IDR WG
IETF 102

Susan Hares and John Scudder

IDR Co-chairs

Jie Dong (WG Secretary)

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•BCP 54 (Code of Conduct)
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•BCP 79 (Patents, Participation)
•https://www.ietf.org/privacy-policy/ (Privacy Policy)

Thursday (18:10-19:10pm)

0) Agenda bashing (5)

1) Update on merger of RLP and eOTC drafts for route leaks solution [Kotikalapudi Sriram] (8)
draft-ietf-idr-route-leak-detection-mitigation (solution)/
draft-sriram-idr-route-leak-solution-discussion-00 (design discussion)

2) BGP Model for Service Provider Networks [Keyur Patel] (8)
draft-ietf-idr-bgp-model/

3) BGP Extra Extended Community [Jakob Heitz] (8)
draft-heitz-idr-extra-extended-community/

4) BGP Neighbor Autodiscovery [Ketan Talaulikar] (8)
https://tools.ietf.org/html/draft-xu-idr-neighbor-autodiscovery/

5) Requirements for BGP Neighbor Autodiscovery (15)
[Randy Bush] provides LSVR [8]
Discussion [7]

Route leaks solution

- Open questions about semantics, syntax
- Semantics - Space/Information Trade-off
  - Design A – Design option A
  - Design B – Design Option B
  - Sriram's talk. Chairs believe we are close.
- Syntax – Attribute or Community?
  - Option 1: Proceed with Attribute Approach
  - Option 2: Use (Large) Community Approach
  - Needs development.

Autodiscovery

- Multiple proposals in multiple groups
  - Overlapping functionality
  - Ranging from minimal to maximal
- Clear to chairs that
  - The WG has great interest in the topic
  - There is no consensus on the requirements
- Ideally chairs would have prepared a full comparison of all proposals
  - It’s an imperfect world, we’re going with what we have today
  - Possible interim

BGP Data Model

- NMDA is requirement for all new Models
  - draft-idr-bgp-model-03.txt – is NMDA
  - Replaces the old model
- Going to WG LC at end of today's meeting
- Original draft
  - Authors may publish as historical work product, but little interest

Session II: Friday, 11:50-13:20, 7/20/2018

- 0) Agenda bashing and Chair's slides (10)

- 1) LOCAL_PREF Overloaded = Overwritten [Alexander Azimov] (5)

  2) Updates to BGP Signaled SR Policies [Dhanendra Jain] (8)
  draft-ietf-idr-segment-routing-te-policy

- 3) YANG data model for BGP Segment Routing Extensions [Dhanendra Jain] (8)
  draft-dhjain-spring-bgp-sr-yang

  4) BGP-LS Extend for Inter-AS Topology Retrieval [Aijun Wang] (10)
  draft-wang-idr-bgpls-inter-as-topology-ext

  5) Distribution of Traffic Engineering (TE) Policies and State using BGP-LS [Ketan Talaulikar] (10)
  draft-ietf-idr-te-lsp-distribution

Session II: Friday, 11:50-13:20, 7/20/2018

6) Flexible Algorithm Definition Advertisement with BGP Link-State
[Ketan Talaulikar] (5)
draft-ketant-idr-bgp-ls-flex-algo

BGP Link-State Extensions for Seamless BFD [Ketan Talaulikar]
draft-li-idr-bgp-ls-sbfd-extensions/

7) Applying BGP flowspec rules on a specific interface set [Jeff Haas] (5)
draft-ietf-idr-flowspec-interfaceset/

8) Segment Routing Policies for Path Segment and Bi-directional Path [Cheng Li] (15)
draft-li-idr-sr-policy-path-segment-distribution/

SR Policies for Path Segment and Bi-directional Path in BGP-LS [Cheng Li]
draft-li-idr-bgp-ls-sr-policy-path-segment/

9) BGP-LS Extensions for Advertising Path MTU [Zhibo Hu] (10)
draft-zhu-idr-bgp-ls-path-mtu/

See you at IETF 103

IDR Chair
Document Status Slides
IETF 102

Susan Hares and John Scudder

(co-chairs)

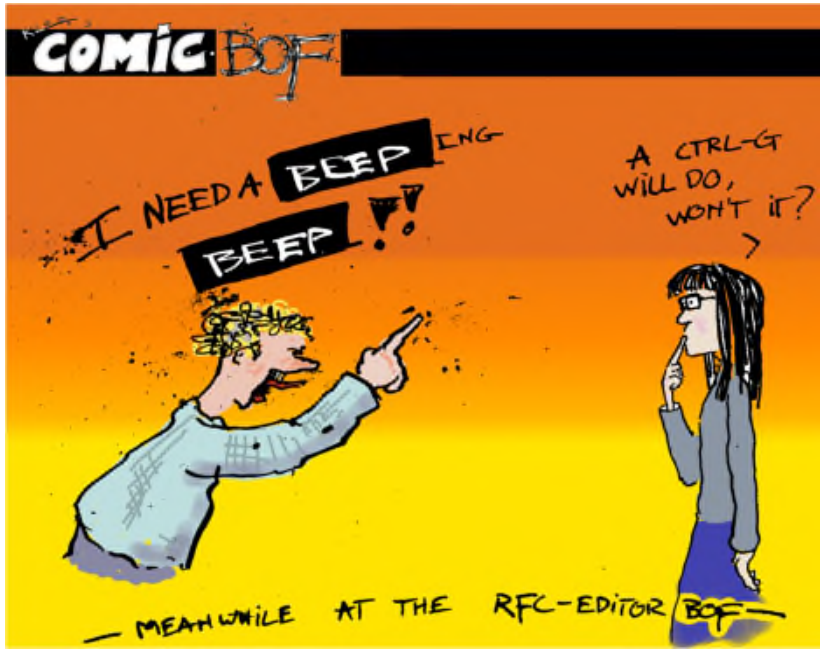
Jie Dong (WG Secretary)

Chairs found life was the

Thank you For your Patience … Still working to catch up

Drafts at RFC Editor

- draft-ietf-bgp-gr-notification
- draft-idr-prefix-sid-27



Past WG LC + 2 implementations

- Draft-ietf-bgpls-segment-routing-epe
- Draft-ietf-bgp-ls-segment-routing-ext
- draft-ietf-idr-rfc5575bis-04
- Draft-ietf-idr-tunnel-encaps-07.txt
  - partial reports, need better reports
- Draft-ietf-idr-bgp-optimal-route-reflection

After WG LC

Lots of work to finish RFC

Needing 2 implementations

- draft-ietf-idr-bgp-ls-node-admin-tag-extensions
- draft-ietf-idr-te-pm-bgp
- Draft-ietf-rtc-no-rtc
- draft-ietf-rs-bfd-05

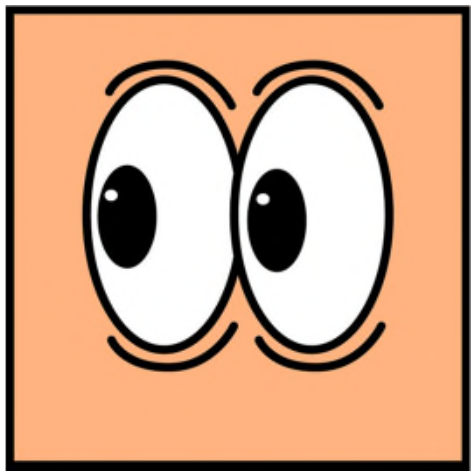
Implementations needed

Upcoming WG LC

- draft-ietf-idr-flowspec-interfaceset
  - IPR Call in process (John Scudder)
- draft-ietf-bgp-model-03.txt
  - IPR call in process (Sue Hares)
  - NMDA replacement for earlier model
  - Old model not NMDA compliant

Special mentions

- Route-leak/Open policy
  - See discussion in WG
- Extended Messages
- Flow specification drafts
- BGP-LS*
- BGP-* for segment routing
- Operator drafts



Extended messages

- draft-ietf-idr-bgp-extended-messages-22
  - WG Chairs think useful draft
- Last Working Group call
  - Everyone had implementation comments
  - Need to revise implementations
  - Shall we try WG LC – 1 MT

Flow Specification

- **draft-ietf-idr-rfc5575bis-04**
  - WG consensus wanted minimal upgrade, did not want to include v6
  - authors addressing latest review comments (7/14/2018)

Shall we include in a combined draft?

- draft-ietf-idr-flow-spec-v6.txt
- draft-ietf-idr-bgp-flowspec-oid-06.txt
- draft-flow-spec-interfaceset-04.txt

Flow Specification drafts

Any implementations?

- draft-ietf-idr-flowspec-l2vpn-08
- draft-ietf-flowspec-nv03-02
- draft-ietf-idr-flowspec-path-redirect-06
- draft-ietf-idr-flowspec-mpls-match

BGP-LS WG LC?

- Draft-ietf-idr-segment-routing-te-policy
- Draft-ietf-idr-bgp-ls-segment-routing-rld

Operator drafts

- draft-ietf-idr-rfc8203bis-00 – Shutdown BIS

LOCAL_PREF Overloaded = Overwritten

Alexander Azimov

aa@qrator.net

How LOCAL_PREF is set?

- Using route maps – set pref = #VALUE;
- Using GRSH – set pref = 0;
- Default policy (leak detection) – set pref = 0;
- Another bright idea…

Surprise, but 0 isn’t a reserved number!

Order does matter!

How LOCAL_PREF is set?

- Using route maps – routing policy;
- Using GRSH – backup route;
- Default policy (leak detection) – invalid route;

Why do we comparing different types of routes?

Hypothesis: Route Type

Invalid < Backup < Valid

IETF 102 – Montreal
July 2018
IDR Working Group

Advertising Segment Routing Policies in BGP

draft-ietf-idr-segment-routing-te-policy-04

Dhanendra Jain on behalf of

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Agenda

- Share updates with the WG
  - Last update was presented at IETF-98
  - Latest update submitted as revision 04 prior to IETF-102
  - https://tools.ietf.org/html/draft-ietf-idr-segment-routing-te-policy-04
- Collect feedback/comments from the WG

Introduction

- This draft defines signaling of Segment Routing Policies via BGP protocol
- BGP Signals a Candidate Path of a given SR Policy
- A new SAFI (SR-Policy, code 73) is defined in this draft
  - Identification of the SR Policy is encoded in NLRI bits
  - Details of the SR Policy Candidate Path are encoded in the SR Policy TLV within Tunnel Encapsulation attribute
- Defines extensions to the Color Extended Community to achieve Automatic Steering

```
SR Policy SAFI NLRI:
<Distinguisher, Policy-Color,
Endpoint>

Attributes:
Tunnel Encaps Attribute (23)
 Tunnel Type (15): SR Policy
  Binding SID
  Preference
  Priority
  Policy Name
  Explicit NULL Label Policy (ENLP)
  Segment List
     Weight
     Segment
     Segment
       ...
       ...
```

Summary of Updates

- Updates to the Segment Types
  - Correction in SID type 3 and 8 definitions
  - Addition of segment 9, 10, 11 to cover SRv6 segments
- Addition of new sub-TLVs
  - SR Policy Symbolic name sub-TLV
  - SR Policy Priority sub-TLV
  - ENLP sub-TLV
- Addition of SR Flex Algorithm specification in Segment Type sub-TLV
  - Type 3, 8 refer to the Segments with IP Prefix
  - Head-end calculates the SR SID corresponding to the prefix
  - Addition of SR Algorithm ID to indicate Head-End to calculate the Flex-Algo SID
- Addition of new flags in Segment Type sub-TLV
  - V-Flag : Enable Verification of the SID supplied by the controller
  - A-Flag: Enable SR Algorithm
- Addition of new flags to Binding SID
  - S-Flag : “specified-BSID-only” behavior
  - I-Flag: “Drop upon Invalid” behavior
- Other updates

```
SR Policy SAFI NLRI:
<Distinguisher, Policy-Color, Endpoint>

Attributes:
Tunnel Encaps Attribute (23)
 Tunnel Type (15): SR Policy
  Binding SID
  Preference
  Priority
  Policy Name
  Explicit NULL Label Policy (ENLP)
  Segment List
     Weight
     Segment
     Segment
       ...
       ...
```

Other updates

- Next-Hop address length specification to cover IPv4 or IPv6 next-hop in both SAFIs
- Defaults for Policy Preference, Weight parameters
- Updates to align terminology and the section references post WG adoption of SR Policy Architecture doc
  - https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01
  - https://tools.ietf.org/html/draft-filsfils-spring-sr-policy-considerations-01
- Updates to the Error handling text in few sections
  - Malformed sub-TLVs
  - Duplicate sub-TLVs
  - Clarification on Mandatory and optional sub-TLVs
- Editorial corrections

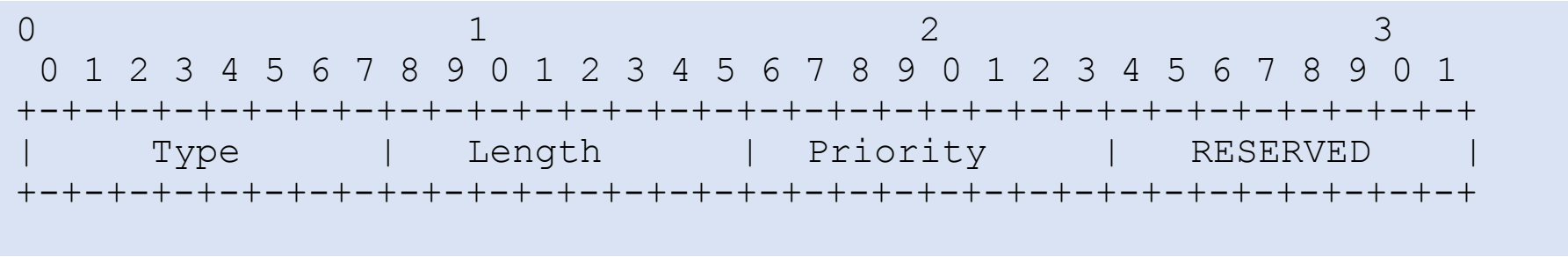
Next Steps

- Address any comments
- IANA code points assignments for newly defined sub-TLVs and Flags
- Request for WGLC subsequently

Backup (sub-TLV details)

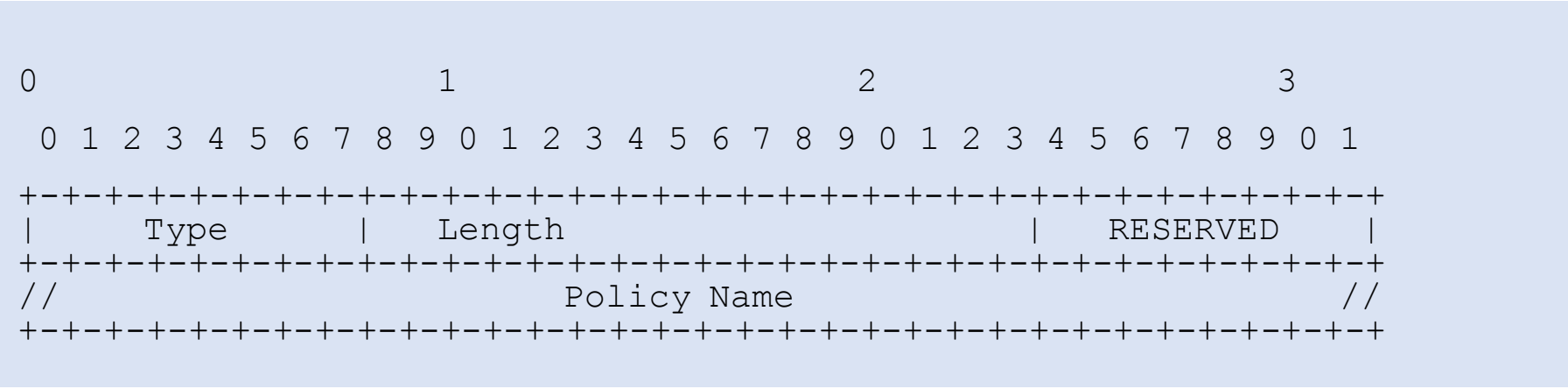
New Sub-TLVs (Policy Priority)

- Policy Priority sub-TLV
- An operator MAY set the Policy Priority sub-TLV to indicate the order in which the SR policies are re-computed upon topological change
- Reference - section 2 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



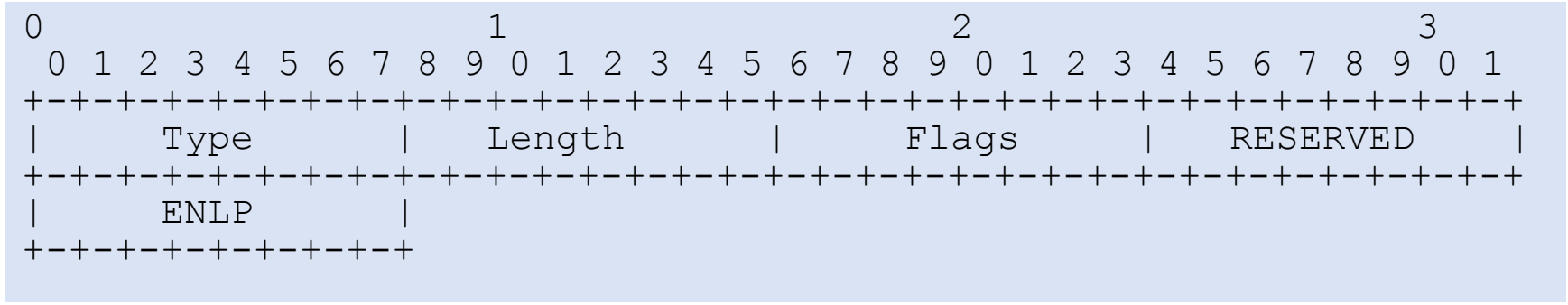
New Sub-TLVs (Policy Name)

- Policy Name sub-TLV
- An operator MAY set the Policy Name sub-TLV to attach a symbolic name to the SR Policy candidate path
- Reference - section 2 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



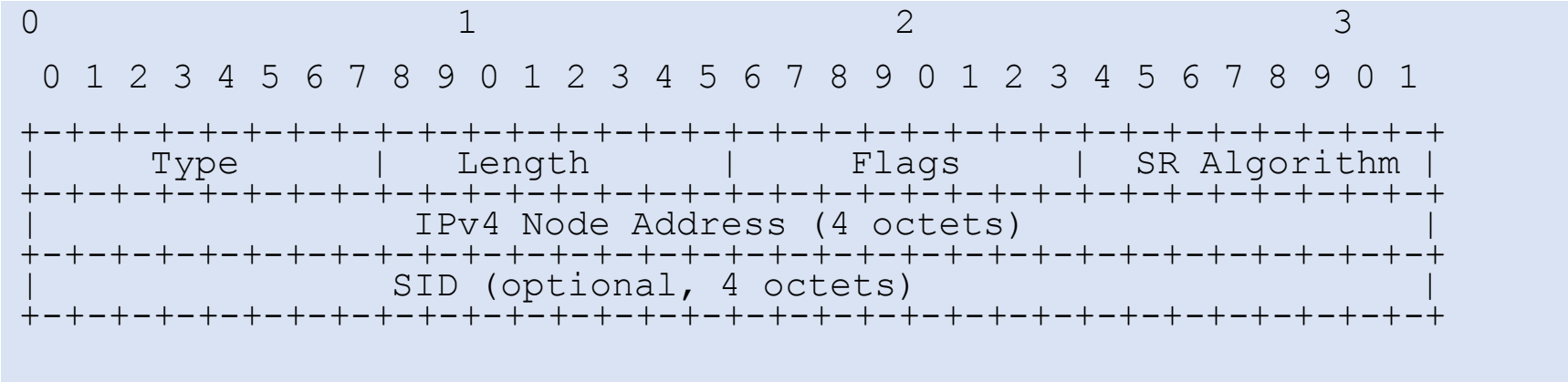
New Sub-TLVs (ENLP)

- Explicit Null Label Policy (ENLP) sub-TLV
- An operator MAY set the ENLP sub-TLV to indicate whether an Explicit NULL Label [RFC3032] must be pushed on an unlabeled IP packet before any other labels
- Reference - section 4 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



SR Algorithm

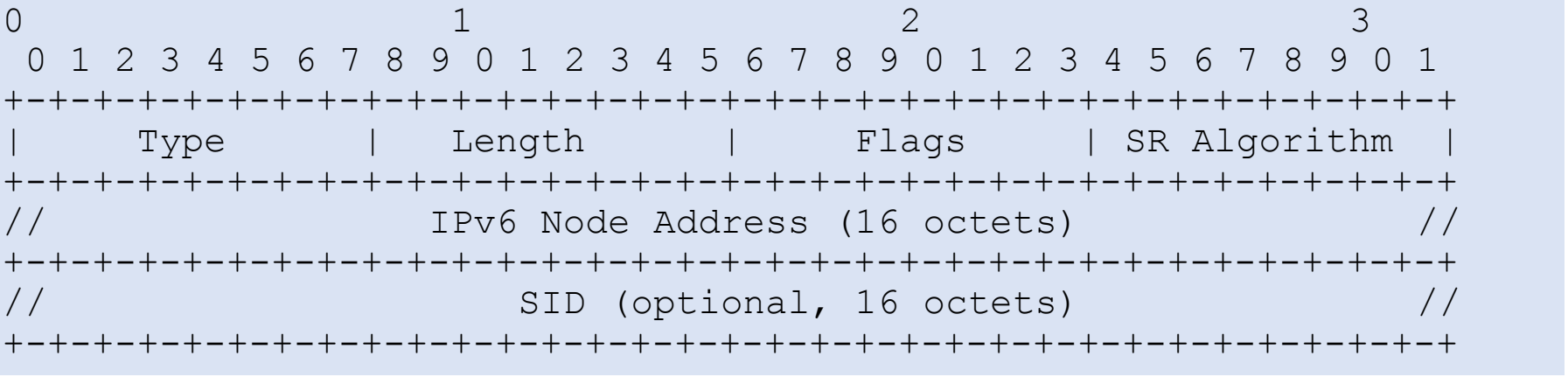
- SR Flex Algorithm Flag (A-Flag)
- An operator MAY signal this flag with the Segment Type and supply a SR Algorithm ID.
- Reference - section 4 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



New Segments

- Type 9: IPv6 Node Address with optional SID for SRv6
- Type 10: IPv6 Address + index for local and remote pair with optional SID for SRv6
- Type 11: IPv6 Local and Remote addresses for SRv6
- Reference - section 4 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01

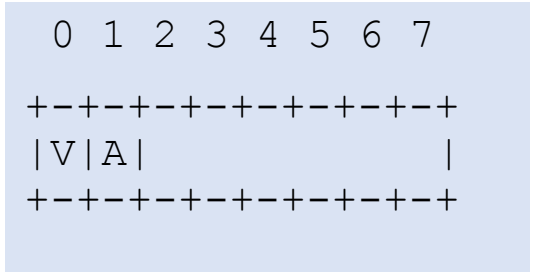
Type 9:



Segment Flags

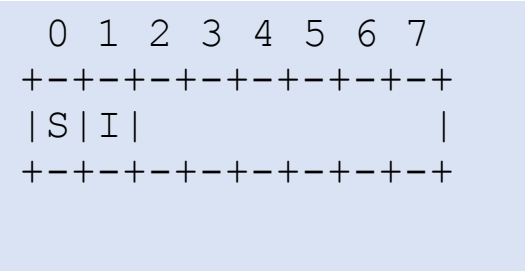
- Segment Flags encode the per Segment behavior
- V-Flag : Segment Verification is performed on Head-end
  - Reference - section 5 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01

- A-Flag: SR Flex Algorithm is used for SID calculation
  - Reference - section 4 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



Binding SID Flags

- S-Flag : Enable “Specified-BSID-only” behavior on Head-End
  - Reference - section 6 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01
- I-Flag: Enable “Drop Upon Invalid” behavior on Head-End
  - Reference - section 8 in https://tools.ietf.org/html/draft-ietf-spring-segment-routing-policy-01



IETF 102 – Montreal
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SPRING Working Group

BGP Segment Routing Yang Model

https://tools.ietf.org/html/draft-dhjain-spring-bgp-sr-yang-00

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Presenter : Dhanendra Jain

Introduction

- BGP Segment Routing (SR) YANG data model can be used to configure and manage Segment Routing extensions in BGP
- 00 version submitted prior to IETF-102
  - https://tools.ietf.org/html/draft-dhjain-spring-bgp-sr-yang-00
- This Yang model covers following SR extensions in BGP
  - Prefix Sid extensions in the context of SR MPLS, as described in [I-D.ietf-idr-bgp-prefix-sid]
  - Egress Peer Engineering (EPE) as described in [I-D.ietf-spring- segment-routing-central-epe]
  - BGP Signaled SR Policy as described in [I-D.ietf-idr-segment-routing-te-policy]
  - Automatic Steering as described in [I-D.ietf-spring-segment-routing-policy] and [I-D.ietf-idr-segment-routing-te-policy]
  - SRv6 VPN extensions as described in [I-D.draft-dawra-idr- srv6-vpn]
- This model will be evolved to cover remaining SR extensions in subsequent revisions

BGP SR Yang Model

- This model augments base BGP model defined in [I-D.ietf-idr-bgp-model]
- The model complies with the Network Management Datastore Architecture (NMDA) [RFC8342].
- Imports common Routing Yang data types from [RFC8294]
- Expected to import/augment SR specific common elements from
  - Base SR Yang model
  - Base SR Policy Yang model
  - Base SRv6 Yang model

SR Prefix SID

- Prefix SID attribute in BGP in the context of SR MPLS, carries the label index and SRGB block information
- The configuration to attach the label index is modeled as a new route-policy set action
- Per BGP route Prefix SID attribute state is modeled under BGP AF mode for select address families

```
module: ietf-bgp-sr
augment /rpol:routing-policy/rpol:policy-definitions/rpol:policy-definition +
        /rpol:statements/rpol:statement/rpol:actions/bgp-pol:bgp-actions:
    +--rw set-label-index?   Uint32


augment /bgp:bgp/bgp:global/bgp:afi-safis/bgp:afi-safi/bgp:ipv4-labeled-unicast:
    +--ro routes
       +--ro route* [prefix neighbor add-path-id]
          +--ro prefix                inet:ip-prefix
          +--ro neighbor              inet:ip-address
          +--ro add-path-id           uint32
          +--ro prefix-sid
          |  +--ro label-index?       Uint32
          |  +--ro originator-srgb
          |     +--ro srgb-ranges* [srgb-min srgb-max]
          |        +--ro srgb-min    rt-types:mpls-label
          |        +--ro srgb-max    rt-types:mpls-label
```

Egress Peer Engineering

- The configuration and state for the EPE parameters is modeled by augmenting the neighbor container defined in the base BGP model [I-D.ietf-idr-bgp-model]
- Peer node SID, Peer adjacency SID and Peer set SID
- Static and dynamic EPE SID configuration
- FRR backup policy and backup SID specification

```
module: ietf-bgp-sr
augment /bgp:bgp/bgp:neighbors/bgp:neighbor:
+--rw egress-peer-engineering
  +--rw sid-allocation-type?   enumeration
  +--rw explicit-sid?          sid-type
  +--ro allocated-sid?         sid-type
  +--rw peer-set-name?         string
  +--rw backup
  |  +--ro active?         boolean
  |  +--rw backup-type?    enumeration
  |  +--rw backup-peer?    inet:ip-address
  |  +--rw backup-sid?     sid-type
  +--rw peer-adjacency* [first-hop-ipaddress]
     +--rw first-hop-ipaddress    inet:ip-address
     +--ro first-hop-interface?   string
     +--rw sid-allocation-type?   enumeration
     +--rw explicit-sid?          sid-type
     +--ro allocated-sid?         sid-type
     +--rw backup                +--ro active?
boolean
     +--rw backup-type?   enumeration
     +--rw backup-peer?   inet:ip-address
     +--rw backup-sid?    sid-type
```

SR Policies

- SR Policies configuration and state data in the context of BGP
  - Addition of two AF identities corresponding to IPv4 SR-policy and IPv6 SR-policy
  - BGP Signaled SR Policy Explicit Candidate paths
  - On Demand SR Policy Candidate paths triggered by BGP
  - SR Policy state in the context of BGP

SR Explicit Policies

- SR Explicit Policies refer to BGP Signaled SR Policy Candidate paths
- Signaled via BGP within SR Policy SAFI
- This is modeled by adding SR Policy address family specific container under generic BGP afi-safi list

```
module:ietf-bgp-sr

 augment /bgp:bgp/bgp:global/bgp:afi-safis/bgp:afi-safi:
       +--rw ipv4-srpolicy
          +--ro explicit-policies
             +--ro sr-policy* [distinguisher color endpoint]
                +--ro distinguisher           uint32
                +--ro color                   uint32
                +--ro endpoint                inet:ip-address
                +--ro preference?             Uint32
                +--ro explicit-binding-sid
                |  +--ro binding-sid?       sid-type
                |  +--ro strict?            Boolean
                |  +--ro drop-on-invalid?   Boolean
                +--ro usable?                 Boolean
                +--ro registered?             boolean
```

SR ODN Policies

- There are two parts to the On Demand Policies in the context of BGP.
  - A set of authorized SR Policy Colors for On Demand Policy triggers
  - The actual instantiated candidate paths per BGP next-hop.
- New containers and lists are added under BGP global mode to model this information

```
augment /bgp:bgp/bgp:global:
       +--rw segment-routing
          +--rw on-demand-policies
          |  +--ro authorized-colors
          |  |  +--ro colors* [color]
          |  |     +--ro color    uint32
          |  +--ro installed-policies
          |     +--ro sr-policy* [color end-point]
          |        +--ro color        uint32
          |        +--ro end-point    inet:ip-address
```

SR Policy State and Automatic Steering

- SR Policy state in BGP (regardless of method of instantiation of SR Policy)
- Automatic Steering (AS) refers to the ability to forward traffic over a SR Policy on the head-end
- Automatic Steering is modeled as state information per BGP path

```
module: ietf-bgp-sr
augment /bgp:bgp/bgp:global:
       +--rw segment-routing
          +--ro policy-state
             +--ro sr-policy* [color end-point]
                +--ro color                uint32
                +--ro end-point            inet:ip-address
                +--ro policy-state?        Enumeration
                +--ro binding-sid?         sid-type
                +--ro steering-disabled?   Empty
                +--ro ref-count?           Uint32

augment /bgp:bgp/bgp:global/bgp:afi-safis/bgp:afi-safi/bgp:ipv4-unicast:
    +--ro routes
       +--ro route* [prefix neighbor add-path-id]
          +--ro prefix                union
          +--ro neighbor              inet:ip-address
          +--ro add-path-id           uint32
          +--ro automatic-steering
          |  +--ro color?         -> /bgp:bgp/global/bgp-sr:segment-routing/policy-state/sr-policy/color
          |  +--ro end-point?     -> /bgp:bgp/global/bgp-sr:segment-routing/policy-state/sr-policy/end-point
          |  +--ro co-flag?       Enumeration
          |  +--ro binding-sid?   -> /bgp:bgp/global/bgp-sr:segment-routing/policy-state/sr-policy/binding-sid
```

SRv6 extensions

- SRv6 extensions for BGP refer to VPN programming as described in
  - [I-D.draft-dawra-idr-srv6-vpn]
  - [I-D.draft-filsfils-spring-srv6-network-programming]
- SRv6 SID allocation mode
- SRv6 SID state per route

```
module: ietf-bgp-sr
  augment /bgp:bgp/bgp:global/bgp:afi-safis/bgp:afi-safi/bgp:ipv4-unicast:
    +--rw segment-routing
       +--rw srv6
          +--rw sid-alloc-mode?   Enumeration


 augment /bgp:bgp/bgp:global/bgp:afi-safis/bgp:afi-safi/bgp:l3vpn-ipv4-unicast:
    +--ro routes
       +--ro route* [rd prefix neighbor add-path-id]
          +--ro rd                    rt-types:route-distinguisher
          +--ro prefix                union
          +--ro neighbor              inet:ip-address
          +--ro add-path-id           uint32
          +--ro srv6
             +--ro received-sids* [received-sid]
             |  +--ro received-sid    srv6-types:srv6-sid
             +--ro local-sids* [local-sid]
                +--ro local-sid    srv6-types:srv6-sid
                +--ro locator?     string
```

Next Steps

- Submit new revision with TBDs taken care of
- Discussion on dependencies on base BGP yang model.
- Request detailed review

BGP-LS extension

for inter-as topology retrieval

draft-wang-idr-bgpls-inter-as-topology-ext

Aijun Wang

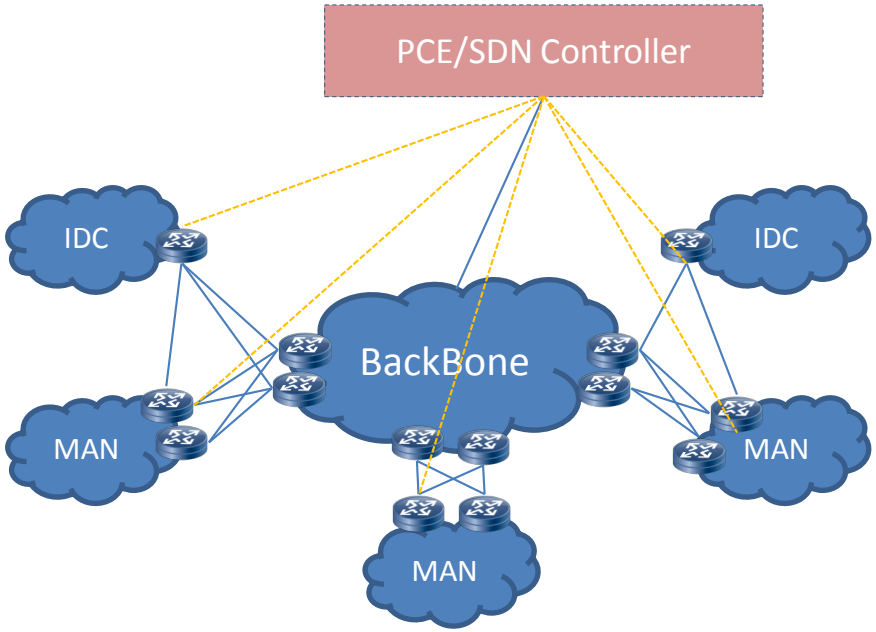
China Telecom

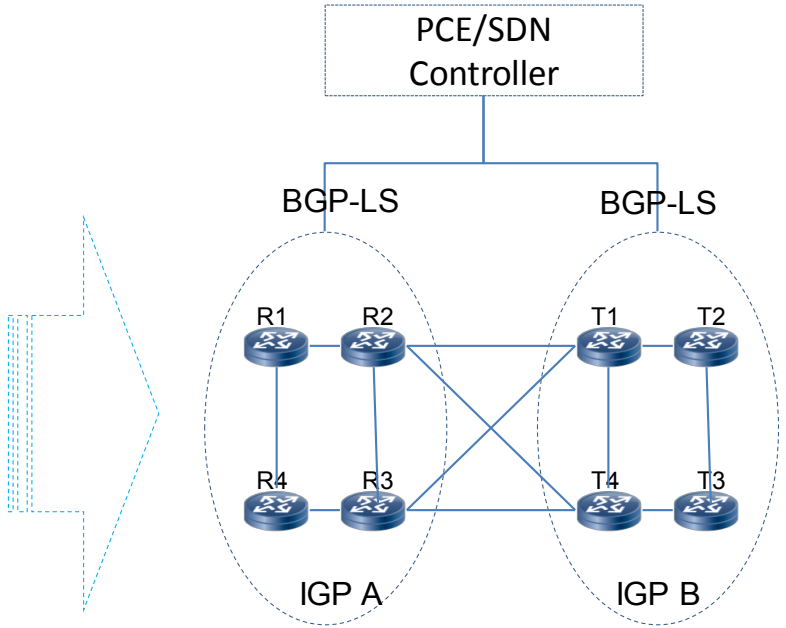
IETF102@Montreal, July 2018

Contents

- Scenarios Review
- Updated Solutions
- Proposed BGP-LS Extensions
- Further Action

Scenario Review





1. One backbone and hundreds of MAN/IDC, which are interconnected with each other via bundles of links. Each MAN/IDC and Backbone are in different IGP domain.
2. Need to collect the topology of each domain and build the inter-domain topology as well automatically.

1. IGP A/IGP B may run different IGP protocol, distributed traffic engineering may or may not deploy in every domain.
2. Collect the topology information from different domains via BGP-LS, and retrieve inter-as topology under different scenarios.

Current Solutions

RFC/Draft	Key Points	Limitation
RFC7752(BGP-LS)	IGP topology within one domain	No inter-as topology information
SR-EPE	ASBR reports the inter-as links and nodes	Every ASBR must run BGP-LS protocol
SR-EXT	Introduce “Source Router Identifier” TLV to transfer	Mainly for IS-IS
RFC5316(IS-IS TE extension for inter-AS)	IS-IS TLV extension to transfer the information about inter-AS TE links and nodes	Deployment TE within each domain/Not included in BGP-LS
RFC 5392(OSPF TE extension for inter-AS)	OSPF TLV extension to transfer the information about inter-AS TE links and nodes	Deployment TE within each domain/Not included in BGP-LS
PCE in Native IP	Describe scenarios for PCE in Native IP	No solution for inter-as topology retrieval

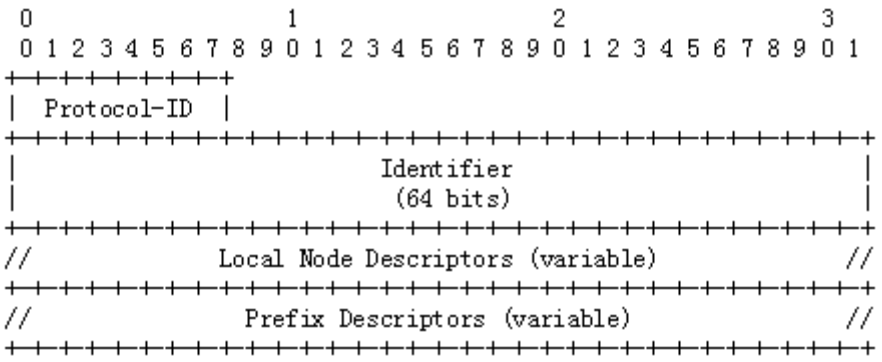
Updated Solution

IS-IS/OSPF Inter-AS in Native IP Scenario

1. Redistribute the interconnect links into ISIS/OSPF protocol

IGP Protocol	Redistributing Router Information	Ref.
OSPFv2	Advertising Router of “LSA Type 5”	RFC2328 section 12.1.5 “Advertising Router”
OSPFv3	Advertising Router of “E-AS-External-LSA”	draft-ietf-ospf-ospfv3-lsa-extend-23#section-4.5
ISIS	IP External Reachability Information	RFC1195

2. Encode the “Redistributing Router Information” in “Local Node Descriptor” of Prefix NLRI



Proposed BGP-LS extension

IS-IS/OSPF Inter-AS TE Scenario

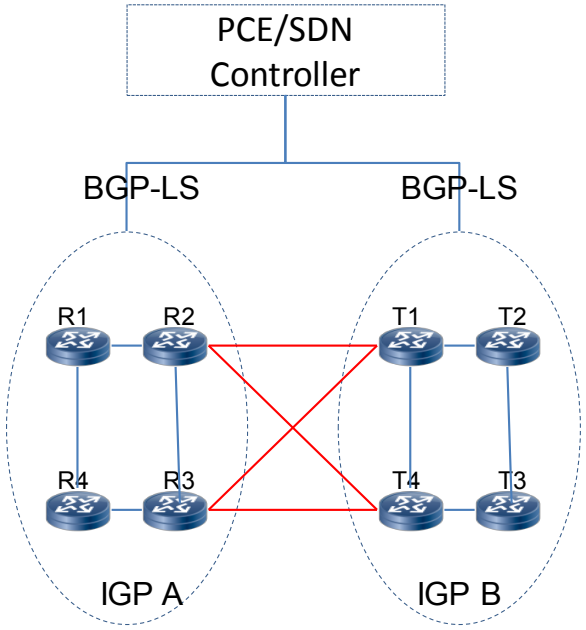
Define new Inter-AS TE related TLVs

TLV Code Point	Description	IS-IS/OSPF TLV/Sub-TLV	Reference (RFC/Section)
TBD	Remote-AS Number	24/21	[RFC5316]/3.3.1 [RFC5392]/3.3.1
TBD	IPv4 Remote ASBR ID	25/22	[RFC5316]/3.3.2 [RFC5392]/3.3.2
TBD	IPv6 Remote ASBR ID	26/24	[RFC5316]/3.3.3 [RFC5392]/3.3.3

TE scenario

Topology Reconstruction

- TE Scenario
  - Topology reconstruction is straightforward. Because PCE/SDN controller knows the AS, ASBR IPv4/IPv6 router-ID, associated TE links that are already included in BGP-LS TLV, and remote AS, remote ASBR IPv4/IPv6 router-ID that newly proposed in current draft.
- Non-TE Scenario
  - Reconstruction Process is shown below:



Non-TE Scenario

PCE collects BGP-LS topology respectively in different domain
(inter-AS links are normally not included)

↓

Redistribute inter-as links on every ASBR router in each domain

↓

Redistribute routes will be included in NLRI type 3 or NLRI type 4 of BGP Link-State NLRI
(no information about the originator of these prefixes)

↓

With "Local Node" that associated with Prefix NLRI be encoded with redistribute information described in current draft
PCE can anchor these prefixes to corresponding ASBR

↓

PCE reconstruct the inter-as topology when comparing these prefixes and their anchors

Further Action

- Comments?
- Adopt as WG-draft?

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IETF 102 – Montreal
July 2018
IDR Working Group

draft-ietf-idr-te-lsp-distribution-09

Stefano Previdi, Ketan Talaulikar (Cisco Systems)

Jie Dong, Mach Chen (Huawei)

Hannes Gredler (RtBrick)

Jeff Tantsura (Nuage Networks)

Overview

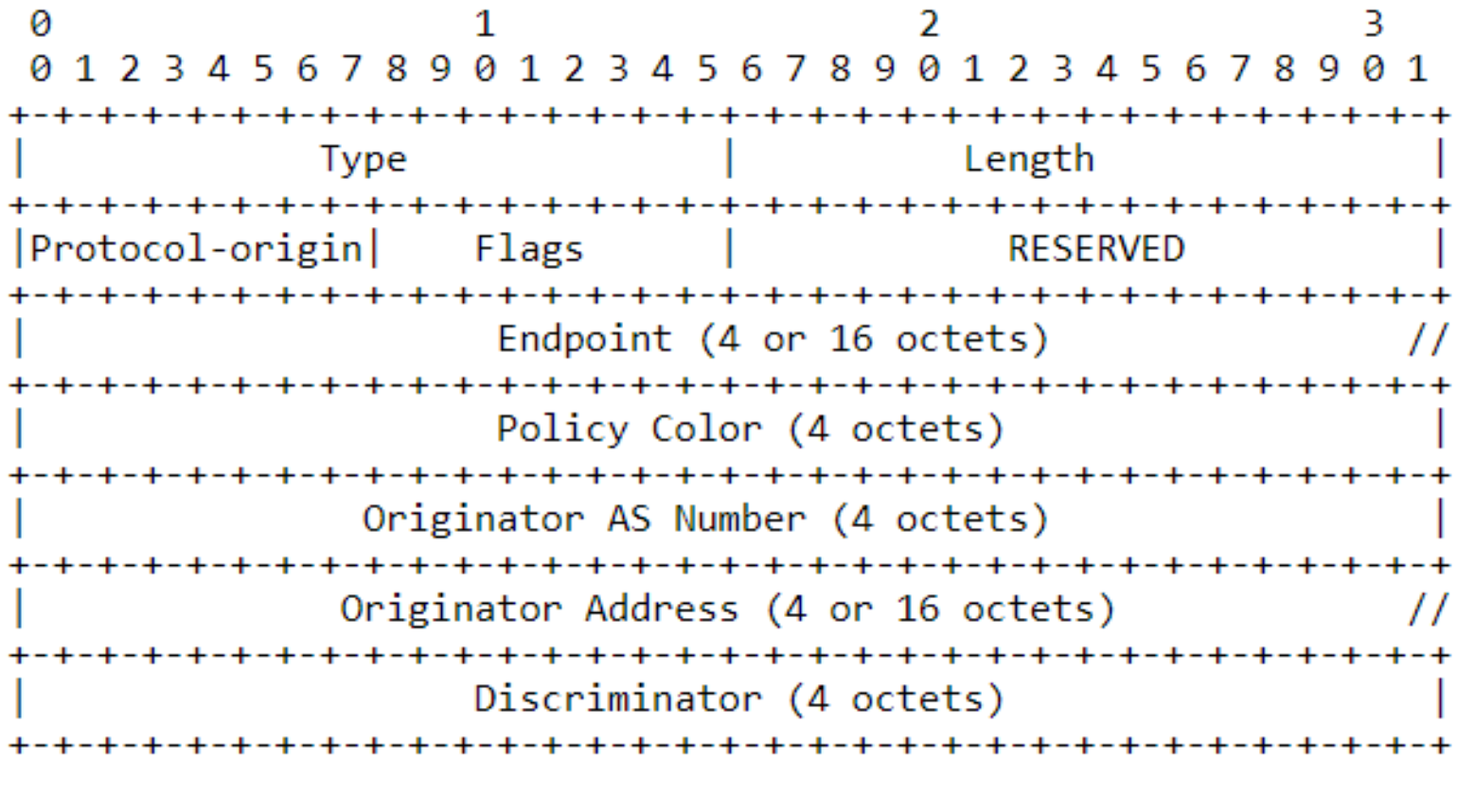
- Defines a new BGP-LS NLRI Type for TE Policy advertisement
- Covers different types of TE Policies
  - RSVP-TE
  - Segment Routing
  - Local Cross Connects
- Signals the path details and status

Updates in version 09

- Alignment of Segment Routing Policies with draft-ietf-spring-segment-routing-policy adopted by SPRING WG
- Major updates for SR Policy advertisement
  - Updated descriptors to align with SR Policy Architecture
  - Updated attributes to not just advertise the segment-list but also other key attributes and status
- Editorial changes in other parts of the document for clarity and section re-organization
- No changes for RSVP-TE advertisements

SR Policy Descriptor

Describes the SR Policy Candidate Path in the TE Policy NLRI



SR Policy State TLVs

Attributes of the TE Policy NLRI for SR Policies

1. SR Binding SID TLV
   - Indicates the BSID in use and its properties
2. SR Candidate Path State TLV
   - Indicates whether the CP is active and its validation state
   - Indicates how the CP was instantiated (e.g. PCE initiated, PCE delegated, ODN instantiated, etc.)
   - Other attributes and properties like Preference, Priority, etc.
3. SR Candidate Path Name TLV

SR Policy State TLVs – contd.

4. SR Candidate Path Constraints TLV
   - Indicates the algorithm and constraints associated with the path
   - SR Affinity Constraint sub-TLV
   - SR SRLG Constraint sub-TLV
   - SR Bandwidth Constraint sub-TLV
   - SR Disjoint Group sub-TLV
5. SR Segment List TLV
   - One or more Segment-Lists associated with the CP
   - Indicates whether it was computed dynamically or was explicit path
   - Indicates the computation and validation/resolution state
   - Also indicates the weight and algorithm of the SR Policy
   - Includes one or more SR Segment sub-TLVs

SR Policy State TLVs – contd.

6. SR Segment TLV
   - Indicates the segment-type and a type-specific descriptor
   - Indicates the SID corresponding to the segment
   - Indicates the validation/resolution status of the SID
7. SR Segment List Metric TLV
   - Sub-TLV of the SR Segment List TLV
   - Indicates the metric type, metric value and bounds for the computation

Procedures

- SR Policies may be instantiated on the headend by
  - Local configuration
  - PCEP
  - BGP SR Policy
- Headend reports the SR Policies instantiated on it via BGP-LS using this specification
- Document describes how Attribute TLVs are used to convey the state of the SR Policy

Next Steps

- Document needs review in view of the content changes
- Requesting WG review and any inputs/feedback
- Consider early code-point allocation for implementations

IETF 102 – Montreal
July 2018
IDR Working Group

draft-ketant-idr-bgp-ls-flex-algo-00

Ketan Talaulikar, Peter Psenak (Cisco Systems)

Problem Statement

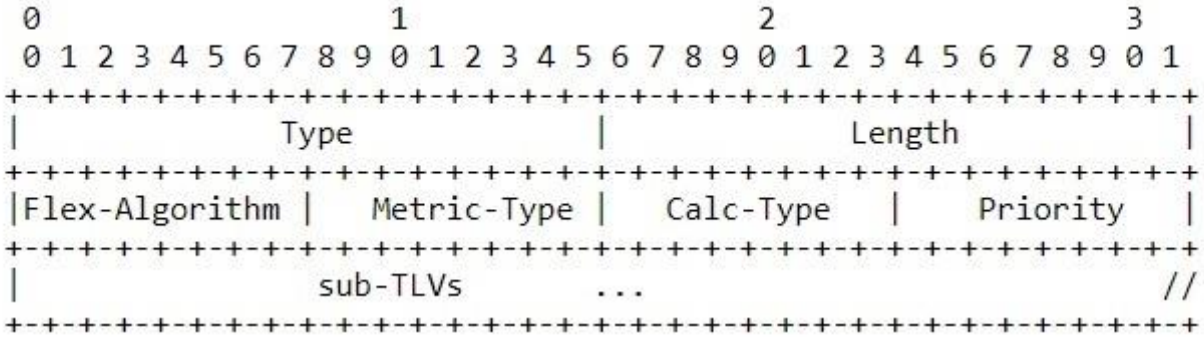
- Flexible Algorithm enables operators to setup IGPs to perform constrained based topology computation
- Each Flex-Algo can be defined by
  - The type of calculation to be used (e.g. shortest path or strict SPF)
  - The metric type of be used (e.g. IGP metric, delay, TE metric)
  - The set of constraints to be applied (e.g. extended admin group/affinities)
- PCE/controller learns IGP topology from multiple domains and computes end to end SR Policies
- SR Policies can be setup with smaller SID stack when using flex-algo prefix SID that follows similar constraints & optimization objective
- The advertisement of IGP flex-algo definition via BGP-LS enables PCE/controller to map the intent of the SR Policies to Flex-Algo

What does this draft propose?

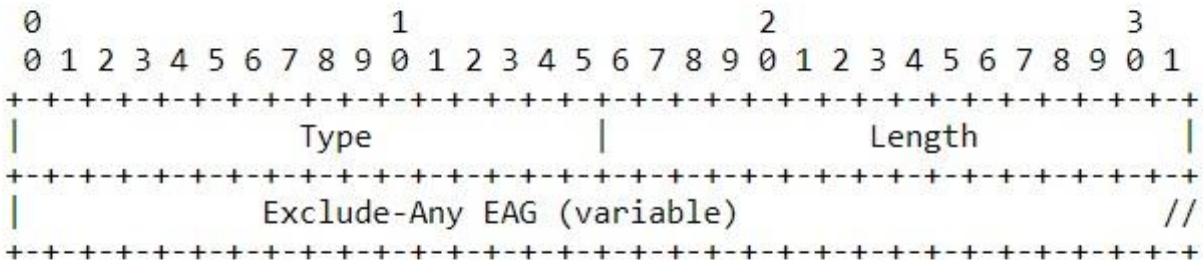
- The Flex-Algo definition is advertised by one or more routers in an IGP domain as a node attribute
  - As specified in draft-ietf-lsr-flex-algo for both OSPF & IS-IS
- Advertise the same Flex-Algo definition as node attribute via BGP-LS
- Enable learning of the mapping of flex-algos to their definition for a PCE/controller

Flex-Algo Definition TLV

- Attribute signalled as part of the Node NLRI



- Sub-TLVs for affinity constraints



Next Steps

- Requesting WG review and any inputs/feedback

IETF 102 – Montreal
July 2018
IDR Working Group

draft-li-idr-bgp-ls-sbfd-extensions-02

Zhenbin Li, Shunwan Zhuang (Huawei)

Ketan Talaulikar (Cisco Systems)

Sam Aldrin (Google)

Jeff Tantsura (Nuage Networks)

Greg Mirsky (ZTE)

Problem Statement

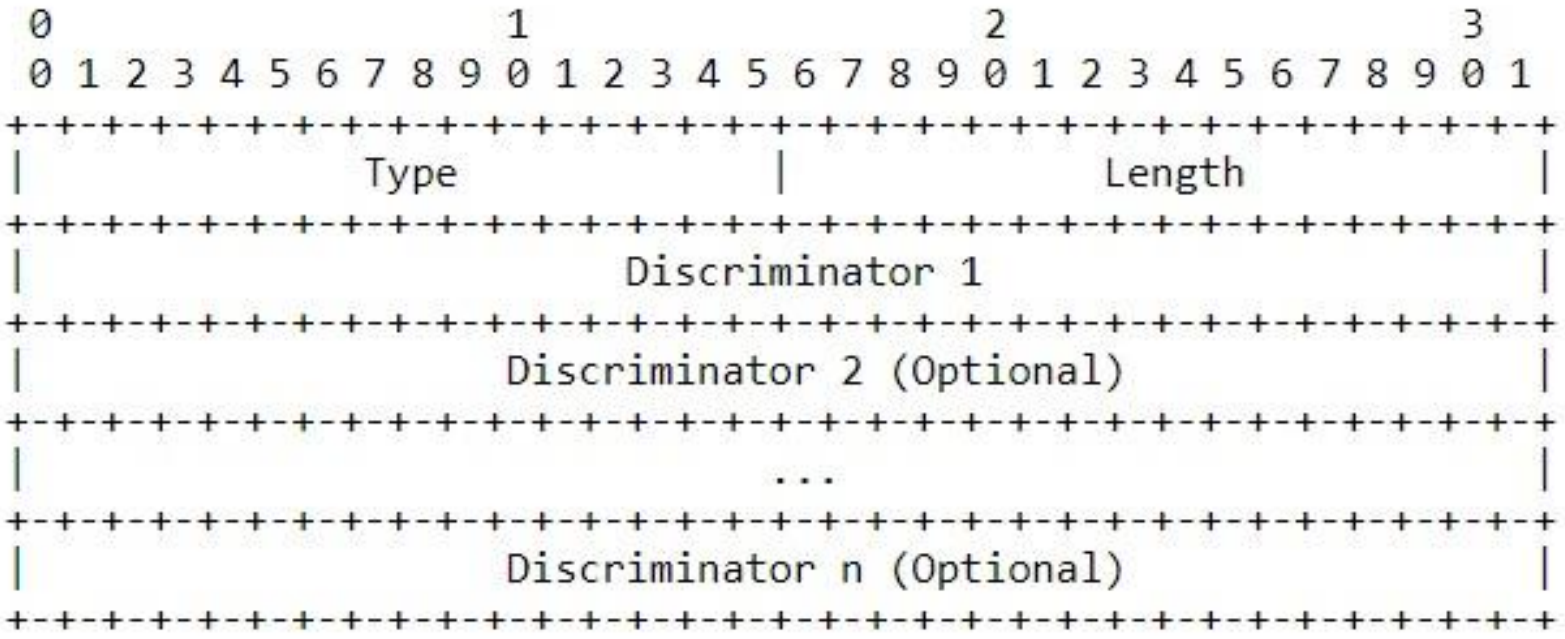
- S-BFD session can be setup in a light weight manner for monitoring a service path between two nodes in a network
- S-BFD session is setup to a remote node using its S-BFD discriminator which is flooded via IGPs
- Use-cases require discovery of S-BFD discriminators for nodes across IGP domains
  - End to end service path over Seamless MPLS network
  - SR Policies spanning multiple-domains

What does this draft propose?

- S-BFD discriminators are node attributes that are flooded via IGPs
  - OSPFv2/v3 – RFC7784
  - IS-IS – RFC7883
- Advertise S-BFD discriminators as node attribute via BGP-LS
- Enable learning of S-BFD discriminators for remote nodes across domains and by a controller to set up S-BFD monitoring for end-to-end multi-domain paths

S-BFD Discriminators TLV

- Attribute signalled as part of the Node NLRI



Status

- Corresponding IGPs drafts have been RFCs for some time now
- This document had expired but updated now with new requirements/use-cases and clarified text

Next Steps

- Requesting WG adoption and any inputs/feedback

Applying BGP flowspec rules on a specific interface set

draft-ietf-idr-flowspec-interfaceset-04

S. Litkowski, Orange

A. Simpson, Nokia

K. Patel, Arrcus, Inc

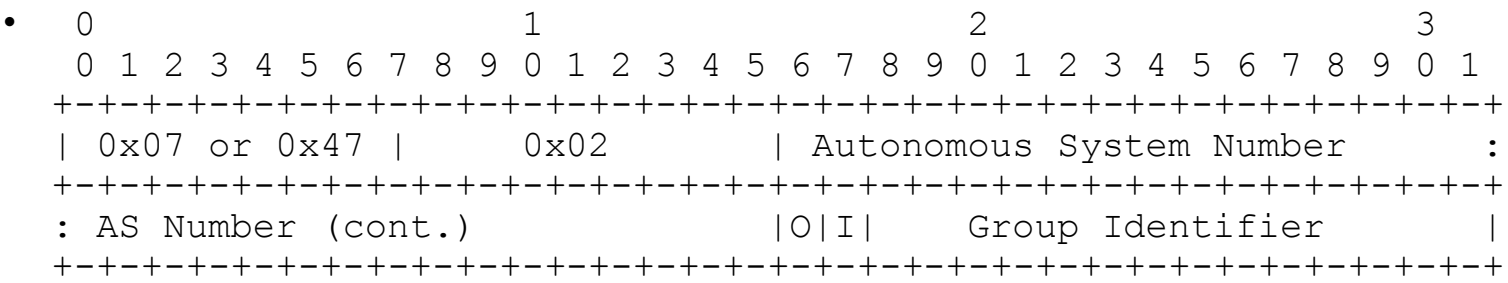
J. Haas, Juniper Networks

L. Yong Huawei

Status of -04

- Geoff Huston had supplied substantial feedback on -03. (Thanks, Geoff!)
- The authors decided to simplify the use cases in the document.
- -04 does not functionally differ from -03.
  - It does note the code points registered via IANA since -03.

Open Issues



- The draft text calls out O=0, I=0 as reason to discard the NLRI.
  - Should move text to “cannot become active, treat as withdraw”.
- The text is silent on the treatment of the AS number.
  - Nokia’s implementation currently ignores the AS number. I.e. its interfaces are treated as being in a wildcard AS group.
  - Should the draft discuss expected use of this field or leave it to the implementation?

Next Steps

- We’d like to drive the open issues to closure, then resume the Last Call process.

Questions?

Path Segment/ID in BGP/BGP-LS

draft-li-idr-sr-policy-path-segment-distribution
draft-li-idr-bgp-ls-sr-policy-path-segment

Cheng Li/Mach Chen/Jie Dong/Zhenbin Li@Huawei

IETF#102

Background

- The extension of BGP to advertise the SR Policy is defined in draft-ietf-idr-segment-routing-te-policy.
- To support use cases like performance measurement, path identification is required.
- In SR-MPLS, the egress node cannot determine from which SR path the packet comes
  - since no label or only the last label may be left in the MPLS label stack when the packet reaches the egress node.
- draft-cheng-spring-mpls-path-segment introduces a new segment to uniquely identify an SR path called Path Segment.
- For easier identifying an SRv6 path, the Path ID that identifies an SRv6 path is proposed in draft-li-spring-passive-pm-for-srv6-np-00.
- For advertising path ID information within an BGP SR policy , new extension is needed.
- Also, for collecting path ID information within an BGP SR policy, new extension in BGP-LS is needed.

Drafts

- draft-li-idr-sr-policy-path-segment-distribution-00
  - defines extensions to BGP to distribute SR policies with Path segment and bi-directional path information.
  - based on the extension described in draft-ietf-idr-segment-routing-te-policy.

- draft-li-idr-bgp-ls-sr-policy-path-segment-00
  - specifies the way of collecting configuration and states of SR policies carrying path ID and bi-directional path information by using BPG-LS.
  - based on the extension described in draft-ietf-idr-te-lsp-distribution.

Structure of Path Segment/ID in BGP SR Policy

- draft-ietf-idr-segment-routing-te-policy defines the SR Policy structure in BGP.
- draft-li-idr-sr-policy-path-segment-distribution-00 introduced a path segment to identify an SR path, so the SR policy structure becomes:
  - SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
    - Attributes: Tunnel Encaps Attribute (23)
    - Tunnel Type: SR Policy
      - Binding SID
      - Preference
      - Segment List
        - Weight
        - **Path ID**
        - Segment ...

Path ID TLV

- G-Flag: Global flag.
  - Set when the Path segment/ID is global within an SR domain.
- E-Flag: Egress flag for local segment/IDs.
  - Set when a path segment/ID is a local segment/ID allocated by the egress node.
  - When G-flag is set, this flag should be ignored.
- PIT: Path ID type, specifies the type of the Path ID, and it has following types:
  - 0: SR-MPLS Path Label
  - 1: 4-octets integer Path ID
- Path ID: The Path ID of an SR path.

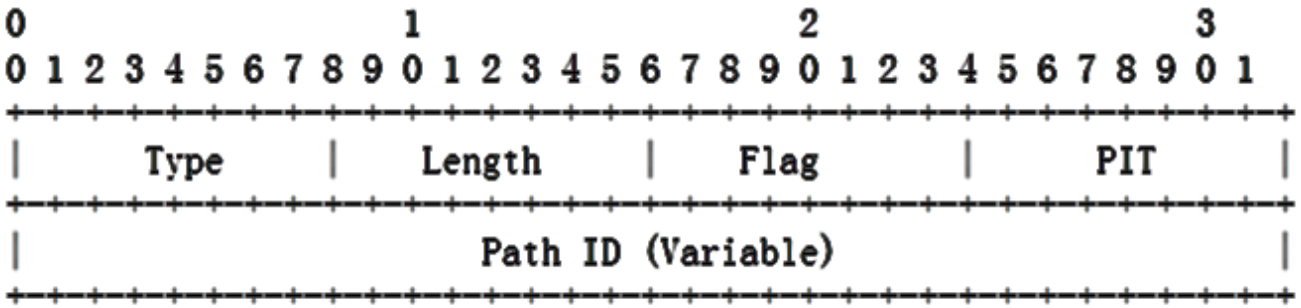


Figure 1. Path ID sub-TLV

SR Policy for Bidirectional Path

- In SR, a bidirectional path can be represented as a binding of two unidirectional SR paths.
- New sub-TLVs are defined to describe an SR bi-directional path in SR Policy.

```
SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
    Attributes: Tunnel Encaps Attribute (23)
    Tunnel Type: SR Policy
        Binding SID
        Preference
        Bi-directioanl Path
            Segment List
                Weight
                Path ID
                Segment
                Segment
                ...
            Reverse Segment List
                Weight
                Path ID
                Segment
                Segment
                ...
```

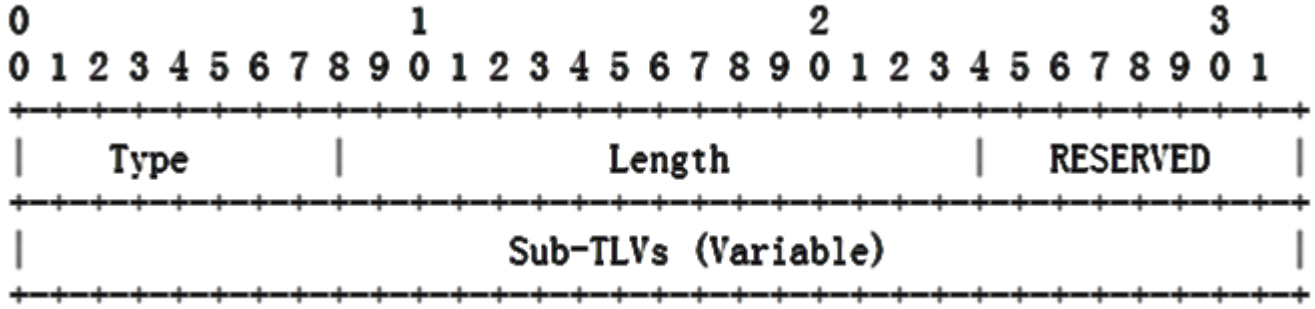


Figure 2. SR Bi-directional path sub-TLV

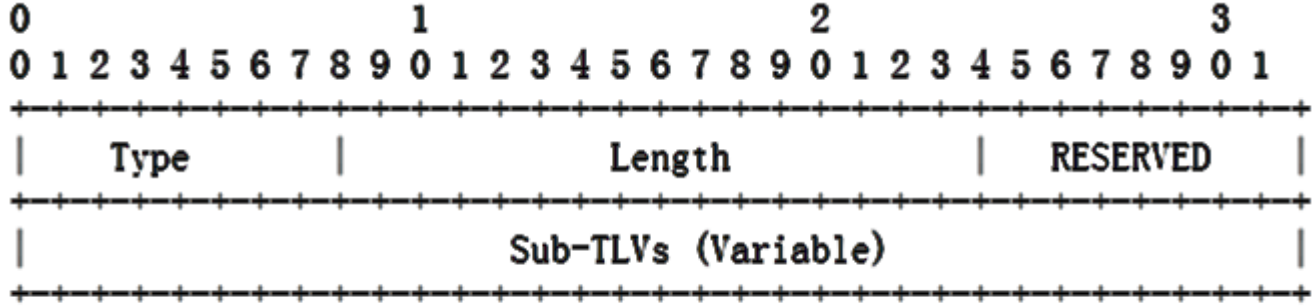


Figure 2. SR Reverse Path Segment List Sub-TLV

draft-li-idr-bgp-ls-sr-policy-path-segment-00

Path Segment/ID in BGP-LS

- Specifies the way of collecting configuration and states of SR policies carrying path ID and bi-directional path information by using BGP-LS.

- The characteristics of an SR policy can be described by a TE Policy State TLV defined in draft-ietf-idr-te-lsp-distribution, which is carried in the "LINK_STATE Attribute" [RFC7752].

- Reuses the equivalent sub-TLVs as defined in draft-li-idr-sr-policy-path-segment-distribution.

Next Steps

- Comments and contributions are welcome.

Thank you

BGP-LS Extensions for Advertising Path MTU

draft-zhu-idr-bgp-ls-path-mtu-00

Yongqing Zhu China Telecom

Zhibo Hu HUAWEI

Gang Yan HUAWEI

Fenghua Zhao HUAWEI

BackGround

Currently, MTU is not included in SegmentRouting

- SR may contain more MPLS labels or SRv6 SIDs in the forwarding packet header, and the packet size is larger than the traditional packets.
- Without the MTU information, path-calculation (Especially for Controller) cannot assure the packet size is less than the path MTU.
- This may lead to ineffective packet fragmentation.
- RFC 6326 (Transparent Interconnection of Lots of Links (TRILL) Use of IS-IS) has defined a Sub-TLV to advertise the MTU of a Link
  - Type : 28 (MTU)
  - Length: 3
  - Reserve Byte
  - MTU : MTU Value
- Solution: This new draft extends a new TLV to advertise the MTU(Defined in RFC6323) through BGP-LS

Solution

BGP_LS Extensions for Path MTU(ISIS)

[RFC7752] defines the TLVs that map link-state information to BGP-LS NLRI and the BGP-LS attribute. Therefore, according to this document, a new sub TLV is added to the Link Attribute TLV.

The format of the sub-TLV is as shown below.

- x TYPE - TBD
- x LENGTH - Total length of the value field, it should be 3
- X Reserve Byte
- x VALUE - 2-byte MTU value of the link

	No. of Octets
MTU value	2

Whenever there is a change in MTU value represented by Link Attribute TLV, BGP-LS should re-originate the respective TLV with the new MTU value.

Then, the controller can calculate the Path MTU.

NextStep

1. Any comments welcome.

2. Co-authors welcome

3. The Extension of OSPF

Any Questions?