IETF 110
draft-srcompdt-spring-compression-analysis

Members:
Ron Bonica, Darren Dukes, Wim Hendrickx, Cheng Li, Peng Shaofu, Chongfeng Xie

Presenter and Chair:
Weiqiang Cheng

The design team is to produce (rough) consensus (of the DT) outputs to the WG on two related topics:

1) What are the requirements for solutions to compressing segment routing information for use over IPv6;

On-Going -05 version

2) An analysis of proposed approaches to compressing segment routing information for use over IPv6.

On-Going -00 version

Introduction

An analysis of each mechanism against the requirements.

"The following mechanisms are proposed to compress the SRv6 SID list."

CSID	*Draft-filsfilscheng-spring-srv6-srh-comp-sl-enc*	Describes two new SRv6 SIDs, a combination of SIDs from [draft-filsfils-spring-net-pgm-extension-srv6-usid] and [draft-cl-spring-generalized-srv6-for-cmpr]
CRH	*Draft-bonica-6man-comp-rtg-hdr*	Requires two new routing header types and a label mapping technique
VSID	*Draft-decraene-spring-srv6-vlsid*	Defines a set of SID behaviors to access smaller SIDs within the SR header
UID	*Draft-mirsky-6man-unified-id-sr*	Extends the SRH to carry MPLS labels or IPv4 addresses

CSID

A compressed SRv6 Segment List Encoding in the SRH.

- Does not require any SRH data plane change.
- Does not require any SRv6 control plane change.
- Leverages the SRv6 Network Programming model.

Define two new SID flavors:

- NEXT-C-SID
- REPLACE-C-SID

Merges SID behaviors from uSID (draft-filsfils-spring-net-pgm-extension-srv6-usid) and GSID (draft-cl-spring-generalized-srv6-for-cmpr)

CRH

Two new IPv6 Routing Headers (CRH-16 and CRH-32)

- Next Header, Ext Hdr Len, Routing Type, Segments Left

- SID List (16 or 32-bit SIDs)

Each SID maps to a CRH-FIB entry

- IPv6 address or SRv6 SID

- Topological function plus optional arguments

- Service function plus optional arguments

- Flags

No change to IPv6 forwarding plane or addressing model

Minimal change to SRv6 control plane

vSID

Generalize the SRH for any size of SIDs (<= 128 bits)

- 128-bit SIDs becomes a specific case
- Does not require any SRv6 control plane change.
- Leverages the SRv6 Network Programming model.

Defines one new SID flavor.

Builds on a common SRv6 locator prefix:

- SID := prefix + vSID
- Encodes only the vSID in the SRH. Not the redundant prefix.
- Everything else uses the regular 128-bits SID

UID

A compressed SRv6 Segment List Encoding in the SRH (suggested) or other type of Routing Header.

- Introduce UET Flags to unify traditional SRv6 SID and U-SID forwarding behaviors, no compatibility issues.
    - 00: classical 128-bits IPv6 address
    - 01: 32-bits trunacted piece of IPv6 address
    - 10: 32-bits index (MPLS label suggested)
    - 11: 16-bits trunacted piece of IPv6 address
- Support MAPPING and STICHING mode, The former is used for disorderly IP address planning scenarios, while the latter is used for scenarios with common prefix.
- For MAPPING mode, index to IPv6 address mapping need to be advertised, MPLS prefix-SID can be reused; for STICHING mode, UET-32/16/etc flavors need to be advertised with the endpoint behavior of SRv6 SID, little changes.
- Leverages the SRv6 Network Programming model with new flavors.

SRv6 Compression Scenarios

An SR domain consisting of 3 sub-domains is shown to illustrate the scenarios associated with encapsulation header size, forwarding efficiency and state efficiency.
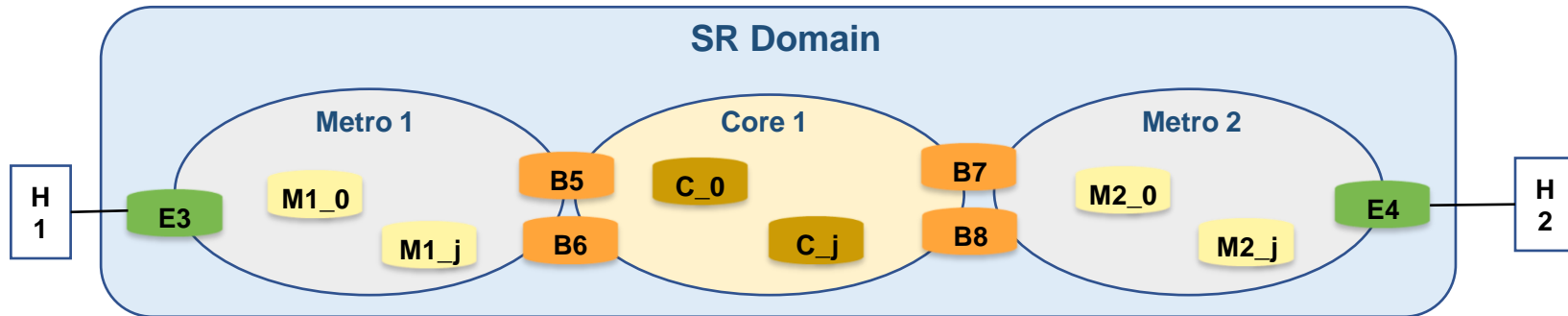
H1、H2	hosts outside the SR domain	Metro 1、Core、Metro 2	sub-domains with independent IGP instances
E3、E4	SR domain edge routers	M1_1..M1_i	routers in Metro 1
B5、B6	border routers between the Metro 1 and Core	C_1..C_j	routers in Core
B7、B8	border routers between the Metro 2 and Core	M2_1..M2_k	routers in Metro 2

Analysis Completion Plan

What we've done:

Feb 3	Analysis template (introduction, template format) proposed to srcomp@ietf
Feb 11	First analysis text proposed to srcomp@ietf
Feb 12	Decided to analyze 4 proposals (CSID,CRH,VSID,UID)
Feb 17	Team reviewed draft text, decided to complete requirements firstly
March 6	Requirements completed, revision 05 submitted, the key input for analysis

Rough plan:

Mid April	Complete remaining analysis text proposal for DT review
Late May	Review and submit a new revision for SPRING review

Comments & Questions?