

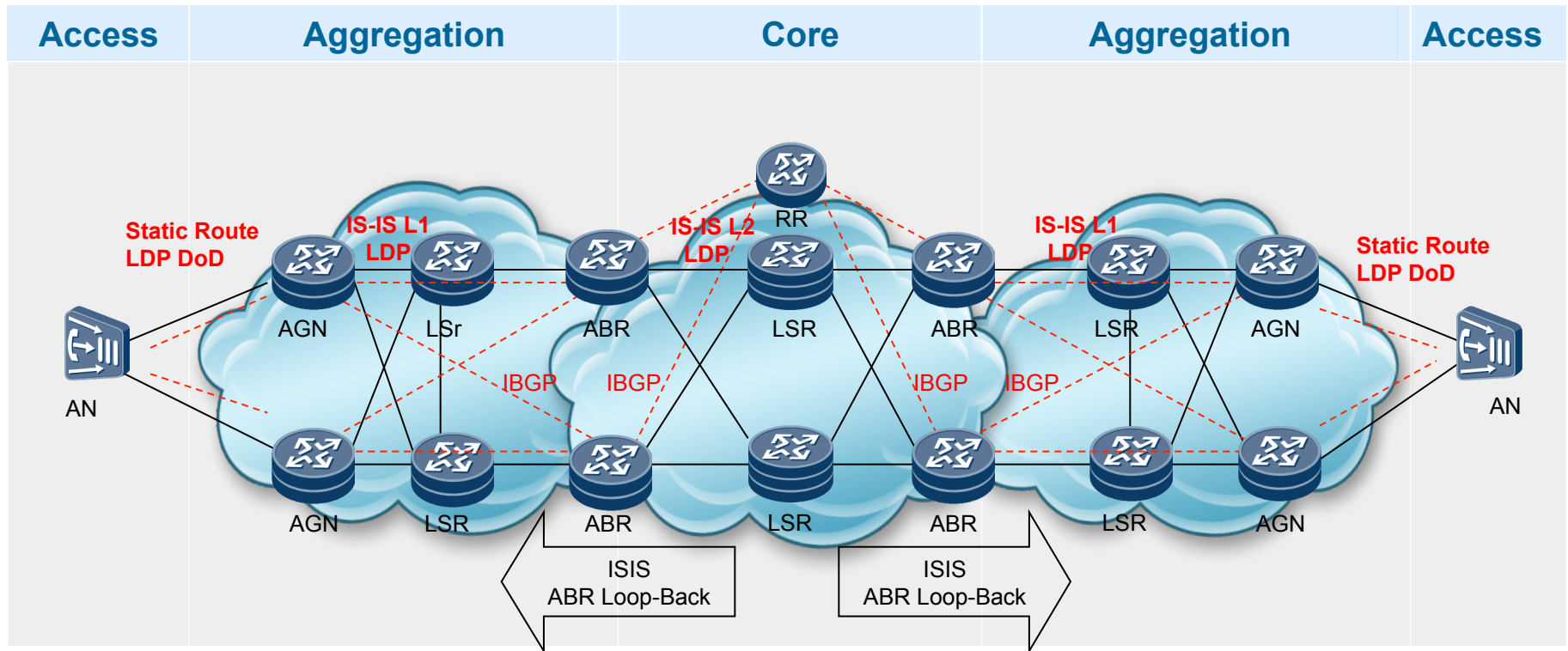
# NEXTHOP\_PATH ATTRIBUTE for BGP

draft-zhang-idr-nexthop-path-attr-00

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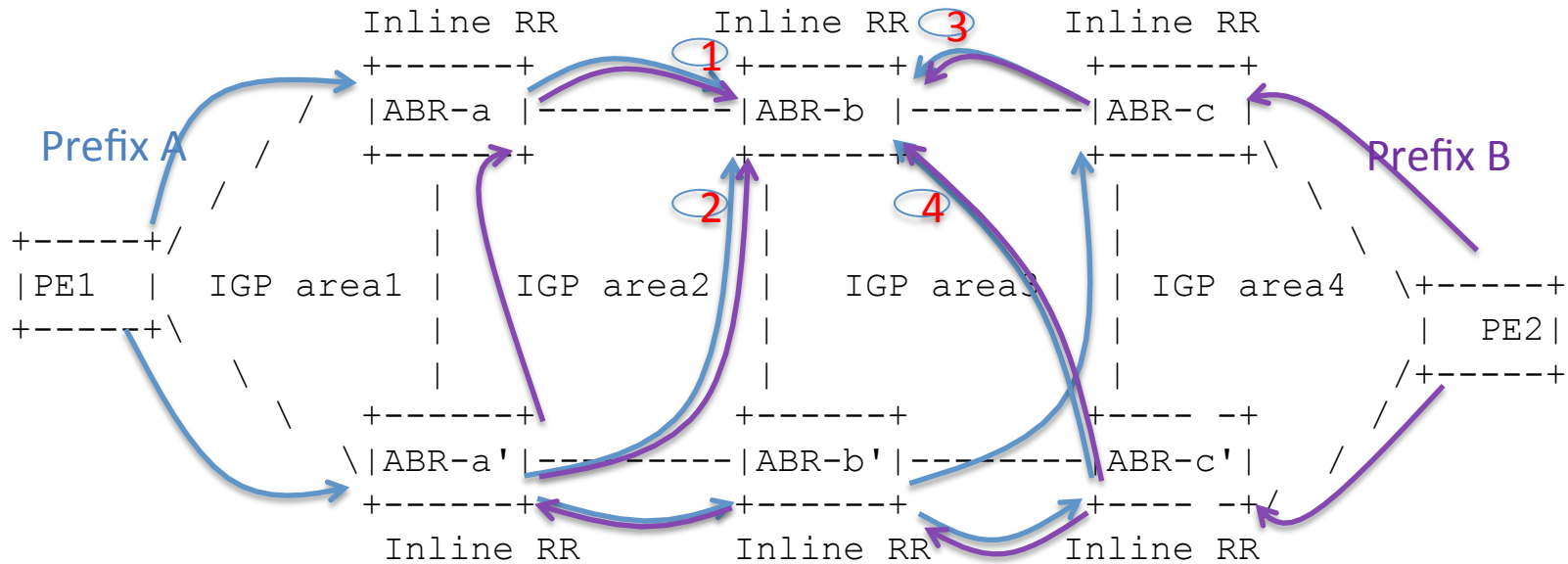
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# Seamless MPLS Network Architecture



- The requirement of the integration of mobile backhaul networks and core/aggregation networks has been proposed
- The network will be divided into multiple IGP areas for access, aggregation and core network
- IBGP run among the Area Border Routers (ABRs)
- BGP ABRs should work as inline RR, which will reflect the route with next hop self (NHF)

# BGP Route Selection Problem



- **Inline RR will reflect the route with next hop self (NHF)**
- **For prefix A, ABR-b should select optimal route with next hop of ABR-a or ABR-a'; while for prefix B, ABR-b should select optimal route with next hop of ABR-c or ABR-c'**
- **To achieve this result, a complex route policy should be predesigned and configured for every peer every prefix**

# BGP NEXTHOP\_PATH ATTRIBUTE Description

## ■ NEXTHOP\_PATH ATTRIBUTE

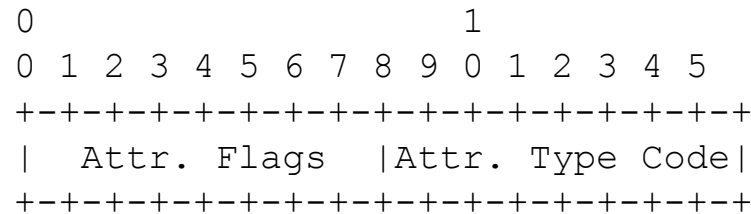
- is an optional transitive BGP Path Attribute
- is composed of a sequence of next hop path segments
- will record the distribution path of a route in Seamless MPLS network by the list of next hop path segment

## ■ Effect of NEXTHOP\_PATH ATTRIBUTE

- for BGP route selection, which can reduce the route policy complexity
- to get the service path in transport network, which will be used for network operation and maintenance

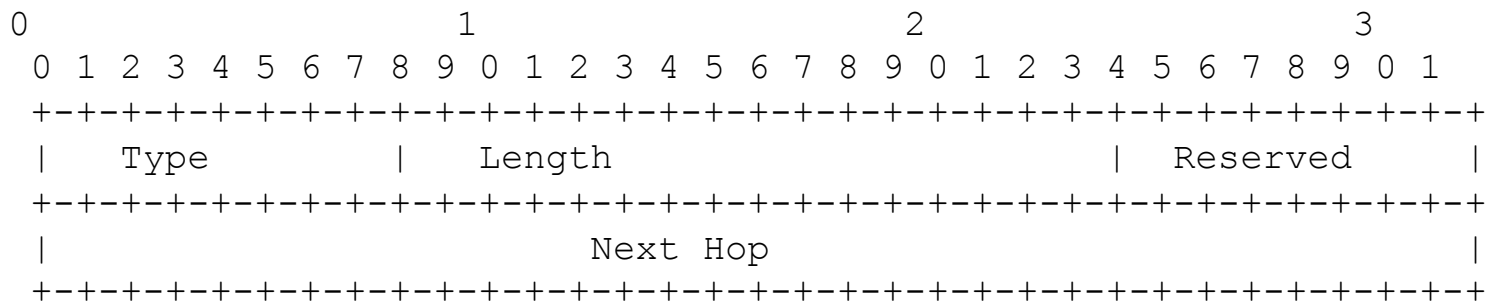
# NEXTHOP\_PATH ATTRIBUTE extension

## ■ NEXTHOP\_PATH ATTRIBUTE



Attr.Flags should be optional transitive  
Attr.Type Code should be allocated by IANA

## ■ Next hop path segment



Next Hop is the route next hop address

# NEXTHOP\_PATH ATTRIBUTE Process in BGP(1)

## ■ Creating and modification process

1. If the route is originated in this BGP speaker
  - If the attribute is supported, the TLV SHOULD be originated including the BGP speaker's own next hop address in a next hop path segment
  - If the attribute is not supported, the route will be distributed without NEXTHOP\_PATH ATTRIBUTE
2. if the route is received from one BGP speaker's UPDATE message
  - If the NEXTHOP\_PATH ATTRIBUTE is NULL and the local BGP speaker support this attribute, when the route is propagated with NHS, the TLV SHOULD be originated including the BGP speaker's own next hop address in a next hop path segment

## NEXTHOP\_PATH ATTRIBUTE Process in BGP(2)

- If the attribute is non-NULL and the local BGP speaker support it, when the route is propagated with (NHS ), the BGP speaker MUST appends its own next hop address as the last one of the next hop path segments.
- If the attribute is NULL and the local BGP speaker support it, when the route is propagated without NHS, the BGP speaker MUST NOT originate the NEXTHOP\_PATH ATTRIBUTE.
- If the attribute is non-NULL and the local BGP speaker it, when the route is propagated without NHS, the BGP speaker MUST NOT change the next hop path sequence.
- If the BGP speaker does not support NEXTHOP\_PATH ATTRIBUTE, it SHOULD keep the NEXTHOP\_PATH ATTRIBUTE unchanged

# NEXTHOP\_PATH ATTRIBUTE Process in BGP(2)

## ■ Decision process

- Next hop path loop detection should be done for scanning the full next hop path
- When the NEXTHOP\_PATH ATTRIBUTE is used for optimal route selection, the priority of this attribute is the same as AS\_PATH ATTRIBUTE
- When the NEXTHOP\_PATH ATTRIBUTE is used for optimal route selection, the route with least next hops should be selected



# Next Steps

- Get feedback on the NEXTHOP\_PATH ATTRIBUTE extension and application
- The procedure for next hop path segment usage for IPv6 or other extensions will be discussed later