SRv6: Is There Anybody Out There?

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[1]MPI-INF

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June 6, 2022

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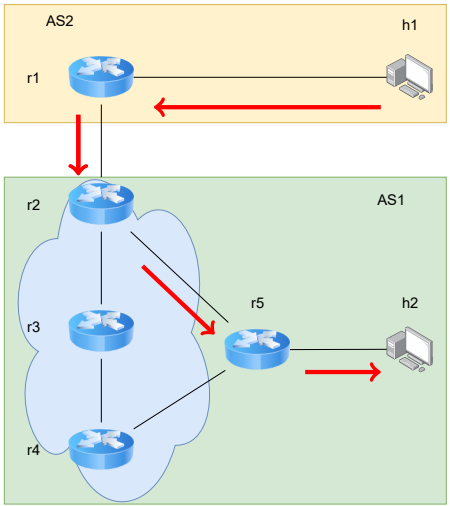
  - directly integrated into IPv6

Segment Routing: The Basics



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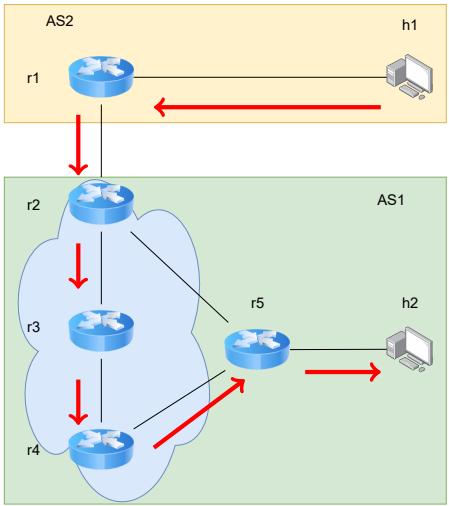

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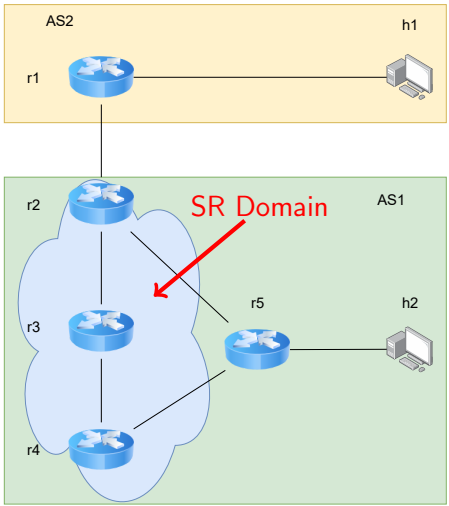

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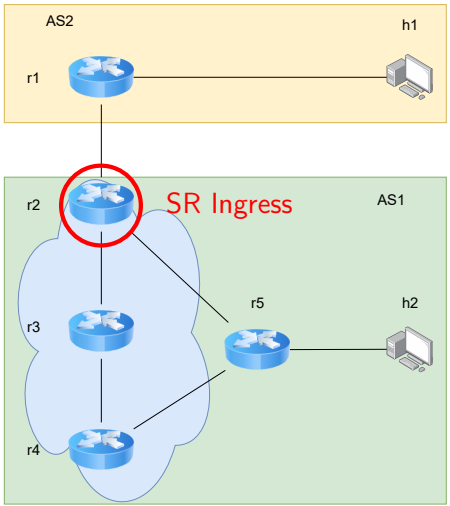

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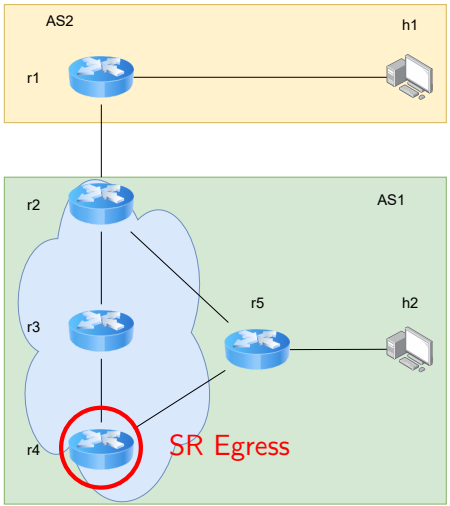

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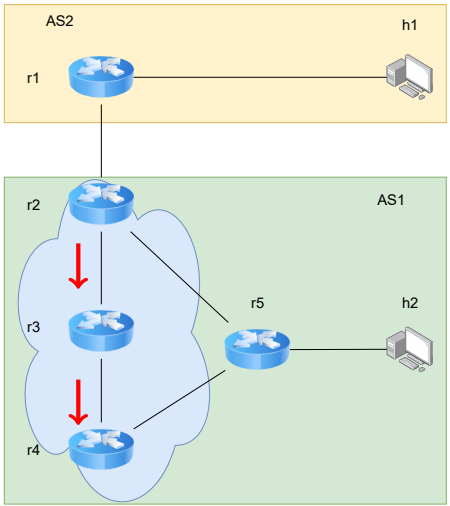

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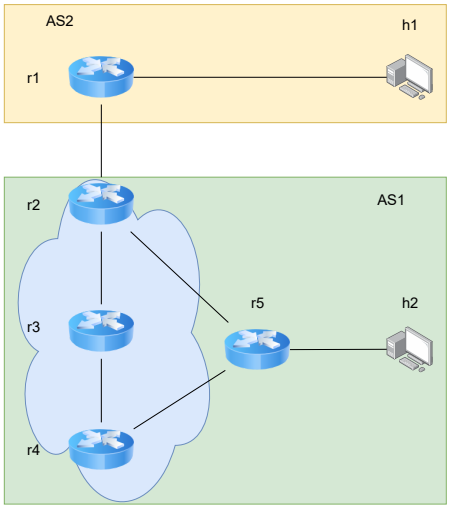

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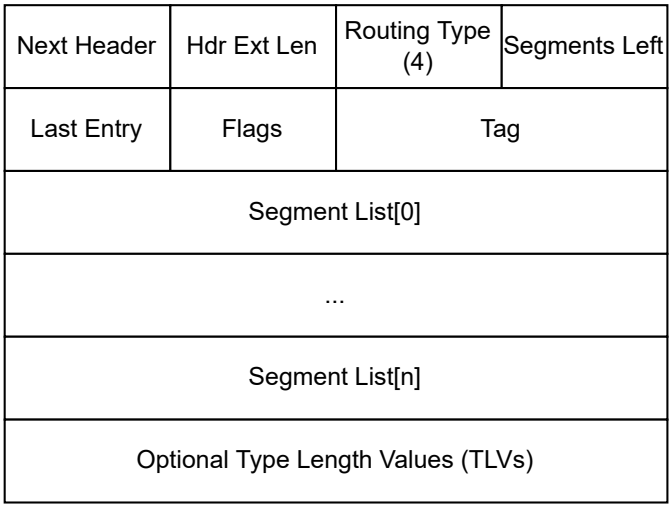
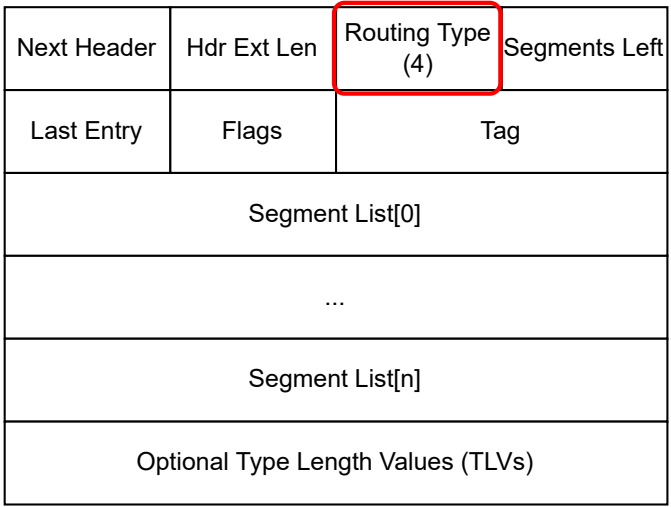
SRv6 Header


Next Header
Hdr Ext Len
Routing Type (4)
Segments Left
Last Entry
Flags
Tag
Segment List[0]
...
Segment List[n]
Optional Type Length Values (TLVs)

SRv6 Header



- Next header = 43 (Routing)
- Routing type = 4 (Segment Routing)

‘The Good’

Press Release

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Jun, 2021

‘The Good’

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SP360: Service Provider

SRv6 is coming

Dec, 2019 cisco

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High-Performance Routing Platforms with Segment Routing (SR)-MPLS and SRv6 Capabilities Enable End-to-End Network Transformation, Delivering AnyService, AnyTime, AnyWhere

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SRv6 Becomes an Industry Consensus and Commercial Use Is Set to Accelerate

A Knowledge Network Article By Huawei
Wednesday 06 April 22

HUAWEI

total telecom

Apr, 2022

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SRv6 is pure snake oil, an easy marketing story to people with limited knowledge. 'It is just IP bro, you already know it'. I'd like to to continue 'like already widely used X', but I don't dare, considering it's so established despite its obvious benefits only existing in marketability.

‘The Bad’

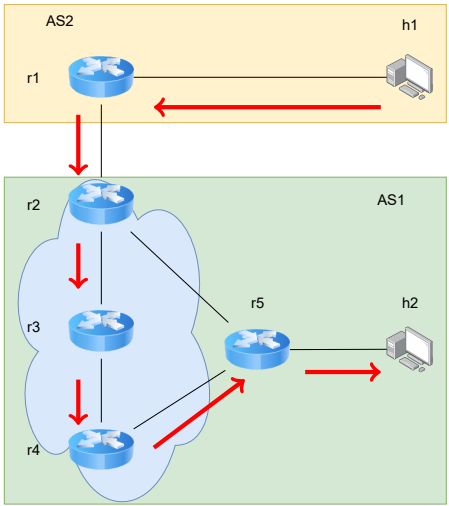
Encap a v4 packet into an SRH – set the next header type to v4 – spoof the v4 source – set the v4 destination to an on net broadcast – urpf wont kick in – because its encapsulated – the auto-deencap at the end of the csid list chucks out a v4 packet – that in theory in certain circumstances – could then hit a broadcast – and dependent on config – you may have just created smurf v2 – and – since the original host is sending encapped packets from an inner source that’s pretty much invisible – could be interesting to track it out.

MAILING LIST

‘And The Ugly:’

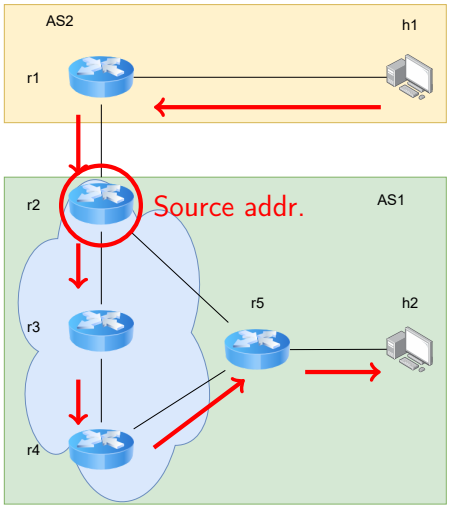

WANTED
FOR RESEARCH PURPOSES
SRV6
CALL MPI-INF
SRv6
Segment Routing
20 COOKIES REWARD

Emulation - Traceroute



Two functioning modes:

Emulation - Traceroute



Two functioning modes:

- H.Encap

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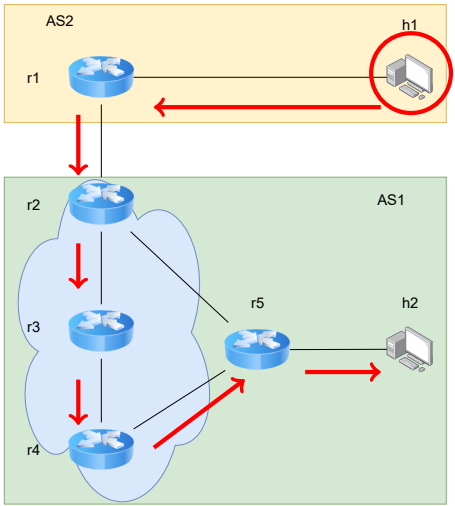

Two functioning modes:

- H.Encap
- H.Insert

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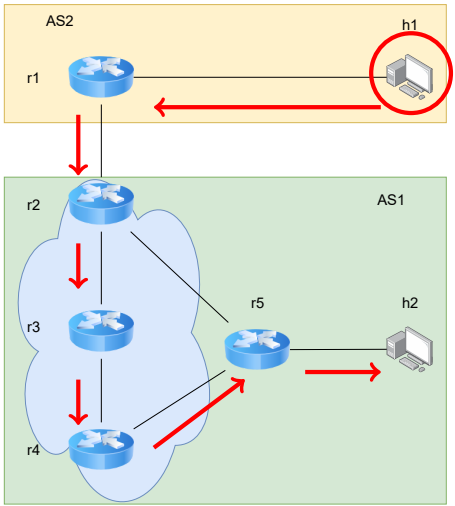

Two functioning modes:

- H.Encap
- H.Insert $\rightarrow$ **leaves traces** even between different ASes

BGP Route Collectors & Attributes

- Data sources - BGP Archives
  - September 2021 - Updates
  - RIPE RIS $\rightarrow$ rrc00, rrc01, rrc04, rrc05, rrc06
  - RouteViews $\rightarrow$ rv2, rv4, rv5, rv6, rv-amsix

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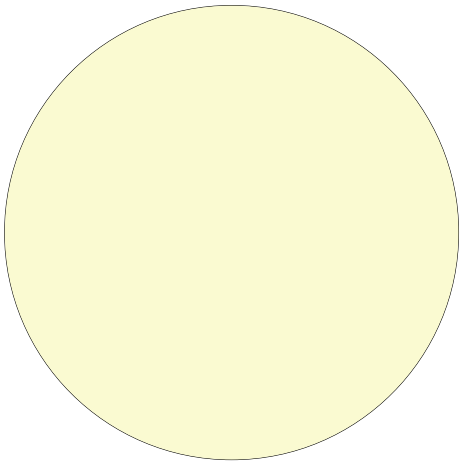
- `Color Extended Communities` may be an indicator of SR (SR Policy Color)
  - Signature bytes → Type 0x03 and Sub-Type 0x0b
  - Not found in the analyzed data
- Search for *generally* interesting attributes
  - `BGP Prefix-SID`, `BGP-LS Attribute`, `Tunnel Encapsulation`
  - Only non-SRv6-related attributes found

BGP Communities Analysis



Method:

- Extract all communities

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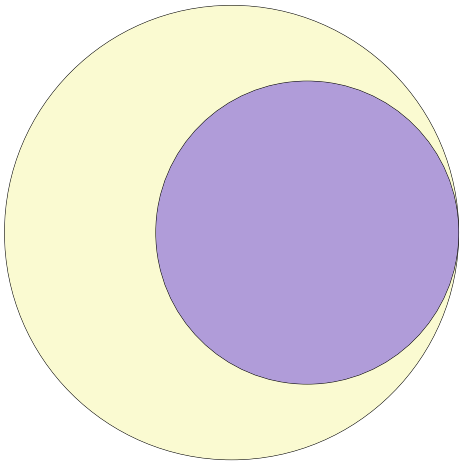

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* ASes of companies that claim to have implemented SR

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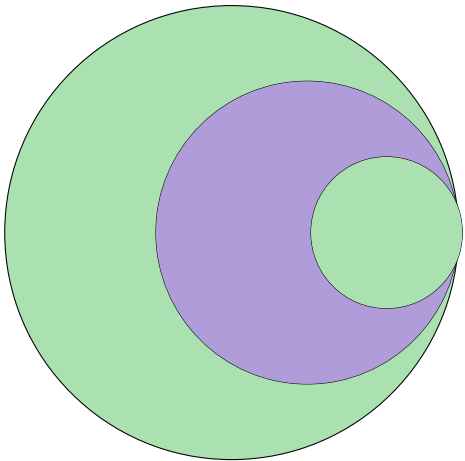

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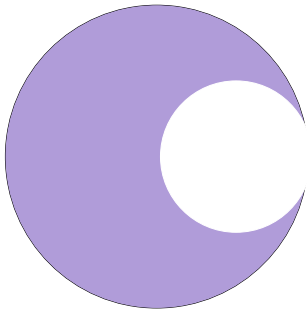

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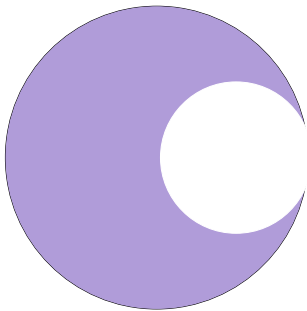

Result: no interesting communities found

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  - Generate 100 random addresses for each prefix $\rightarrow$ 213.8k total addresses

Traceroute Results

Date	Type	SRH sent	Targets	SRv6 leaked
2021-11-09	TCP SYN	✗	hitlist	✗
2022-02-08	TCP6 SYN	✗	suspect	✗
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2022-02-10	ICMPv6	✗	prefix	✗
2022-02-10	TCP6 ACK	✗	prefix	✗
2022-02-10	TCP6 SYN	✗	prefix	✗
2022-02-10	UDP6	✗	prefix	✗
2022-02-15	ICMPv6	✗	prefix	✗
2022-02-15	TCP6 ACK	✗	prefix	✗
2022-02-17	TCP6 ACK	✗	prefix	✗

Overall Results

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*Nothing

Summary

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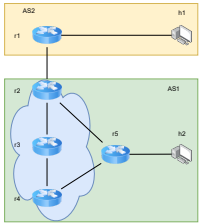

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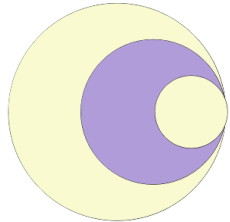

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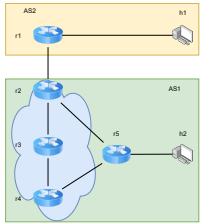

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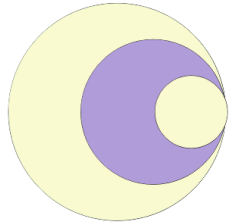

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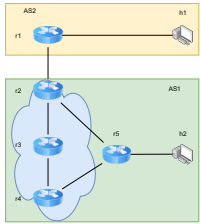

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Traceroute probing - no traces