  • Encapsulation based (BGP-free core)
    • Only PEs and BRs learn and install eBGP SRv6 locator/summary routes
    • Shared End SID of BGP next-hop provides encapsulation for all BGP SRv6 routes of a given intent

• Non-routed SID
  • Distribution of (E, C) BGP CAR routes to ingress PEs from egress BRs
  • Underlay reachability to egress BRs via locator prefix routes
  • Recursive resolution at ingress PEs to build encapsulation based on SIDs
CAR SRv6 - IPv6 Prefix Route

- New route-type: IP Prefix as key (E)
  - IP Prefix == Intent
  - Routable, installed in IPv6 forwarding table
  - Route processing semantics same as RFC 4271, RFC 2545 (IPv6 Unicast)
  - Consistent CAR semantics for color-aware next-hop/SID selection, resolution, route policies, AIGP
    - Route E2E color carried in LCM-EC
  - Complete reuse of well-known, existing BGP routing and CAR mechanisms

- Use-cases
  - SRv6 locator distribution
  - Best effort transport path (~BGP-LU)
Operational benefits of CAR SAFI for SRv6 locator distribution

• Separate SAFI for infrastructure prefixes
  • Avoids overloading IPv6 Unicast SAFI that carries service (Internet) prefixes

• Automatic separation of routes
  • Avoids need for route filtering policies for separation
  • Enables infrastructure route prioritization
Links

• WG adoption call issues & comments

• Implementation Report
Acknowledgements

• Thanks to collaborators and reviewers for discussion and review comments

• Thanks for the support during WGLC