Flowspec Path-id Redirect

(draft-vandevelde-idr-flowspec-path-redirect)

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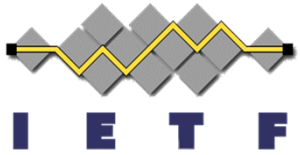


IDR Interim, 26 October 2015
Webex Virtual Meeting

Flowspec Path-id Redirect

- Use-case: Traffic Steering
  - Provide a scalable apparatus to selective steer traffic onto an Tunnel (or Interface)
  - Routing system to propagate Redirect Traffic policies
- Non Use-case: Tunnel Setup signaling
  - No signaling of encapsulations
  - No signaling to setup a tunnel
  - No signaling for tunnel TE operational purpose

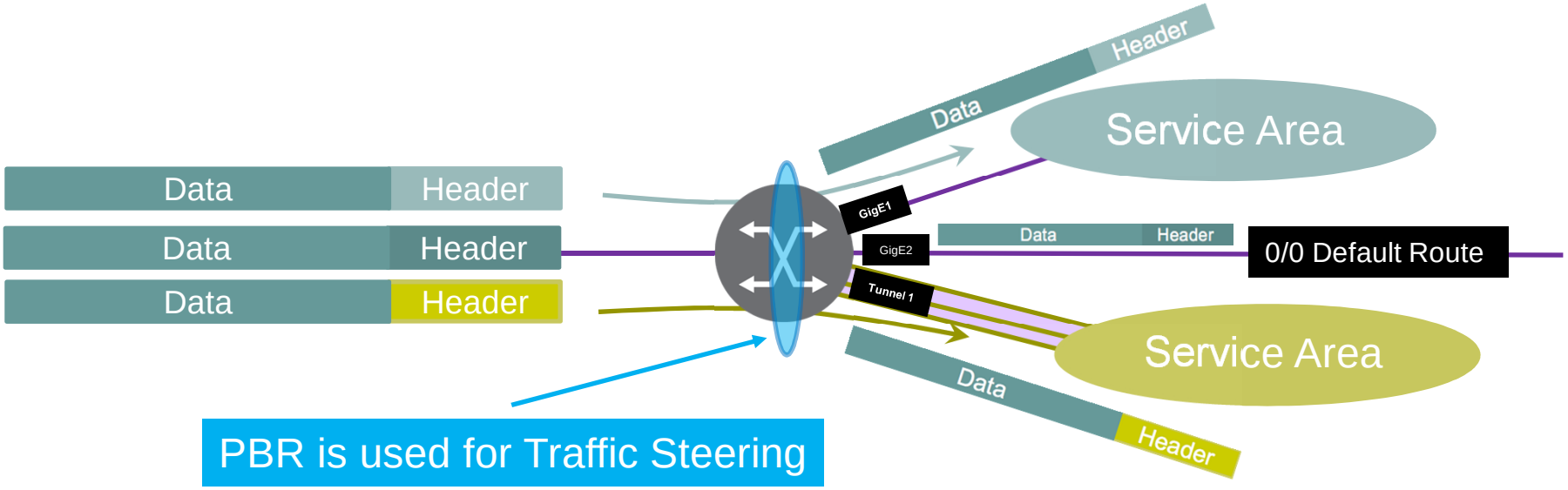
Anatomy of PBR

- Policy Routing has two key components
  - Identify “interesting” traffic
  - instruct what action to do with the “interesting” traffic
    - Actions
      - Traffic Conditioning
        - Policing
        - Shaping
        - DSCP/Precedence rewrite
      - Traffic Steering
        - Redirect to VRF, Interface, VLAN, next-hop, etc

Path_ID Redirect Focus

  - Note that PBR is NOT used to initiate/create/setup Tunnels

Anatomy of PBR (Cont.)

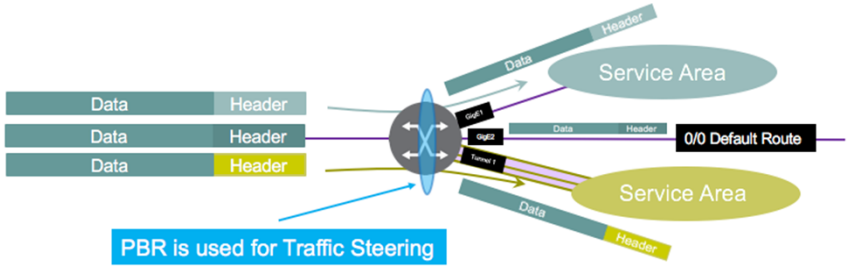


PBR rule contains Traffic Steering information

Interface, VLAN, Tunnel (RSVP-TE, SR-TE, LDP, …)

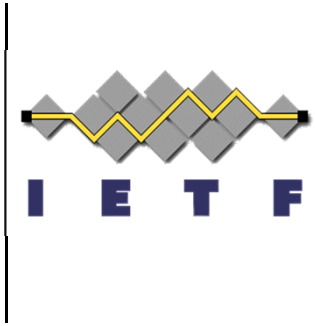
Introduction to PATH_ID

- In the example traffic is redirected to different types of Interface (GigE and Tunnel)



- There be dragons – there is complexity
  - Redirection interface tends to be a router local decision
  - PBR Redirection Interface to facilitate a network service most likely different per router (driven by router diversity, card-type, chassis, etc)
  - A tunnel is setup between head- and tail-end and hence uniquely signaled per router
  - When using traditional PBR, it is assumed that Tunnels are up and running before the PBR rule becomes active (This behavior should be replicated)
  - Misconfiguration of PBR could result in dramatic traffic forwarding issues

Introduction to PATH_ID (Cont.)

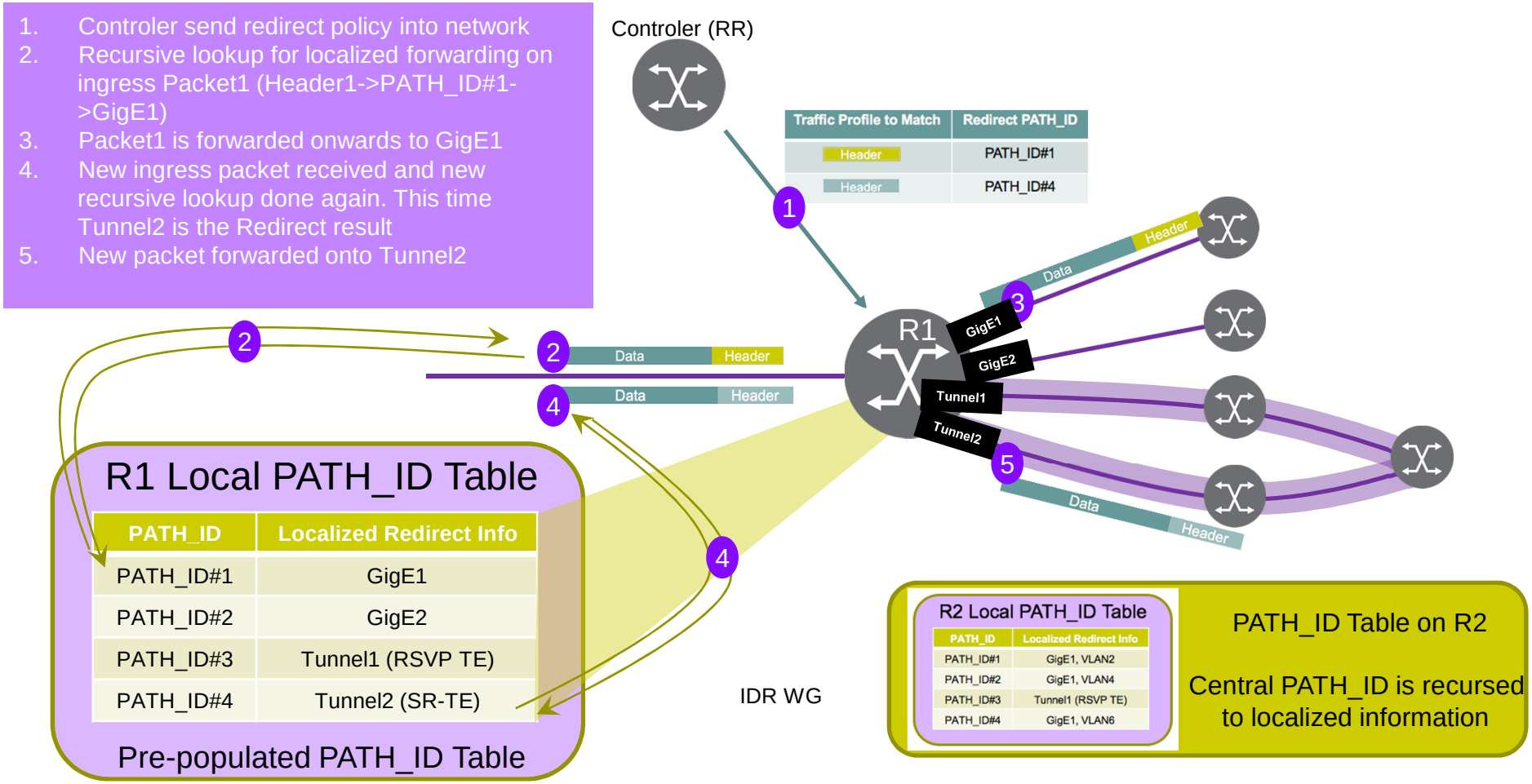


- The Noble PATH_ID Goal
  - Have a central controller send out a single unique network wide redirection policy
- Question: Can it be done by a central controller?

  (i.e. Controller (i.e. RR) sends network wide a single blur of Redirect information using BGP)
  - Type-1: Router localized recursion is possible
    - If redirection is an IP Next Hop or a redirect VPN then router can use localized recursion to discover the localized egress interface/encapsulation
  - Type-2: Router localized recursion is NOT possible
    - ~~Non-solution: configure all routers with same interfaces and tunnels~~😊
    - Solution: Create abstraction "PATH_ID" to have router localized recursion from a single unique network wide identifier to localized ingress interface/encapsulation
    - i.e.
      - Router receives redirection to PATH_ID#1 then traffic is redirected to GigE1
      - Router receives redirection to PATH_ID#2 then traffic is redirected to GigE2
      - Router receives redirection to PATH_ID#3 then traffic is redirected to Tunnel1
- Creation of Local PATH_ID to Interface/encap recursion Table?
  - Manual configuration
  - Use identifiers which already exist (PCE PLSP-ID, etc..)
  - Orchestration
  - Extensions to existing protocols

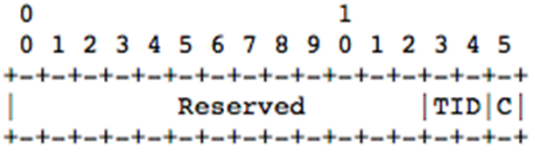
Introduction to PATH_ID

1. Controler send redirect policy into network
2. Recursive lookup for localized forwarding on ingress Packet1 (Header1->PATH_ID#1->GigE1)
3. Packet1 is forwarded onwards to GigE1
4. New ingress packet received and new recursive lookup done again. This time Tunnel2 is the Redirect result
5. New packet forwarded onto Tunnel2



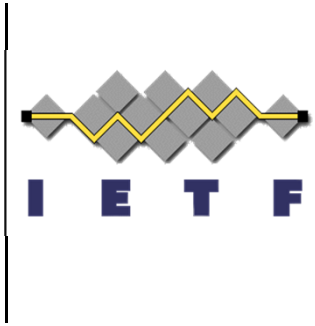
Details: Flowspec Redirect-to-PATH_ID

- New Flowspec Traffic Action Community
- PATH_ID is either 32 or 128 bit identifier
- Assumption
  - Router has PATH_ID table pre-populated
  - Population of this table is outside the scope of Flowspec Redirect-to-PATH_ID (work for RTGWG?)
  - Each PATH_ID is network wide unique and represents a Redirect Service identifier
- PATH_ID structure

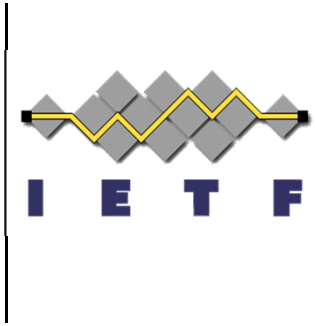


  - PATH_ID is 32 or 128 bit value
  - C-bit (1 bit): copy original packet onto the Re-direct
  - TID (2 bit): support for nested redirects (i.e. SR Segments) or Multi-path functions
- PATH_ID decouples the Redirection Service from Redirection Interface/Encapsulation
- Note: PATH_ID could also be seen as Superset of Redirect-to-IP where Path_ID has additional context as IP address (in this case PATH_ID table and Redirect IP address are the same)

Looking at WG questions



- Difference with other flowspec redirect-to-tunnel drafts?
  - This draft does not signal tunnel setup information unlike other proposals
- Purpose of TID: nested tunnels, Multi-Path, push SR segments
- If the PATH_ID is down/non-exist in the PATH_ID Table
  - If the next-hop or interface is down, then just like PBR behaviour the rule is not applied on the router. No difference with PBR behaviour from this perspective
- PATH_ID Table questions
  - Construction is outside scope
  - It could be populated CLI, Netconf/Yang, protocol extensions, etc.. (see before)
- Difference between Redirect-to-IP and Redirect-to-PATH_ID is small
  - Redirect-to-PATH_ID is indeed superset of Redirect-to-IP (in Redirect-to-ip the 32/128 bit number has IP address context corelated)
- Tunnel Setup Questions
  - Tunnel Setup is outside scope of this draft



THANK YOU!