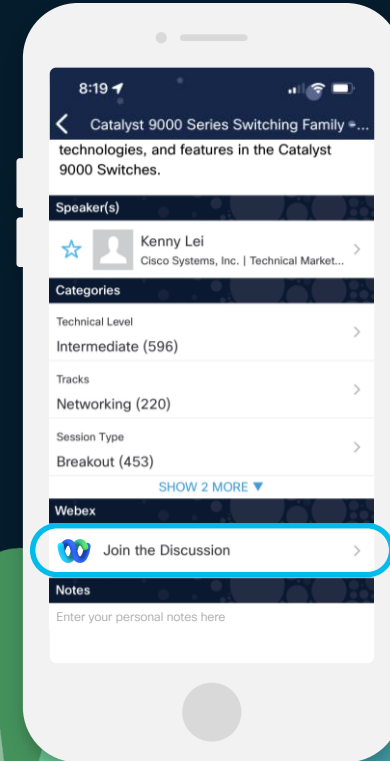# Cisco Webex App

Questions?
Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App

2. Click "Join the Discussion"

3. Install the Webex App or go directly to the Webex space

4. Enter messages/questions in the Webex space

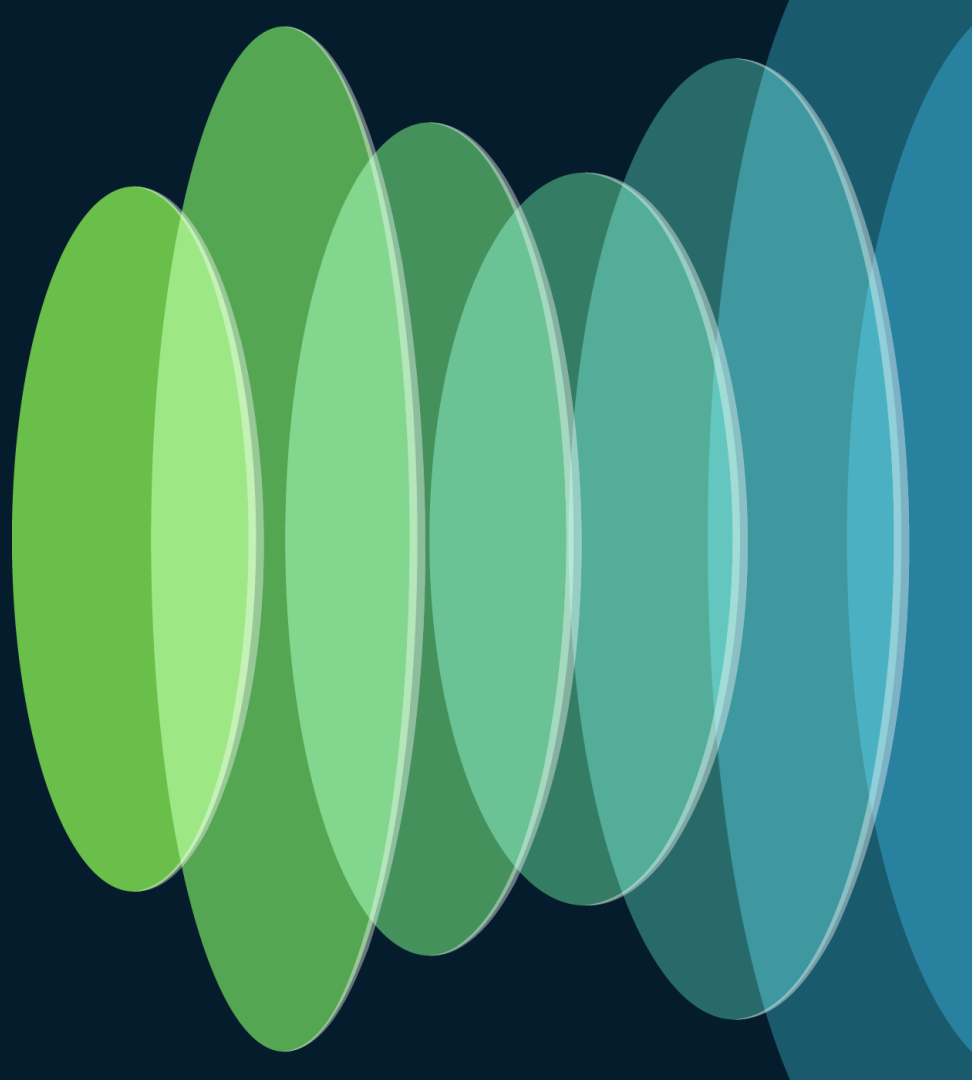Webex spaces will be moderated
by the speaker until June 7, 2024.

CISCO *Live!*

Agenda

- Introduction
- SRv6 uSID Dataplane
- SRv6 uSID Network Programming
- ISIS with SRv6
- BGP with SRv6
- MPLS to SRv6 Migration
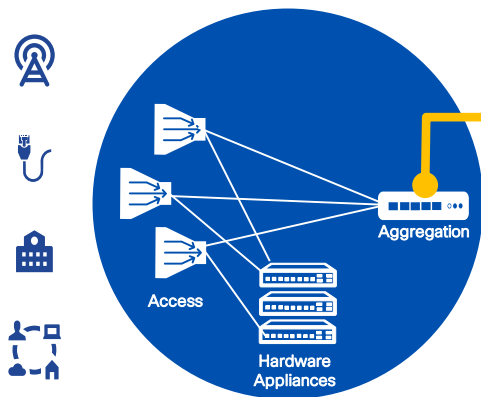- Conclusion

Introduction

Understanding Today's Service Creation

Limited Cross-domain Automation, Cumbersome Service Assurance

Legacy Central Office

Complex E2E Quality of Service (QoS)

Metro Network Domain	Core Network Domain	Data Center Domain
L2VPN	L3VPN	VXLAN
Ethernet	MPLS	IP

Access

Aggregation

Hardware Appliances

Centralized Services Delivery
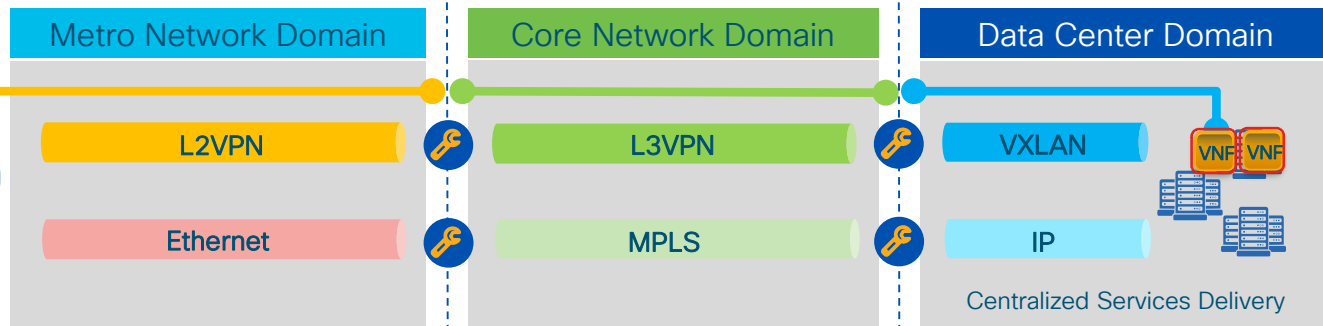
End-to-end service provisioning is lengthy and complex
- Multiple network domains under different management teams
- Manual operations
- Heterogeneous underlay and overlay networks

SR-MPLS: SDN ready
"Network as a Fabric" for Service Creation

Homogenous Cross-domain Automation & Assurance

SDN Control

Cloud Scale Networking
Central Office

Access
Compute   Leaf   Spine

SDN
Metro Network Domain

SDN
Core Network Domain

SDN
Data Center Domain

VPN L2/L3

Segment Routing

Centralized Services Delivery

End-to-end service provisioning is simple
- Multiple network domains under same management teams
- Automated operations
- Homogenous underlay and overlay networks
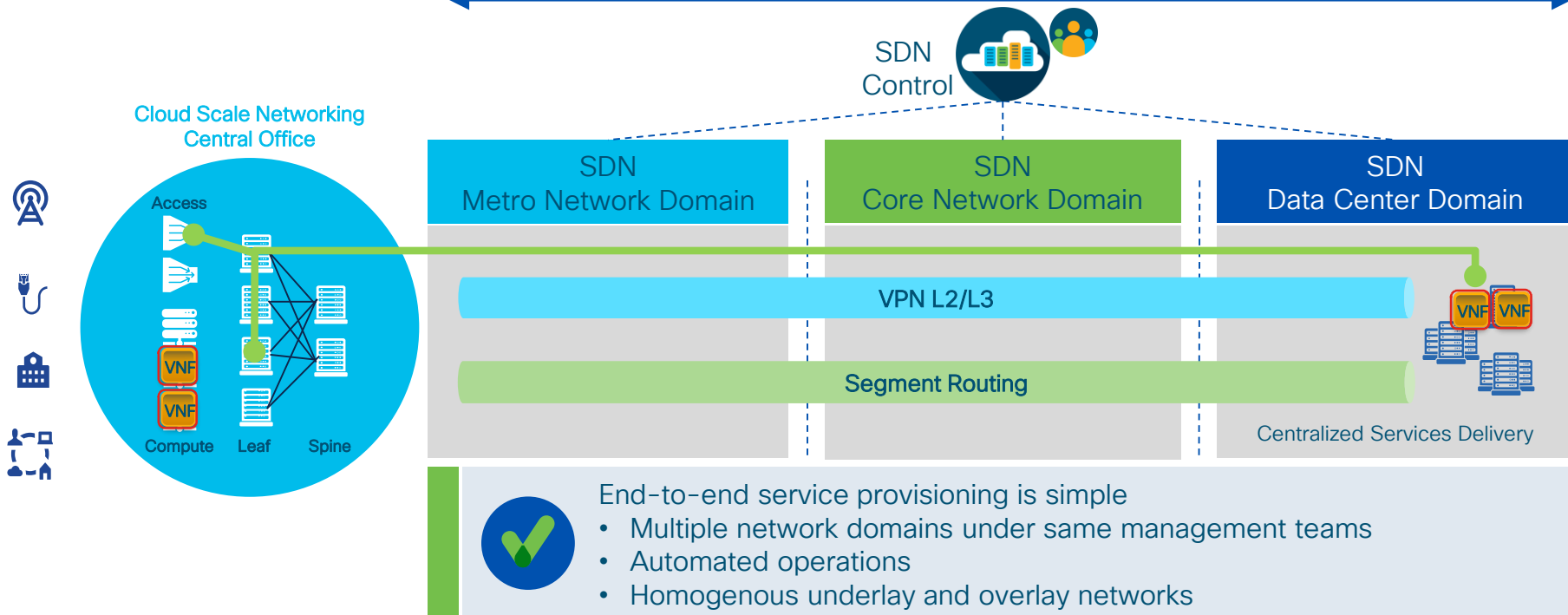
SRv6: SDN, NfV, 5G ready
"Network as an API" for Service Creation

Homogenous Cross-domain Automation & Assurance

SDN Control

Cloud Scale Networking Central Office

Access

VNF
VNF

Compute   Leaf   Spine

SDN Metro Network Domain

SDN Core Network Domain

SDN Data Center Domain

Segment Routing v6 (transport, services and programmability)

NF VNF

Centralized Services Delivery
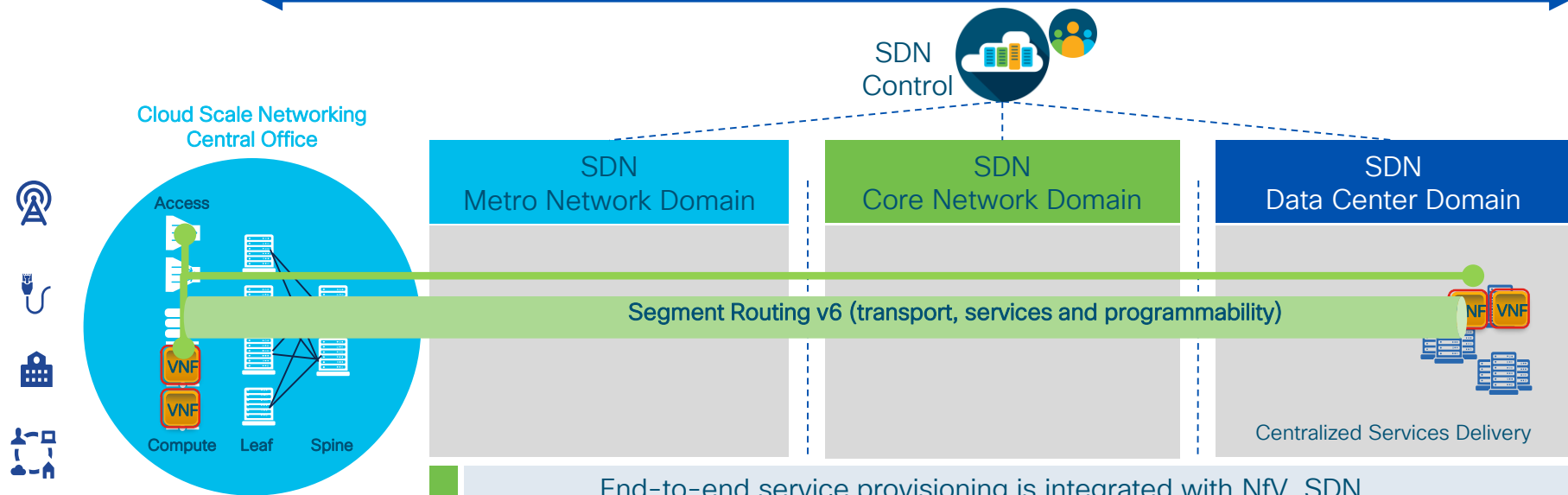
✓ End-to-end service provisioning is integrated with NfV, SDN
- Multiple network domains under same management teams
- Automated operations
- Integrated underlay and overlay networks (NfV)
- Network as API (NfV)
- Hyper Scale (5G)

SRv6 uSID
Dataplane

SRv6

- IPv6 Header

- Destination IP address

ver	tc	flow label		
payload length			next header	hop limit
source address				
destination address				

IPv6 Header

SRv6

- IPv6 Header

- Destination IP address

- Next header field:
  - TCP, UDP, ICMP....

IPv6 Header

ver	tc	flow label	
payload length		**6**	hop limit
source address			
destination address			

TCP Header

source port		destination port	
sequence number			
acknowledgment number			
hlen	reserved	code bits	window
checksum		urgent	
options			
TCP data			

SRv6

- IPv6 Header

- Destination IP address

- Next header field:
  - TCP, UDP, ICMP....
  - IPv4, IPv6

ver	tc		flow label	
payload length		4	hop limit	
source address				
destination address				

IPv6 Header

ver	hl	tos	length	
id		flags	fragment offset	
ttl	protocol	header checksum		
source IP address				
destination IP address				
IP data				

IP Packet

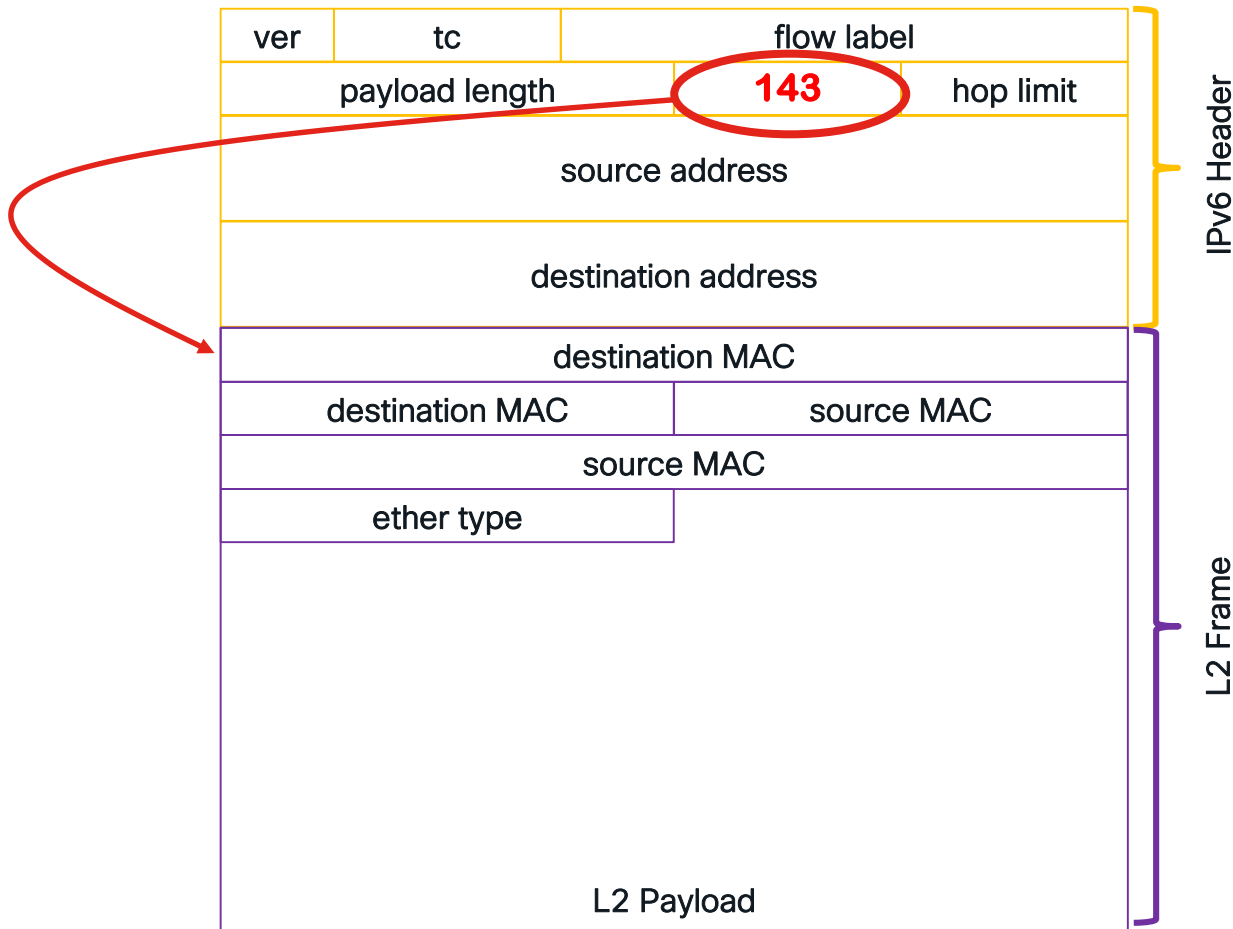# SRv6

- IPv6 Header

- Destination IP address

- Next header field:
  - TCP, UDP, ICMP....
  - IPv4, IPv6, L2

IPv6 Header

ver	tc	flow label	
payload length		**143**	hop limit
source address			
destination address			

L2 Frame

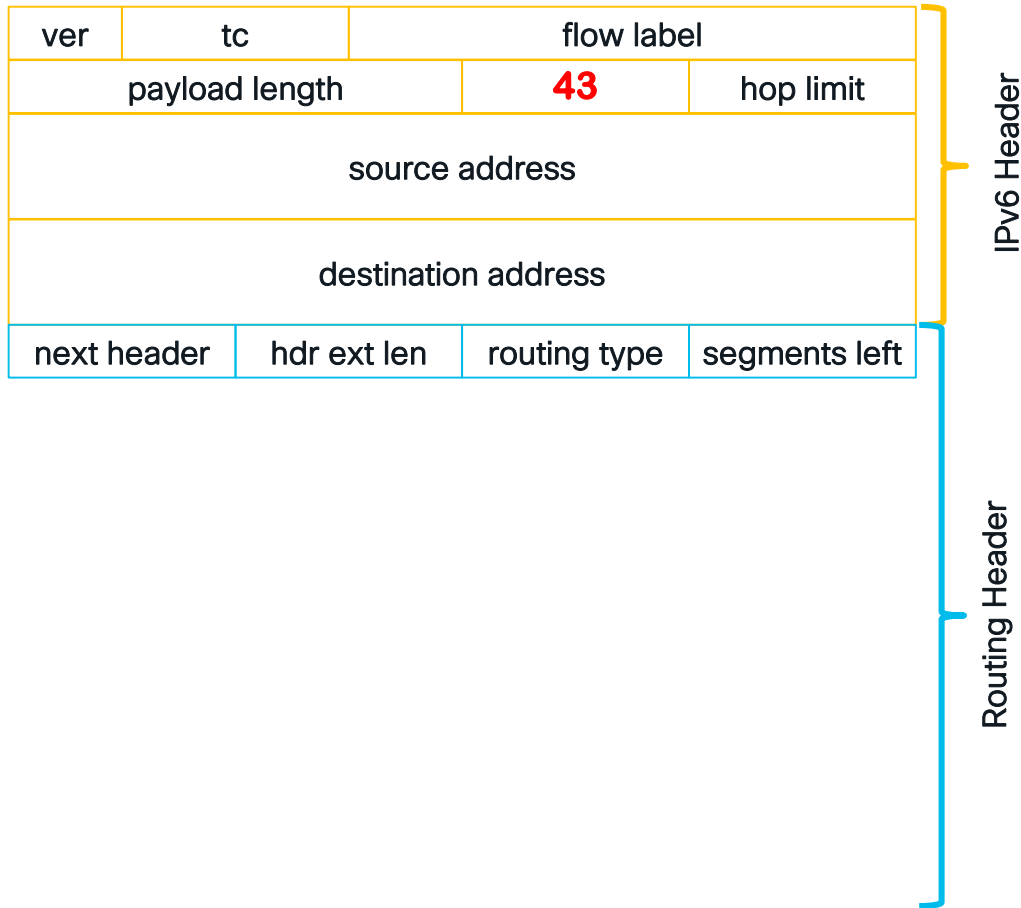| destination MAC	
destination MAC	source MAC
source MAC	
ether type	
L2 Payload	

SRv6

- IPv6 Header

- Destination IP address

- Next header field:
  - TCP, UDP, ICMP....
  - IPv4, IPv6, L2
  - Hop by Hop, Dest. Options, Fragmentation, Authentication Header ...

ver	tc	flow label
payload length	**51**	hop limit
source address		
destination address		

IPv6 Header

6	payload len	reserved
security parameters index		
sequence number		
authentication data		

AH

source port	destination port
sequence number	
acknowledgment number	
hlen	reserved	code bits	window
checksum	urgent
options	
TCP data	

TCP Header

SRv6

- IPv6 Header

- Destination IP address

- Next header field:

  - TCP, UDP, ICMP....

  - IPv4, IPv6, L2

  - Hop by Hop, Dest. Options, Fragmentation, Authentication Header ...

  - Routing Header

    0 Source Route (deprecated)

    1 Nimrod (deprecated)

    2 Type 2 (RFC 6275)

    3 RPL (RFC 6554)

ver	tc	flow label	
payload length		**43**	hop limit
source address			
destination address			
next header	hdr ext len	routing type	segments left

IPv6 Header
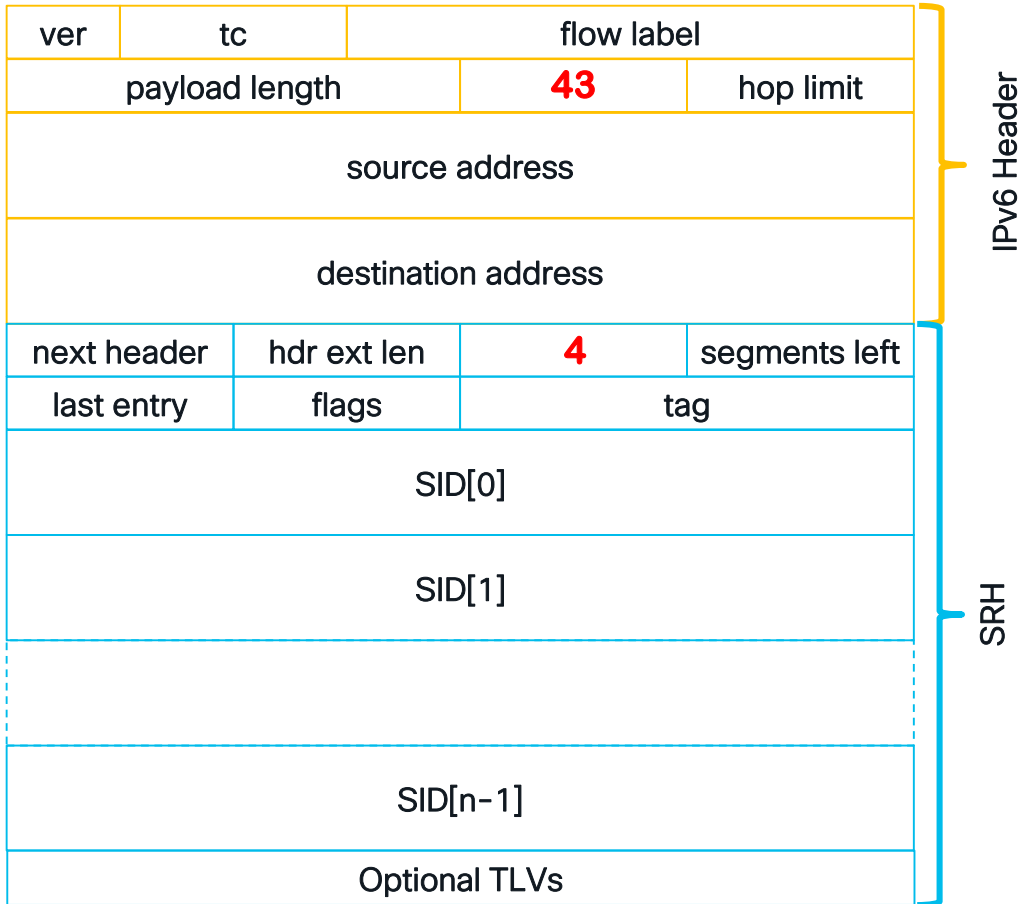
Routing Header

SRv6

- IPv6 Header

- Destination IP address

- Next header field:

  - TCP, UDP, ICMP....

  - IPv4, IPv6, L2

  - Hop by Hop, Dest. Options, Fragmentation, Authentication Header ...

  - Routing Header

  0 Source Route (deprecated)

  1 Nimrod (deprecated)

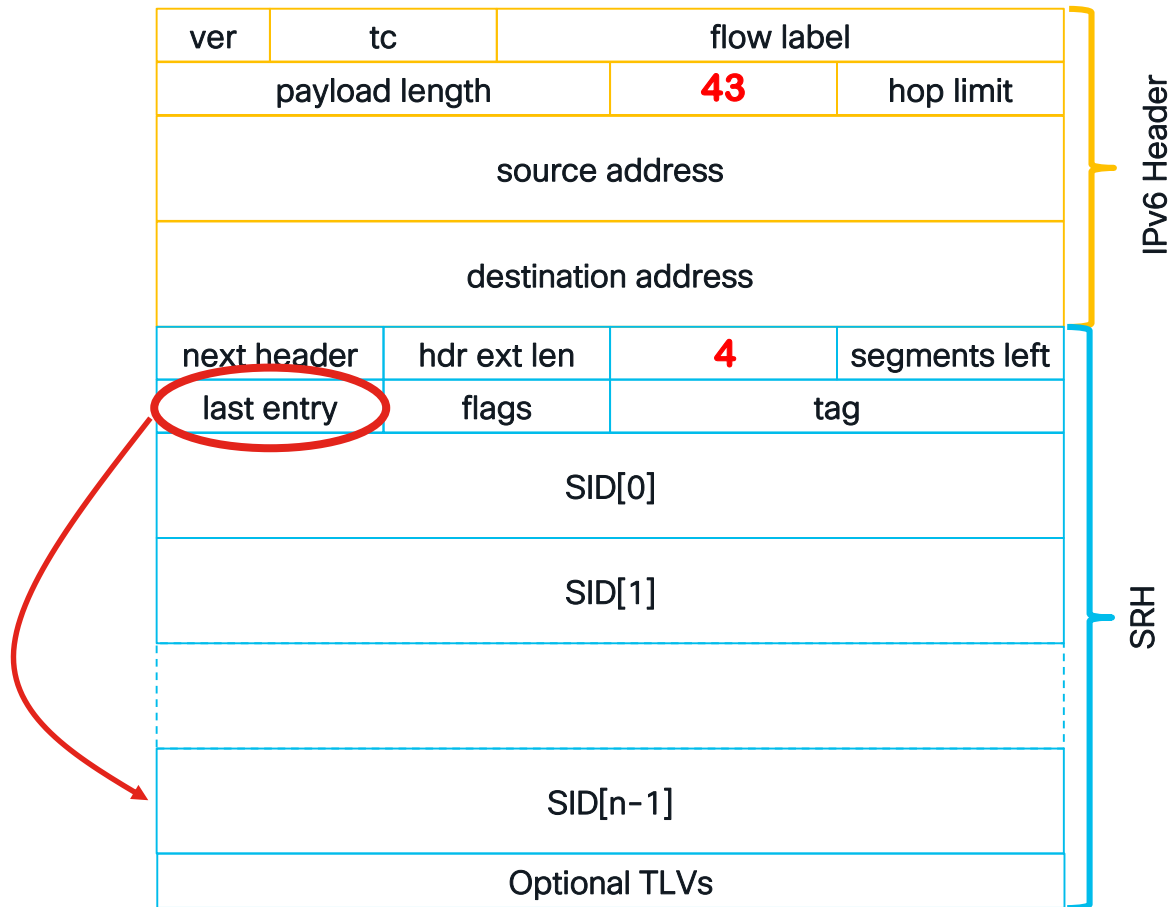 2 Type 2 (RFC 6275)

  3 RPL (RFC 6554)

  4 SRH (RFC 8754)

ver	tc	flow label	
payload length		**43**	hop limit
source address			
destination address			
next header	hdr ext len	**4**	segments left
last entry	flags	tag	
SID[0]			
SID[1]			
SID[n-1]			
Optional TLVs			

RFC 2460 — IPv6 Header

RFC 8754 — SRH

SRH

- Segment Routing Header

- First Segment
  - Pointer to very first SID

ver	tc	flow label	
payload length		**43**	hop limit
source address			
destination address			

(IPv6 Header)

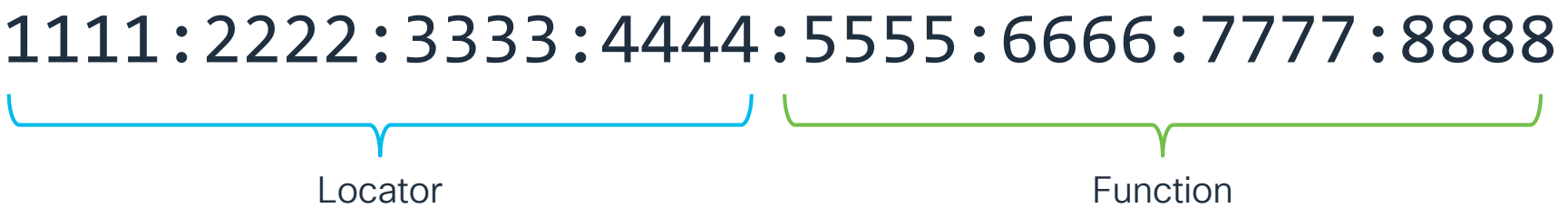| next header	hdr ext len	**4**	segments left
last entry	flags	tag	
SID[0]			
SID[1]			
SID[n-1]			
Optional TLVs			

(SRH)

SRH

- Segment Routing Header

- First Segment
  - Pointer to very first SID

- Segments left
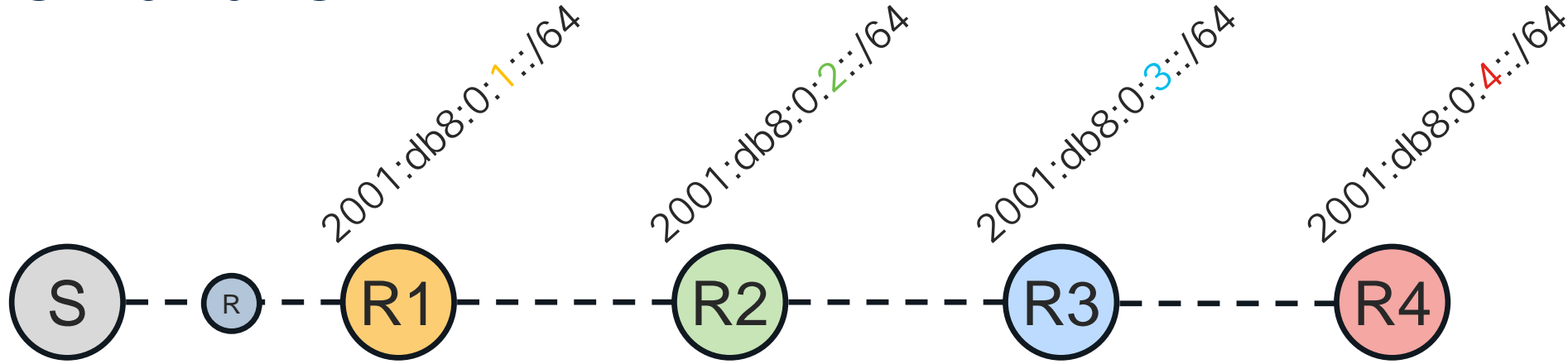 - Pointer to Active SID
  - Active SID always in destination addr

ver	tc	flow label	
payload length		**43**	hop limit
source address			
ACTIVE SID			

IPv6 Header

next header	hdr ext len	**4**	segments left
last entry	flags		tag
SID[0]			
SID[1]			
ACTIVE SID			
SID[n-1]			
Optional TLVs			

SRH

copy
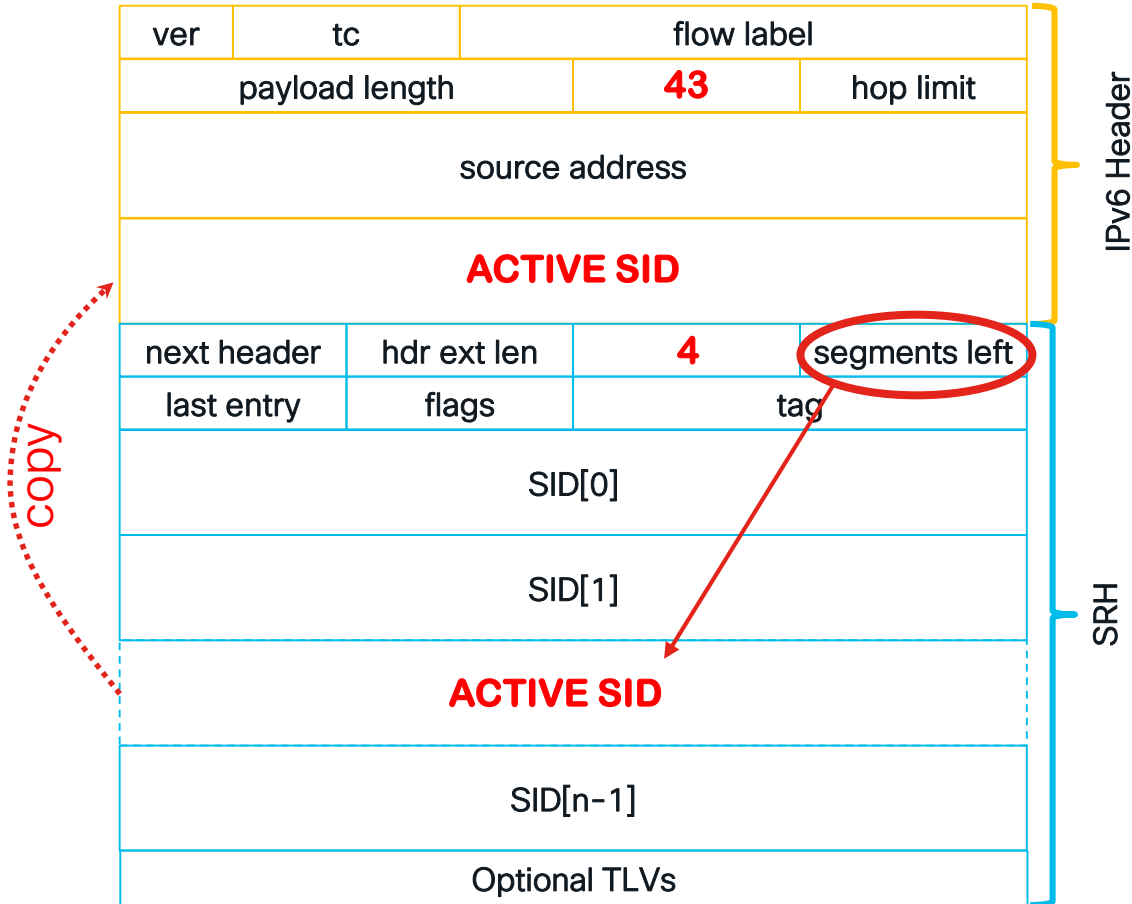
SID Structure – Locator

128 Bits Like IPv6 address but different semantics

$$1111:2222:3333:4444:5555:6666:7777:8888$$

Locator   Function

SRv6 Full SID

2001:db8:0:1::/64

2001:db8:0:2::/64

2001:db8:0:3::/64

2001:db8:0:4::/64

S — R — R1 — R2 — R3 — R4

BGP:2001:db8:0:4:eeee::

```
SA:2001::1
DA:2001:db8:0:1:1::
NH:RH

Type:4(SRH)
NH:IPv4|SL:3
Segment List:
[0]:2001:db8:0:4:eeee::
[1]:2001:db8:0:3:48::
[2]:2001:db8:0:2:1::
[3]:2001:db8:0:1:1::
```
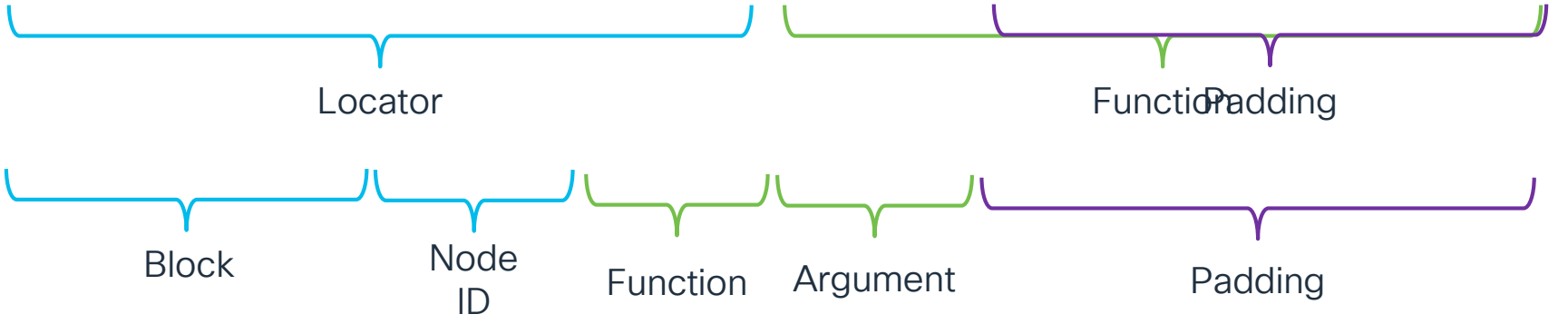
```
SA:2001::1
DA:2001:db8:0:2:1::
NH:RH

Type:4(SRH)
NH:IPv4|SL:2
Segment List:
[0]:2001:db8:0:4:eeee::
[1]:2001:db8:0:3:48::
[2]:2001:db8:0:2:1::
[3]:2001:db8:0:1:1::
```

```
SA:2001::1
DA:2001:db8:0:3:48::
NH:RH

Type:4(SRH)
NH:IPv4|SL:1
Segment List:
[0]:2001:db8:0:4:eeee::
[1]:2001:db8:0:3:48::
[2]:2001:db8:0:2:1::
[3]:2001:db8:0:1:1::
```

```
SA:2001::1
DA:2001:db8:0:4:eeee::
NH:IPv4
```

SID Structure

128 Bits Like IPv6 address but different semantics
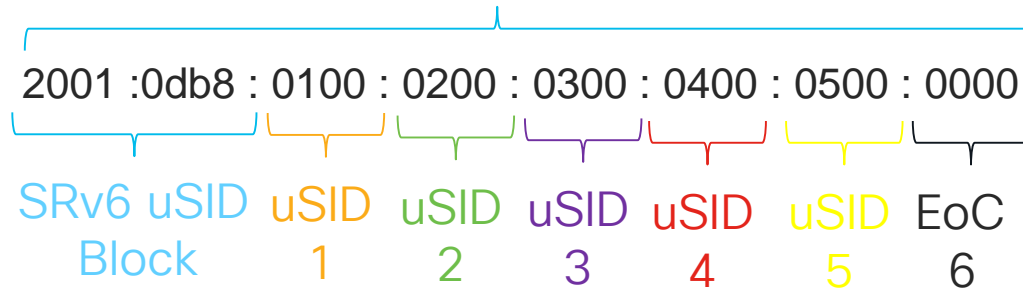
$$1111:2222:3333:4444:5555:6666:7777:8888$$

Locator

Function Padding

Block

Node ID

Function

Argument

Padding

SRv6 uSID format

: 0100 : =SRV6 uSID

16 bits here, but can be anything

SRV6 uSID Container

2001 :0db8 : 0100 : 0200 : 0300 : 0400 : 0500 : 0000

SRv6 uSID Block   uSID 1   uSID 2   uSID 3   uSID 4   uSID 5   EoC 6

32 bits here,
but can be anything

SRV6 Encapsulation

```
SA:2001::1
DA:2001:db8:0:4:1:0:0:0
NH:RH
```

```
Type:4(SRH)
NH:IPv4|SL:1
Segment List:
[0]: 2001:db8:0:5:45:0:0:0
[1]: 2001:db8:0:4:1:0:0:0
[2]: 2001:db8:0:3:48:0:0:0
[3]: 2001:db8:0:2:1:0:0:0
[4]: 2001:db8:0:1:42:0:0:0
```

```
SA:7.5.4.3
DA:11.6.19.71
Port:UDP
```
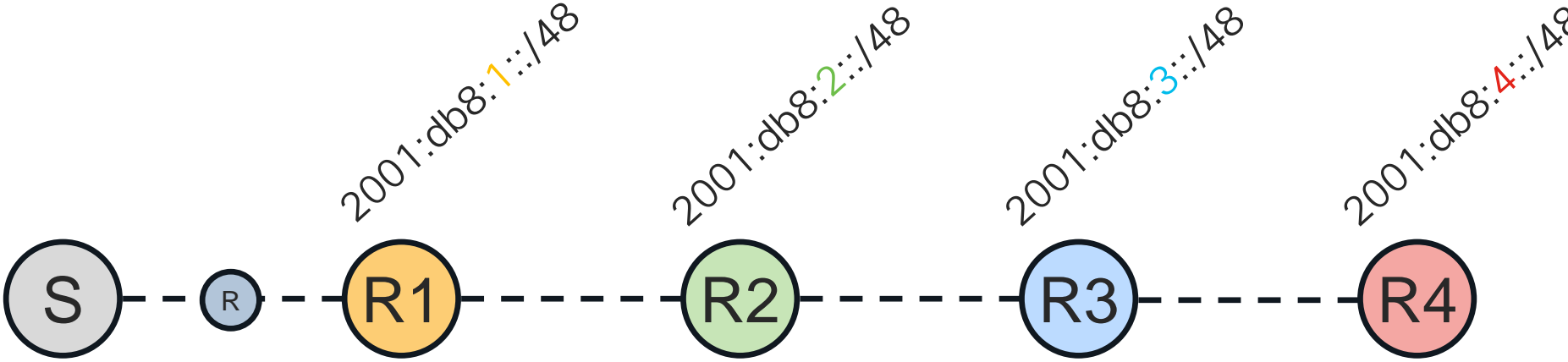
```
UDP Header/Data
```

SRV6 uSID Encapsulation

```
SA:2001::1
DA:2001:db8:100:200:300:400:500::
NH:IPv4
```

```
SA:7.5.4.3
DA:11.6.19.71
Port:UDP
```

```
UDP Header/Data
```

SRv6 uSID F3216

2001:db8:1::/48

2001:db8:2::/48

2001:db8:3::/48

2001:db8:4::/48

S — R — R1 — R2 — R3 — R4

BGP:2001:db8:4:eeee::

```
SA:2001::1
DA:2001:db8:1:2:3:e000:4:eeee
NH:IPV4
```

```
SA:2001::1
DA:2001:db8:2:3:e000:4:eeee::
NH:IPV4
```

```
SA:2001::1
DA:2001:db8:3:e000:4:eeee::
NH:IPV4
```

```
SA:2001::1
DA:2001:db8:4:eeee::
NH:IPV4
```

SRv6 uSID More Than 6 SIDs?

100->200->300->400->500->600->700->800->900->a00->b00

Container 1 2001 : 0db8 : 0100 : 0200 : 0300 : 0400 : 0500 : 0600

Container 2 2001 : 0db8 : 0700 : 0800 : 0900 : 0a00 : 0b00 : 0000

```
SA:2001::1
DA:2001:db8:100:200:300:400:500:600
NH:IPv4
```

```
Type:4(SRH)
NH:IPv4|SL:0
Segment List:
[0]: 2001:db8:700:800:900:a00:b00::
```

```
SA:7.5.4.3
DA:11.6.19.71
Port:UDP
```
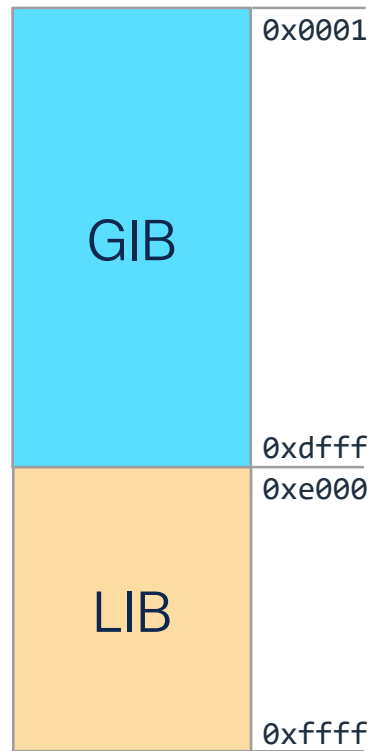
```
UDP Header/Data
```

Shift & Forward
END of Container
-> is there SRH?
Decrement SL
Copy New SID (Container)
PSP

1
2
3
4
5
6
7
8
9
a
b

Sets, Global ID Block (GIB), Local ID Block (LIB)

- Within a Block, SIDs are allocated:
  `FCBB:BB00:XXXX::/48`

- SID can be:
  - Global: shortest path to a node – globally unique
  - Local: a local function – not globally unique

GIB	0x0001 ... 0xdfff
LIB	0xe000 ... 0xffff

SRv6 uSID Configuration

Name to reference

uSID

```
segment-routing
 srv6
  locators
   locator MAIN
    micro-segment behavior unode psp-usd
    prefix fcbb:bb00:1::/48
```
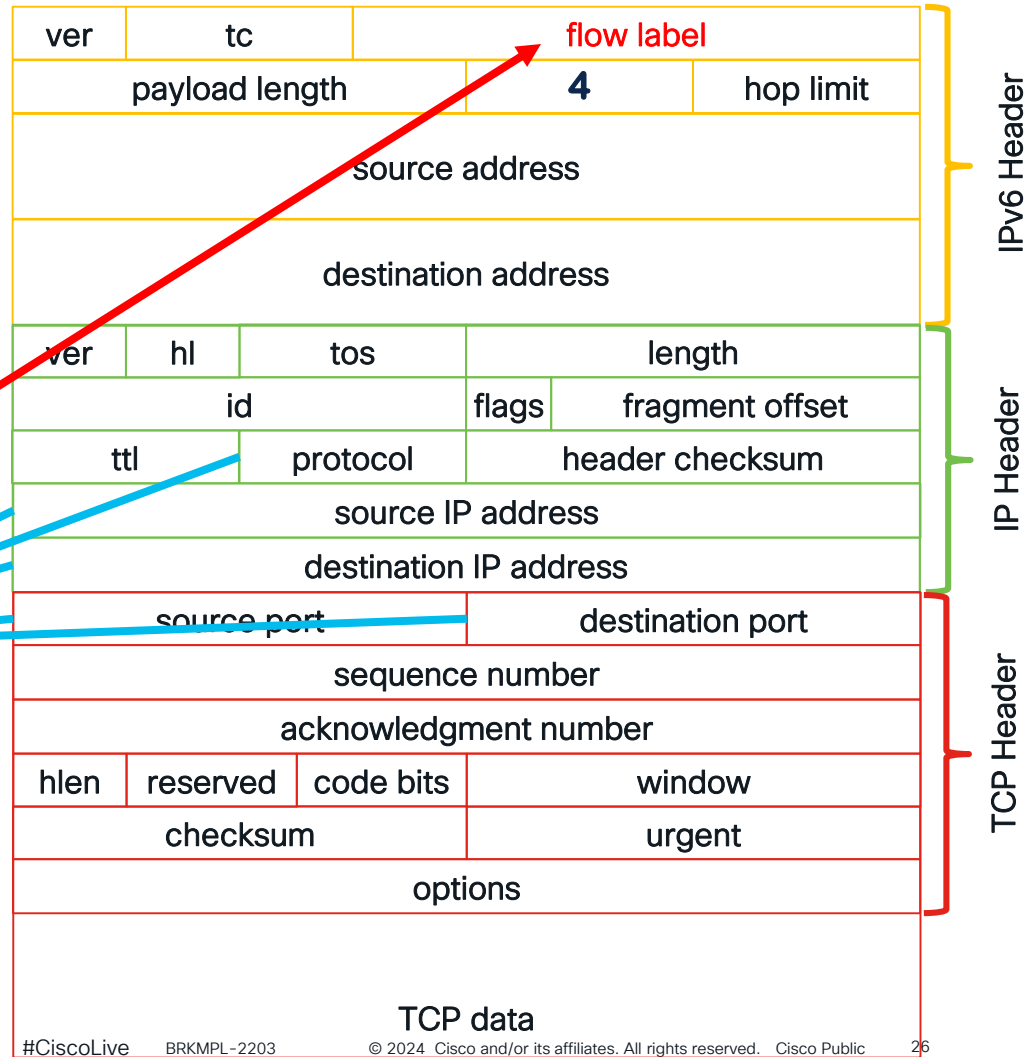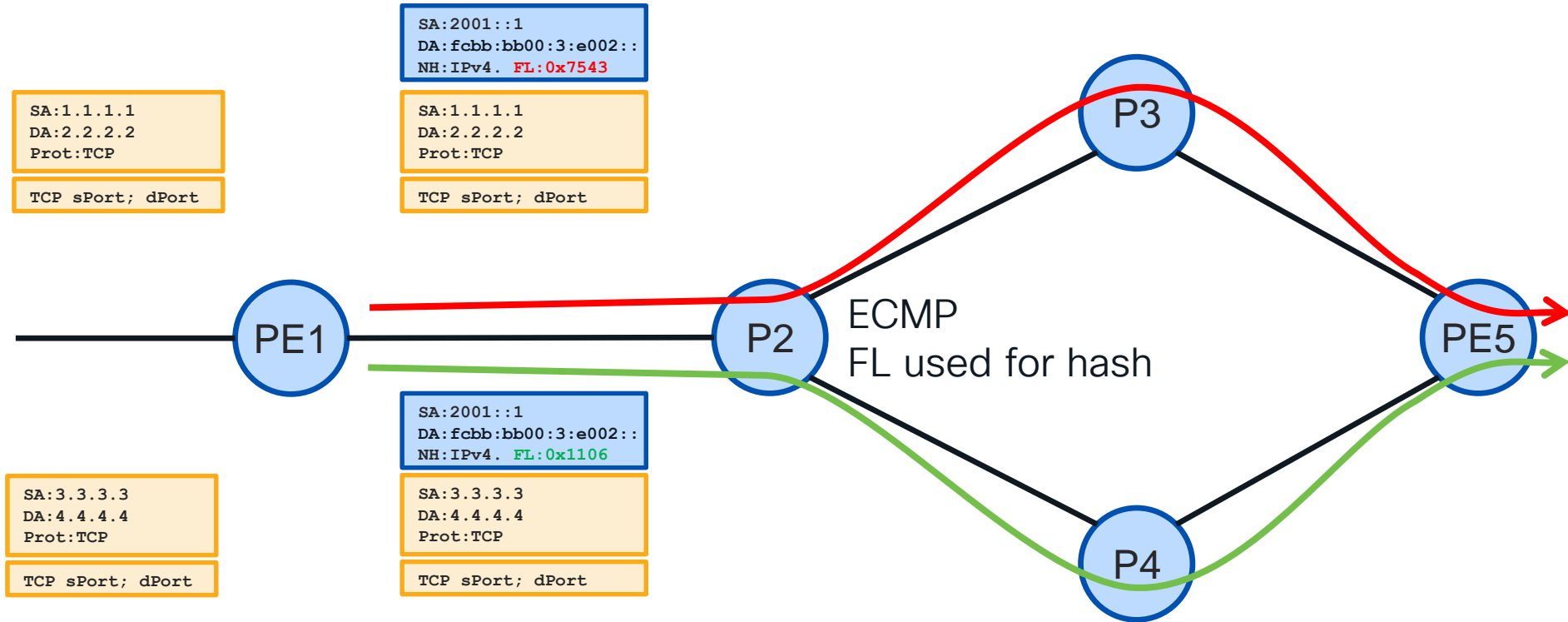
Locator Prefix

Flow Label

- What for?

- Entropy encoding encap
  - 5 Tuple Hash into flow label
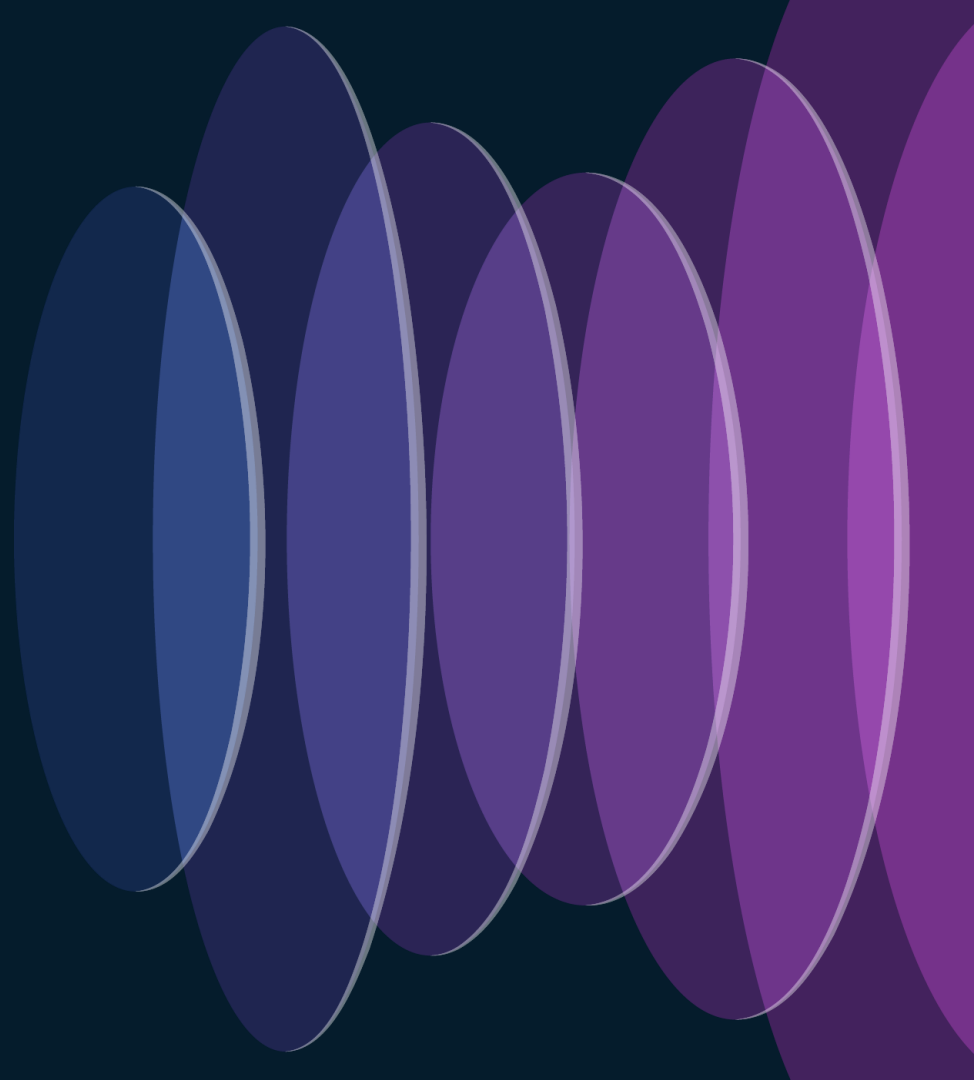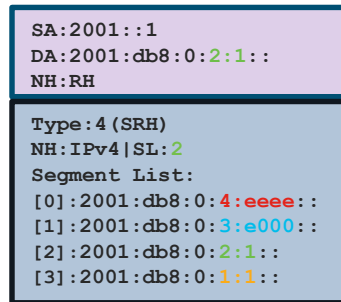
- Used for Hash on P routers

HASH

ver	tc		flow label	
payload length			**4**	hop limit
source address				
destination address				

IPv6 Header

ver	hl	tos	length	
id			flags	fragment offset
ttl		protocol	header checksum	
source IP address				
destination IP address				

IP Header

source port			destination port	
sequence number				
acknowledgment number				
hlen	reserved	code bits	window	
checksum			urgent	
options				
TCP data				

TCP Header

Flow Label

```
SA:2001::1
DA:fcbb:bb00:3:e002::
NH:IPv4. FL:0x7543
```

```
SA:1.1.1.1
DA:2.2.2.2
Prot:TCP
```
```
TCP sPort; dPort
```

```
SA:1.1.1.1
DA:2.2.2.2
Prot:TCP
```
```
TCP sPort; dPort
```

```
SA:2001::1
DA:fcbb:bb00:3:e002::
NH:IPv4. FL:0x1106
```

```
SA:3.3.3.3
DA:4.4.4.4
Prot:TCP
```
```
TCP sPort; dPort
```

```
SA:3.3.3.3
DA:4.4.4.4
Prot:TCP
```
```
TCP sPort; dPort
```

PE1

P2

ECMP
FL used for hash

P3

P4

PE5

SRv6 Network Programming

SRv6 functions: RFC 8986

Codename		Behavior	
End	uN	Endpoint	[Node SID]
End.X	uA	Endpoint with Layer-3 cross-connect	[Adj SID]
End.B6.Insert	uB6.Insert	Endpoint bound to an SRv6 policy	[BSID]
End.B6.Encap	uB6.Encaps	Endpoint bound to an SRv6 encapsulation policy	[BSID]
End.DX6	uDX6	Endpoint with decapsulation and IPv6 cross-connect	[L3VPN Per-CE]
End.DX4	uDX4	Endpoint with decapsulation and IPv4 cross-connect	[L3VPN Per-CE]
End.DT6	uDT6	Endpoint with decapsulation and specific IPv6 table lookup	[L3VPN Per-VRF]
End.DT4	uDT4	Endpoint with decapsulation and specific IPv4 table lookup	[L3VPN Per-VRF]
End.DX2	uDX2	Endpoint with decapsulation and L2 cross-connect	[E-LINE]
End.DT2U/M	uDT2U/M	Endpoint with decapsulation and L2 unicast lookup / flooding	[E-LAN]
End.DTM	uDTM	Endpoint with decapsulation and MPLS table lookup	[Interworking]
H.Insert / H.Encaps		Headend with Insertion / Encapsulation of / into an SRv6 policy	[TiLFA]
H. Encaps.L2		H.Encaps Applied to Received L2 Frames	[L2 Port Mode]
H.Encaps.M		H.Encaps Applied to MPLS Label Stack	[Interworking]

CISCO Live!

END– Default endpoint (Node SID)
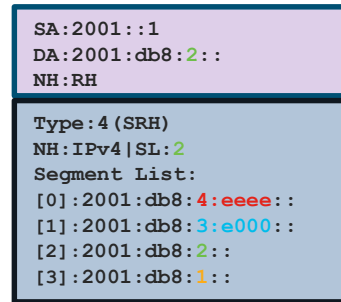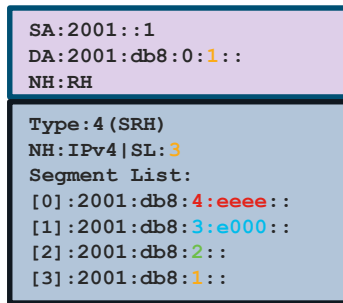
- *Decrement SL*
- *Copy Active SID*
- *Forward*

```
SA:2001::1
DA:2001:db8:0:1:1::
NH:RH
```
```
Type:4(SRH)
NH:IPv4|SL:3
Segment List:
[0]:2001:db8:0:4:eeee::
[1]:2001:db8:0:3:e000::
[2]:2001:db8:0:2:1::
[3]:2001:db8:0:1:1::
```

R1

```
SA:2001::1
DA:2001:db8:0:2:1::
NH:RH
```
```
Type:4(SRH)
NH:IPv4|SL:2
Segment List:
[0]:2001:db8:0:4:eeee::
[1]:2001:db8:0:3:e000::
[2]:2001:db8:0:2:1::
[3]:2001:db8:0:1:1::
```

R2
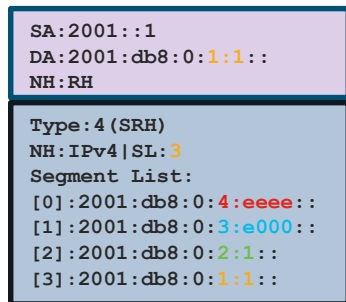
- Different Flavors:
  - End
  - End with PSP
  - End with USP
  - End with PSP & USP
  - End with USD
  - End with PSP & USD
  - End with USP & USD
  - End with PSP, USP & USD

- End with NEXT-ONLY-CSID
- End with NEXT-CSID
- End with NEXT-CSID & PSP
- End with NEXT-CSID & USP
- End with NEXT-CSID, PSP & USP
- End with NEXT-CSID & USD
- End with NEXT-CSID, PSP & USD
- End with NEXT-CSID, USP & USD
- End with NEXT-CSID, PSP, USP & USD

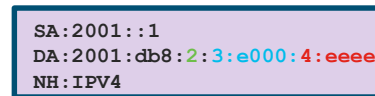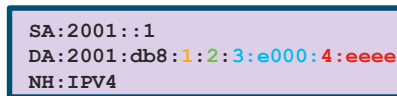# uN=END with Next – Default endpoint (Node SID)
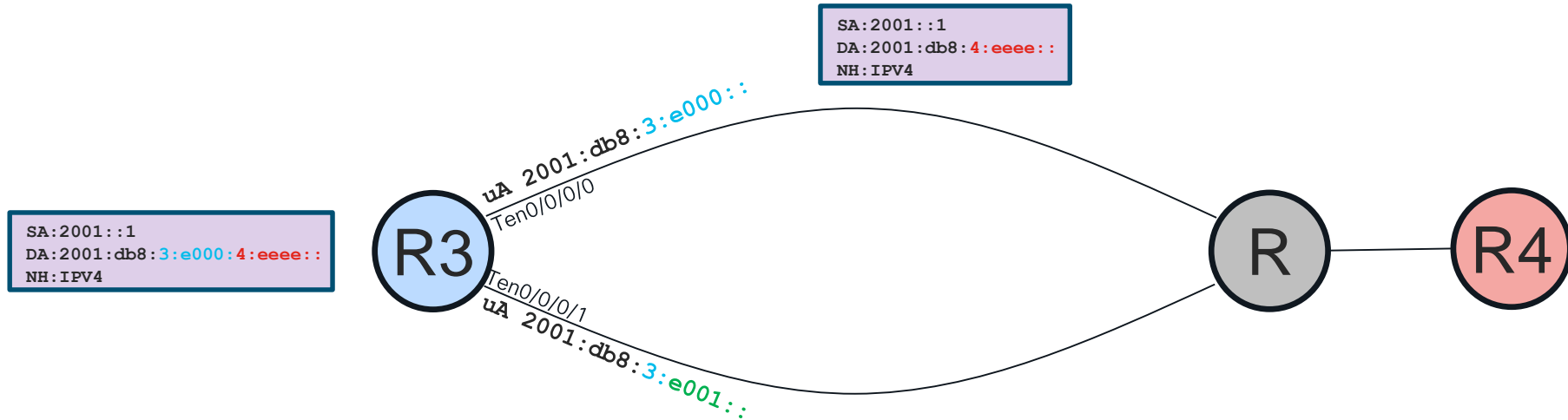
- *Decrement SL*
- *Copy Active SID*
- *Forward*

```
SA:2001::1
DA:2001:db8:0:1::
NH:RH

Type:4(SRH)
NH:IPv4|SL:3
Segment List:
[0]:2001:db8:4:eeee::
[1]:2001:db8:3:e000::
[2]:2001:db8:2::
[3]:2001:db8:1::
```

R1

```
SA:2001::1
DA:2001:db8:2::
NH:RH

Type:4(SRH)
NH:IPv4|SL:2
Segment List:
[0]:2001:db8:4:eeee::
[1]:2001:db8:3:e000::
[2]:2001:db8:2::
[3]:2001:db8:1::
```

R2

Better way:

- *Shift & Forward*

```
SA:2001::1
DA:2001:db8:1:2:3:e000:4:eeee
NH:IPV4
```

R1

```
SA:2001::1
DA:2001:db8:2:3:e000:4:eeee
NH:IPV4
```

R2

uA=END.X with Next – (Adjacency SID)


```
SA:2001::1
DA:2001:db8:4:eeee::
NH:IPV4
```

```
SA:2001::1
DA:2001:db8:3:e000:4:eeee::
NH:IPV4
```

uA 2001:db8:3:e000::
Ten0/0/0/0

Ten0/0/0/1
uA 2001:db8:3:e001::

R3   R   R4

- *Shift & Forward to **SPECIFIC INTERFACE***

uDX4=END.DX4, uDX6=END.DX6, uDX2=END.DX2 Endpoint with Decapsulation and Xconnect

- *Decapsulate and Forward to SPECIFIC INTERFACE*

- *Same as Per CE Label Allocation*
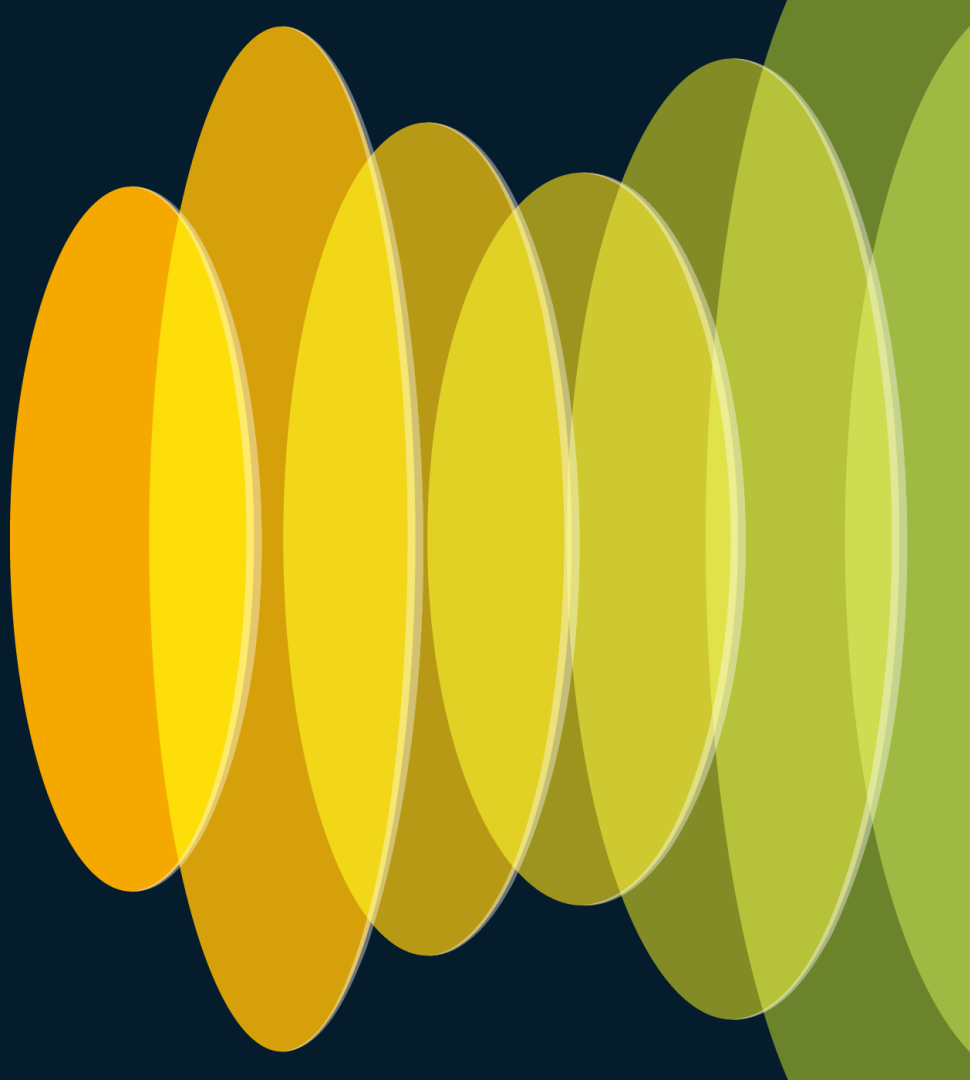
- *Must be last function in SID list*


```
SA:2001::1
DA:2001:db8:4:eeee::
NH:IPV4
```
```
IPv4 Packet
```

R4 Ten0/0/0/0

```
IPv4 Packet
```

uDT4=END.DT4, uDT6=END.DT6
Endpoint with Decapsulation and Table Lookup

- *Decapsulate and Table Lookup (VRF)*

- ***Same as Per VRF Label Allocation (aggregate label)***

- *Must be last function in SID list*

```
SA:2001::1
DA:2001:db8:4:eeee::
NH:IPV4
```
```
IPv4 Packet
```

R4

```
IPv4 Packet
```

SRv6 uSID ISIS

ISIS for SRv6

LSP (Link State Packet):

   TLVs:

Hostname:	r2	
Interfaces:	Hu0/0/0/0	uA:fcbb:0:2:e001::
		Structure: BL=32;NL=16;FL=16;AL=0
	Hu0/0/0/1	uA:fcbb:0:2:e002::
		Structure: BL=32;NL=16;FL=16;AL=0
	Lo0	
Neighbors:	r1	
	r3	
IP addresses:	fcbb:0:2::1/128	
	2001:12::2/64	
Locator:	fcbb:0:2::/48	
	uN:fcbb:0:2::	
	Structure: BL=32;NL=16;FL=0,AL=80	
Capabilities:	Algorithms	
	SIDs can insert	
	SIDs can decap	
	....	

Lo0
fcbb:0:2::1/128

Locator:
fcbb:0:2::/48   r2   Hu0/0/0/1
uN:fcbb:0:2::   uA:fcbb:0:2:e002::
Structure: BL=32;NL=16;FL=0,AL=80 Structure: BL=32;NL=16;FL=16;AL=0

uA:fcbb:0:2:e001::
Structure: BL=32;NL=16;FL=16;AL=0

2001:12::2/64
Hu0/0/0/0

r3

r1
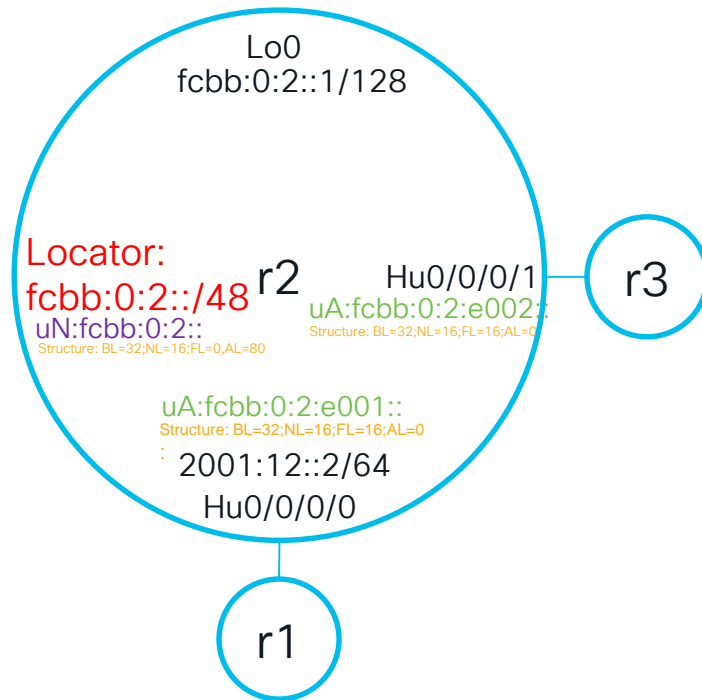
ISIS LSP Example

```
IS-IS 1 (Level-2) Link State Database
LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime/Rcvd  ATT/P/OL
r2.00-00             0x00000009   0x4f06        1145 /1200         0/0/0
  Area Address:    49
  NLPID:           0x8e
  Hostname:        r1
  IPv6 Address:    2001::2
  Metric: 10          MT (IPv6 Unicast) IPv6 fcbb:bb00:2::1/128
    Prefix Attribute Flags: X:0 R:0 N:1 E:0 A:0
  Metric: 1           MT (IPv6 Unicast) IPv6 fcbb:bb00:2::/48
    Prefix Attribute Flags: X:0 R:0 N:0 E:0 A:0
  MT:              IPv6 Unicast                                  0/0/0
  SRv6 Locator:    MT (IPv6 Unicast) fcbb:bb00:2::/48 D:0 Metric: 0 Algorithm: 0
    Prefix Attribute Flags: X:0 R:0 N:0 E:0 A:0
    END SID: fcbb:bb00:2:: uN (PSP/USD)
      SID Structure:
        Block Length: 32, Node-ID Length: 16, Func-Length: 0, Args-Length: 0
  Router Cap:      0.0.0.0 D:0 S:0
    IPv6 Router ID: 2001::2
    SR Algorithm:
      Algorithm: 0
      Algorithm: 1
    SRv6: O:0
    Node Maximum SID Depth:
      SRH Max SL:        3
      SRH Max End Pop:   3
      SRH Max T.insert:  3
      SRH Max T.encaps:  4
      SRH Max End D:     4
  Metric: 10          MT (IPv6 Unicast) IS-Extended r1.00
    Local Interface ID: 6, Remote Interface ID: 6
    Interface IPv6 Address: 2001:12::2
    Neighbor IPv6 Address: 2001:12::1
    END.X SID: fcbb:bb00:2:e001:: B:0 S:0 P:0 uA (PSP/USD) Alg:0
      SID Structure:
        Block Length: 32, Node-ID Length: 16, Func-Length: 16, Args-Length: 0
Total Level-2 LSP count: 1      Local Level-2 LSP count: 0
```

Locator
Capabilities
END
END.X
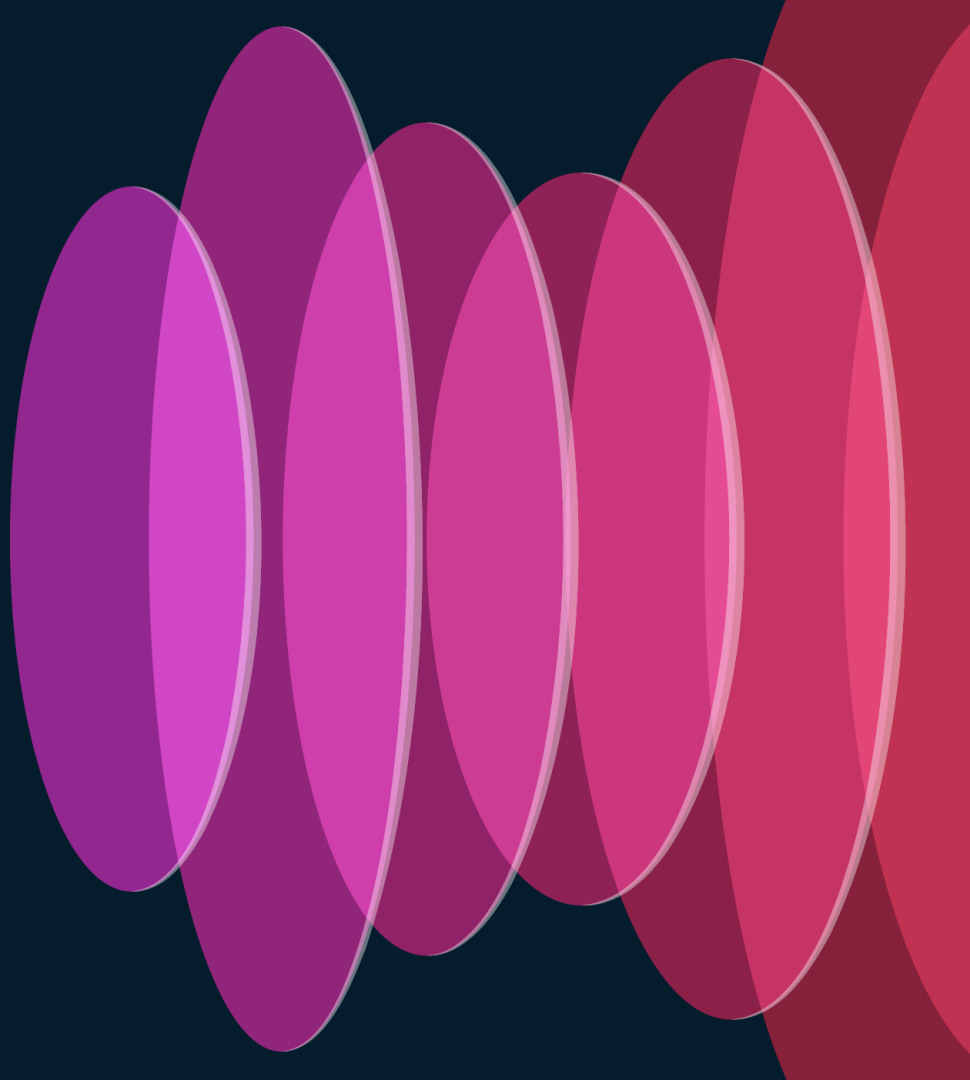SID Structure

SRv6 ISIS Configuration

```
router isis 1
 address-family ipv6 unicast
  segment-routing srv6
   locator  MAIN  ←──────────────────  Name of the Locator
```

This will result in:
- Locator is advertised
- uN function is advertised
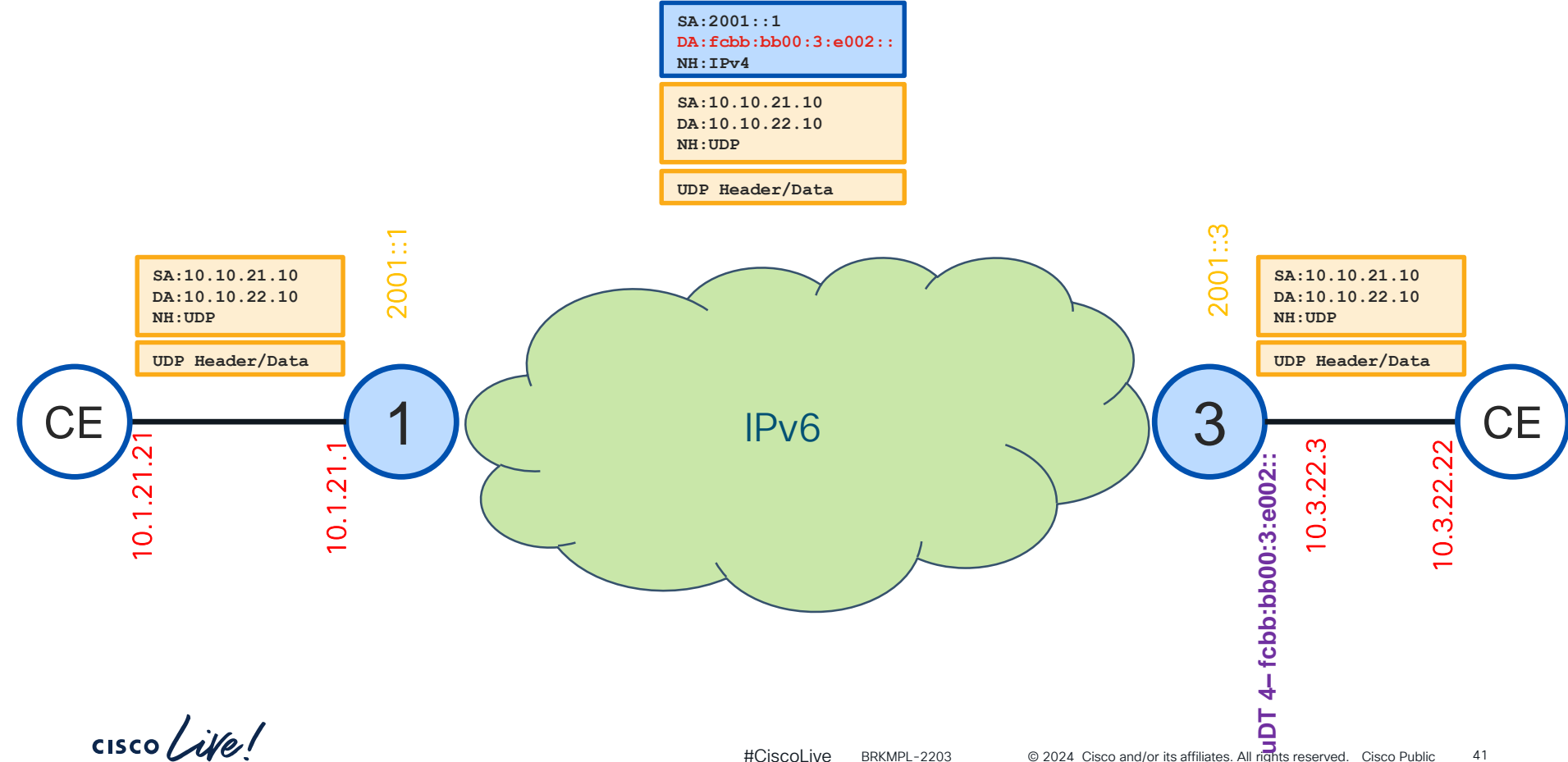- uA for each ISIS interface is allocated and advertised

SRv6 uSID BGP

BGP

- ## No Changes Required!

VPNv4 :10.10.22.0/24
NH:2001::3
RD-1:1
RT -1:1
uDT4- fcbb:bb00:3:e002::

iBGP

IPv4 :10.10.22.0/24
NH:10.1.21.1

IPv4 :10.10.22.0/24
NH:10.3.22.22

eBGP

eBGP

2001::1

2001::3

CE — 1 — IPv6 — 2 — IPv6 — 3 — CE

10.1.21.21

10.1.21.1

10.3.22.3

10.3.22.22

uDT4 – fcbb:bb00:3:e002::

Locator – fcbb:bb00:3::/48

L3 VPN Dataplane

```
SA:2001::1
DA:fcbb:bb00:3:e002::
NH:IPv4
```

```
SA:10.10.21.10
DA:10.10.22.10
NH:UDP
```

```
UDP Header/Data
```

```
SA:10.10.21.10
DA:10.10.22.10
NH:UDP
```

```
UDP Header/Data
```

2001::1

CE ——— **1**

10.1.21.21

10.1.21.1

IPv6

2001::3

```
SA:10.10.21.10
DA:10.10.22.10
NH:UDP
```

```
UDP Header/Data
```

3 ——— **CE**

uDT 4– fcbb:bb00:3:e002::

10.3.22.3

10.3.22.22

SRv6 L3 VPN Configuration

```
router bgp 1
 address-family vpnv4 unicast
 vrf BestEffort
  rd 1:1
  address-family ipv4 unicast
   segment-routing srv6
    locator  MAIN
    alloc mode per-vrf
```

Name of the Locator

Single DT function is allocated per VRF and AF

This will result in:
- uDT4 function is allocated
- All prefixes are advertised with uDT4 function

EVPN

- No Changes Required!

iBGP

EVPN :EVI 7543
NH:2001::3
RD–1:1
RT –1:1
uDX2– fcbb:bb00:3:e002::

2001::1

2001::3

CE — EVI 7543 — 1

IPv6 Locator – fcbb:bb00:3::/48

3 — EVI 7543 — CE

uDX2 – fcbb:bb00:3:e002::

EVPN Dataplane

```
SA:2001::1
DA:fcbb:bb00:3:e002::
NH:L2
```

```
L2 Frame
```

```
L2 Frame
```

CE —— EVI 7543 —— (1)

IPv6   Locator – fcbb:bb00:3::/48

(3) —— EVI 7543 —— CE

```
L2 Frame
```

uDX2 – fcbb:bb00:3:e002::
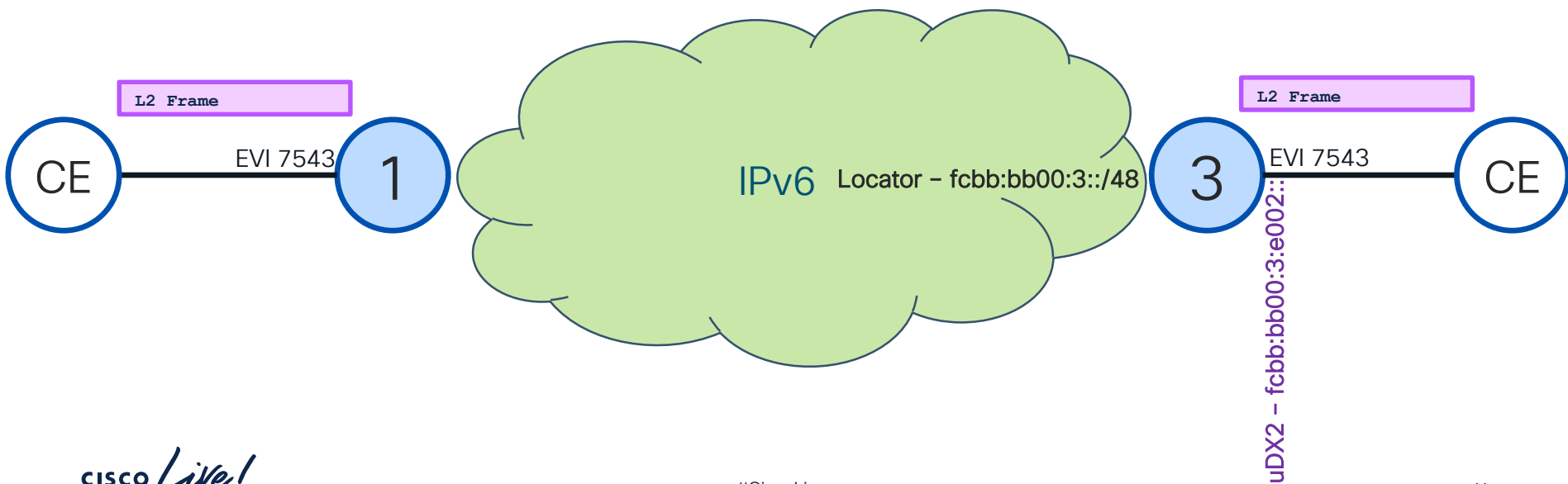
SRv6 L2 VPWS

```
interface TenGigE0/0/0/0.7543 l2transport
 encapsulation dot1q 7543
 rewrite ingress tag pop 1 symmetric


l2vpn
 xconnect group P2P
  p2p 13-14
    interface TenGigE0/0/0/0.7543
    neighbor evpn evi 7543 service 7543
segment-routing srv6


evpn
 evi 7543 segment-routing srv6
  locator MAIN
 segment-routing srv6
```

This will result in:
- uDX2 function is allocated per EVI
- EVI is advertised with uDX2 function

Name of the Locator

MPLS to SRv6 Migration

Dual Connected PE

MPLS PE   DUAL Connected PE   SRv6 PE

BGPv4   VPN prefix +label   BGPv4   BGPv6   VPN prefix +SID   BGPv6

LDPv4   Loopback label   LDPv4   ISISv6   Locators   ISISv6

ISISv4   Loopback addr   ISISv4

Lo:1.1.1.1   **PE**   Lo:1.1.1.1   **PE**   Lo0: A::2   **PE**   Lo0: A::2

VRF   VRF   VRF

10.10.1.0/24   10.10.1.0/24   10.10.1.0/24
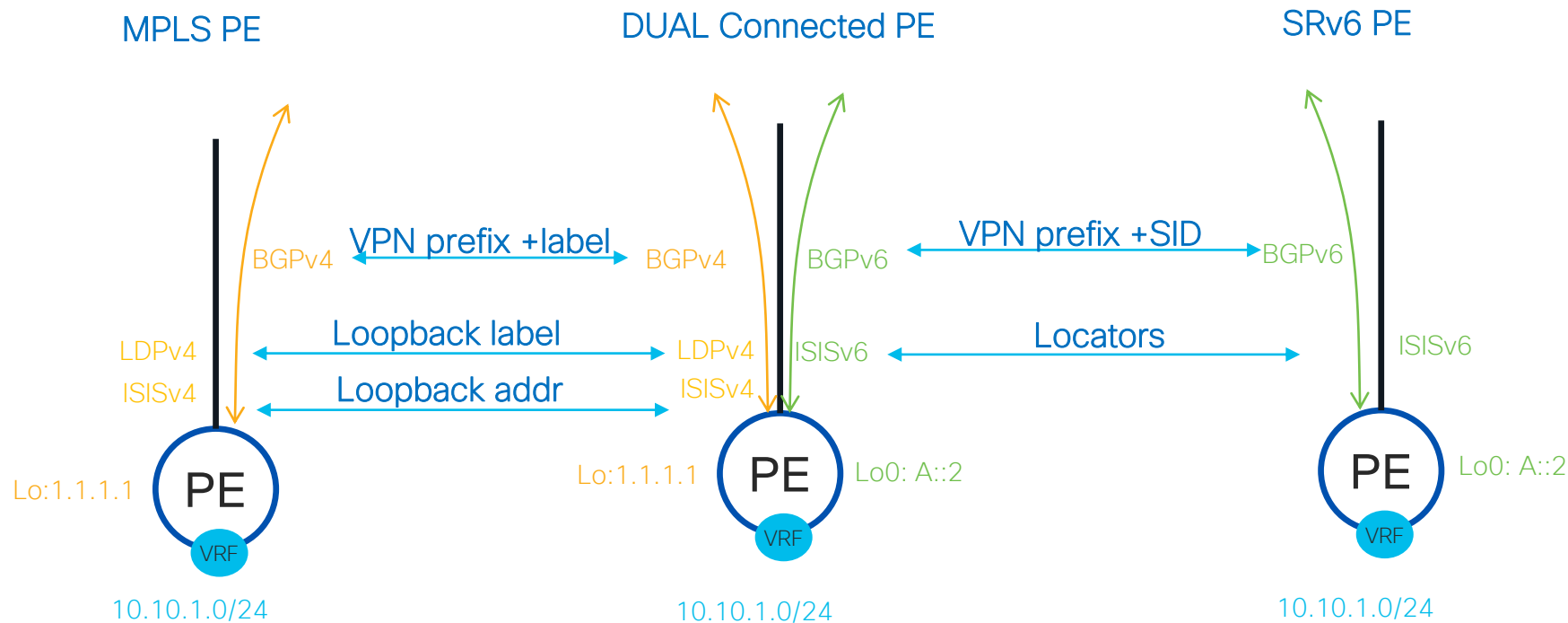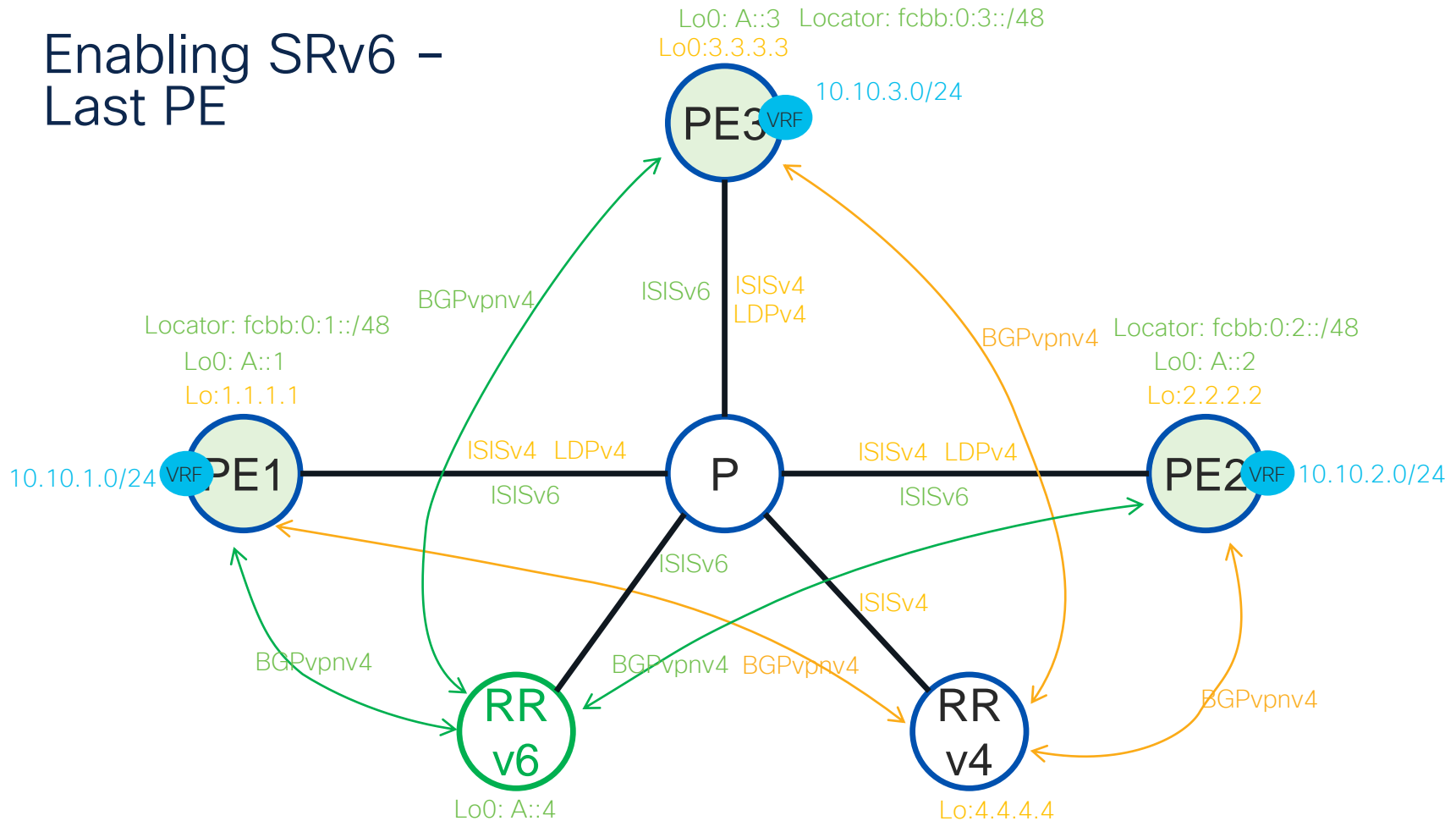
MPLS Network –
Day 0
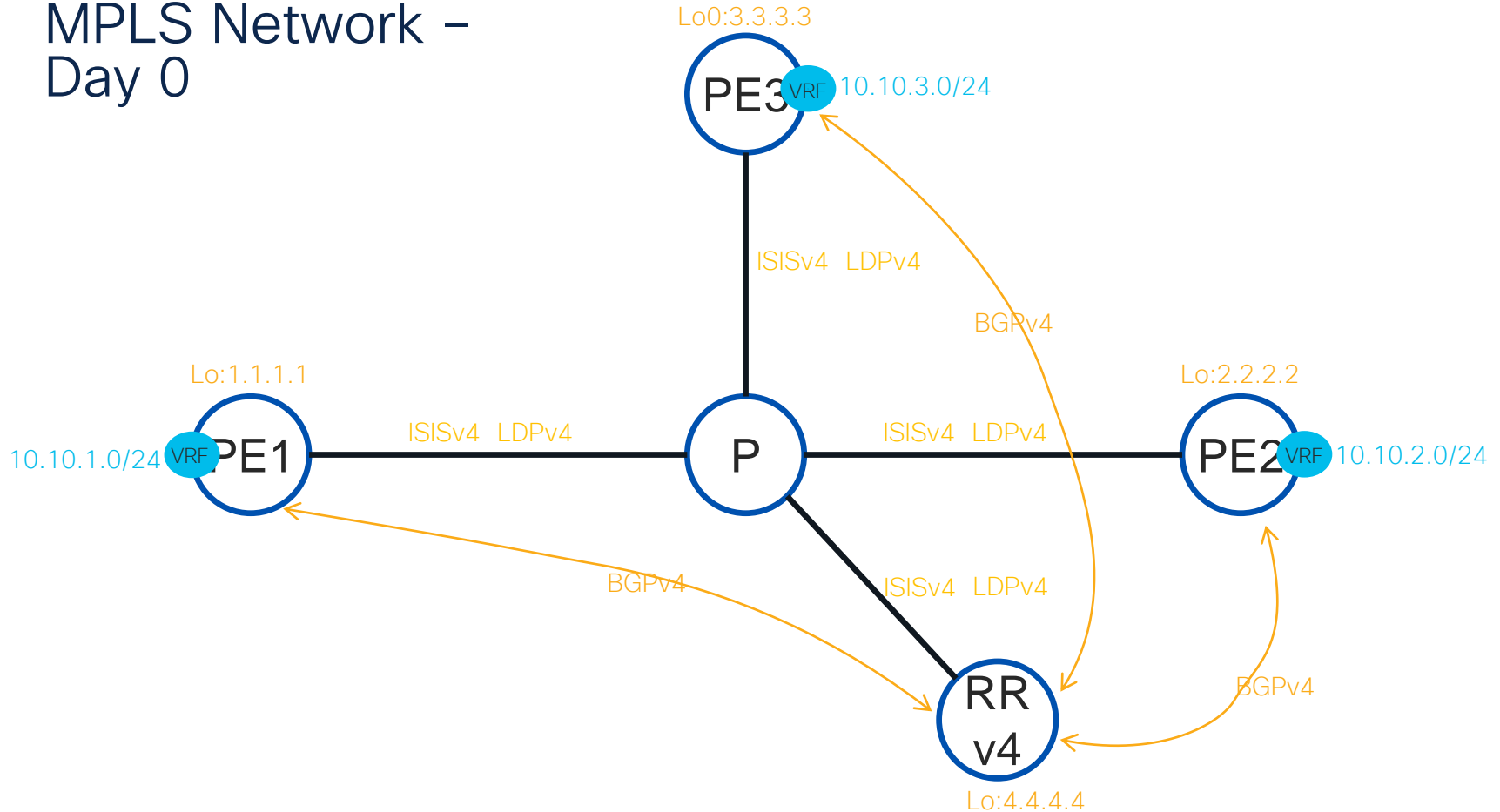
Enabling IPv6 Routing– Day 1
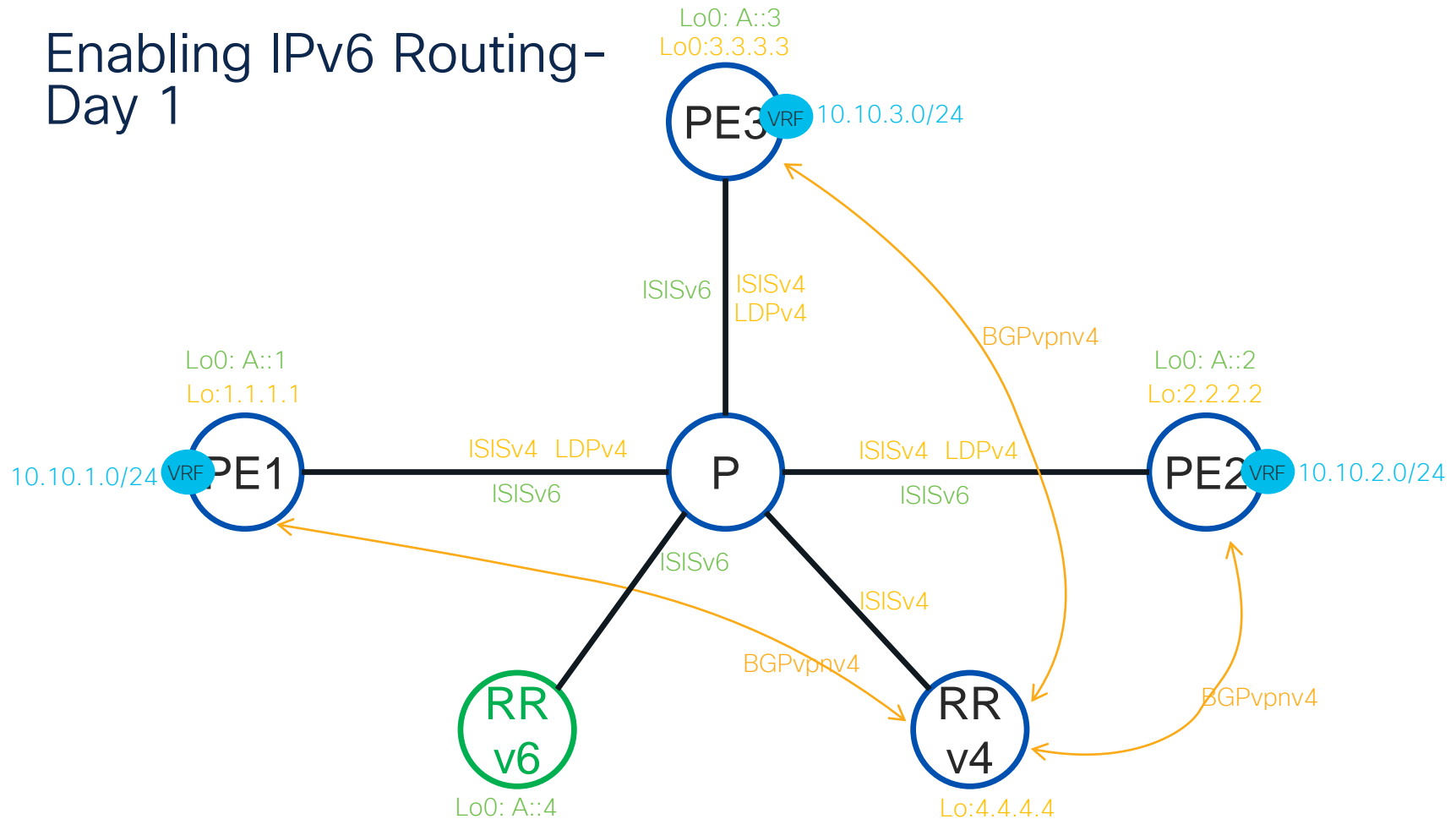
Enabling SRv6 – PE1&PE2
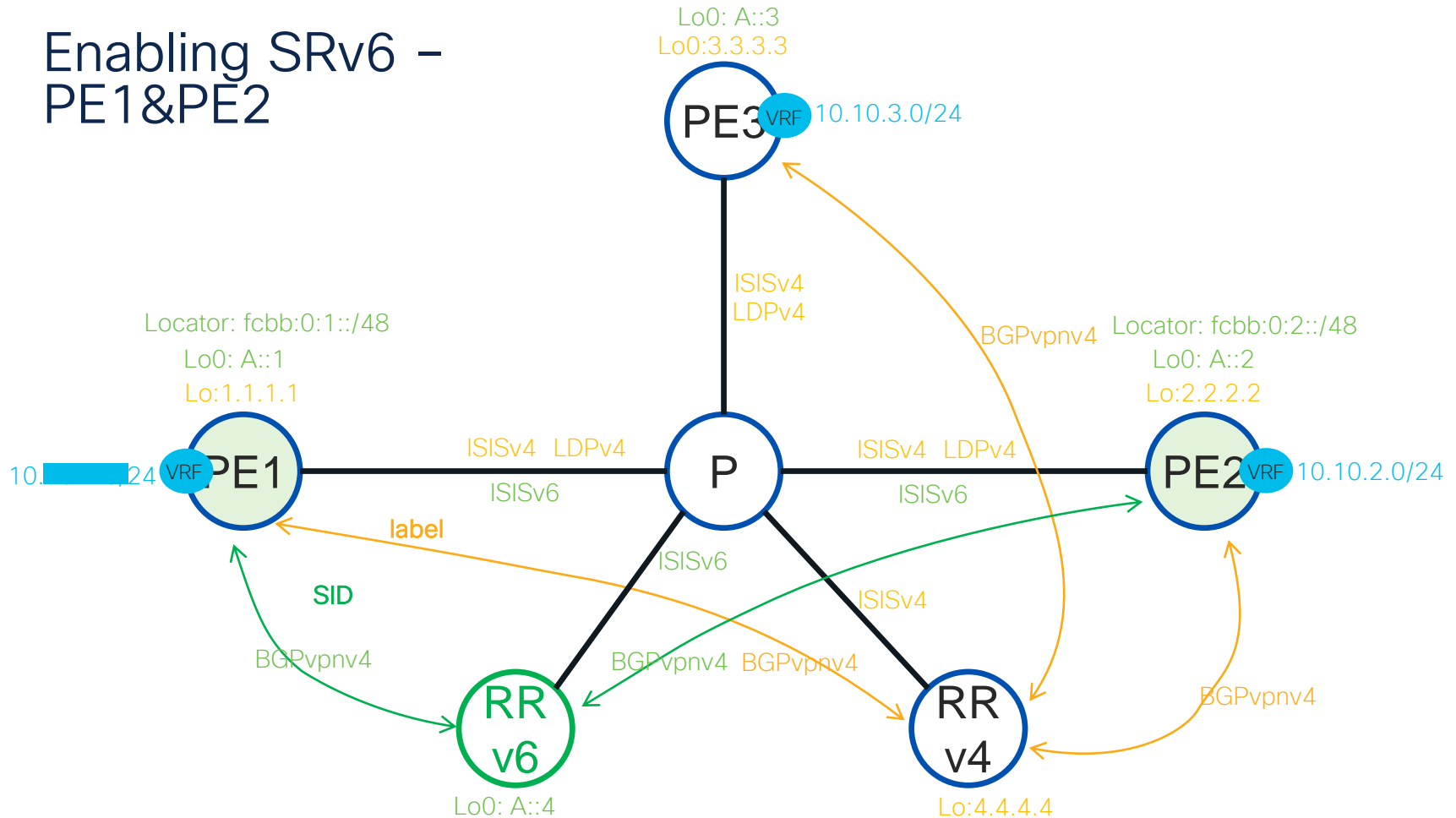
Everything is BGP best path selection driven!! (ie Local Preference)

Enabling SRv6 – Last PE

Removing V4

Lo0: A::3   Locator: fcbb:0:3::/48

PE3   VRF 10.10.3.0/24

Locator: fcbb:0:1::/48
Lo0: A::1

Locator: fcbb:0:2::/48
Lo0: A::2

BGPvpnv4

ISISv6

10.10.1.0/24 VRF PE1

P

PE2 VRF 10.10.2.0/24

ISISv6

ISISv6

ISISv6

BGPvpnv4

BGPvpnv4

RR
v6

Lo0: A::4
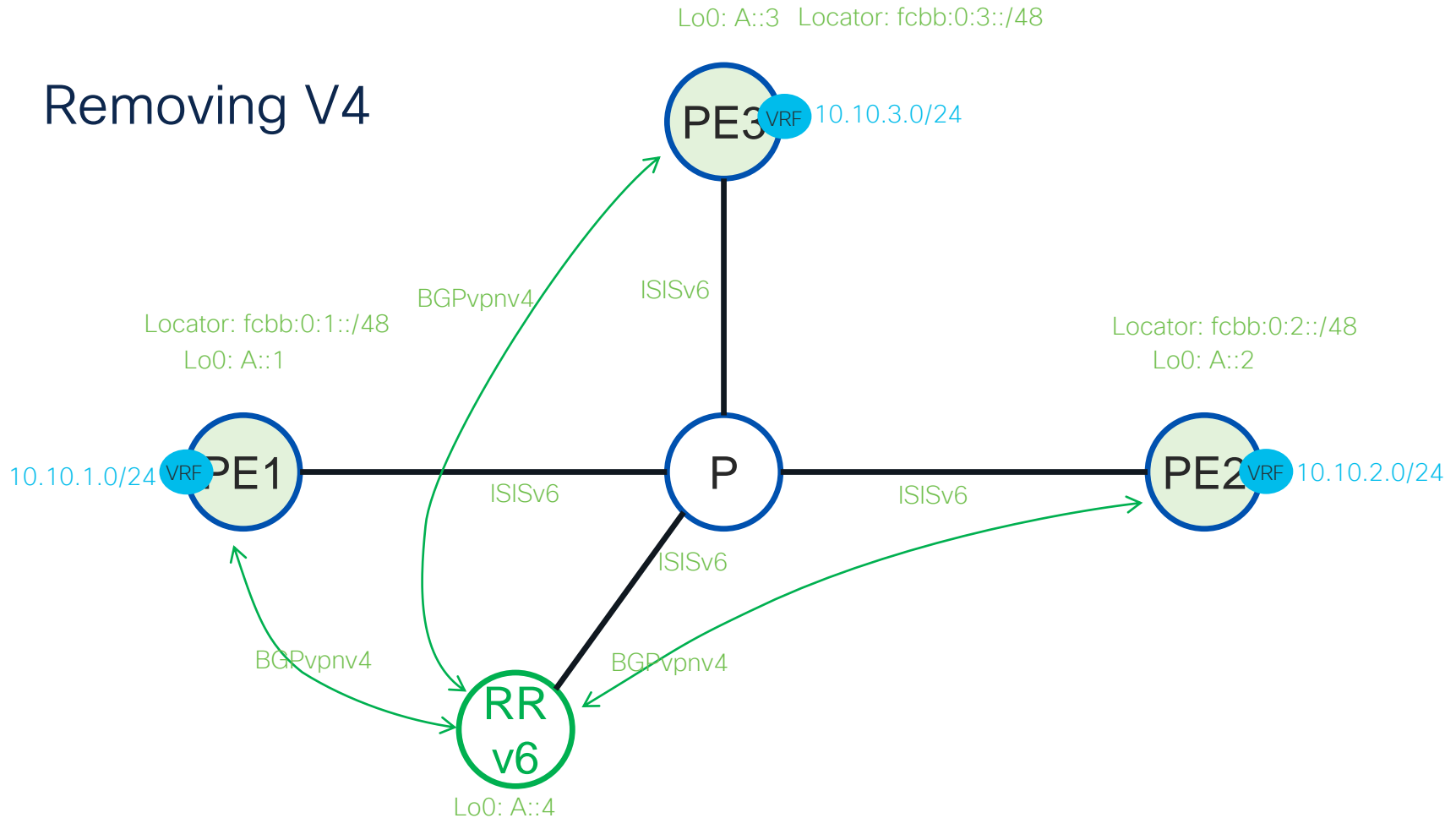
SRv6 Dual PE Configuration

Via RPL we set specific BGP attributes to to prefixes ie Local Preference towards RRv6 and RRv4

```
router bgp 1
 neighbor A::4
  address-family vpnv4 unicast
   encapsulation-type srv6
   route-policy RRv6 out          ⟵  Policy towards v6 RR
 neighbor 4.4.4.4
  address-family vpnv4 unicast
   route-policy RRv4 out          ⟵  Policy towards v4 RR
vrf 1
  address-family ipv4 unicast
   mpls alloc enable              ⟵  Allocates Labels for all prefixes in VRF
    segment-routing srv6
     locator MAIN                 ⟵  Allocates SIDs for all prefixes in VRF
      alloc mode per-vrf             from Locator MAIN
```
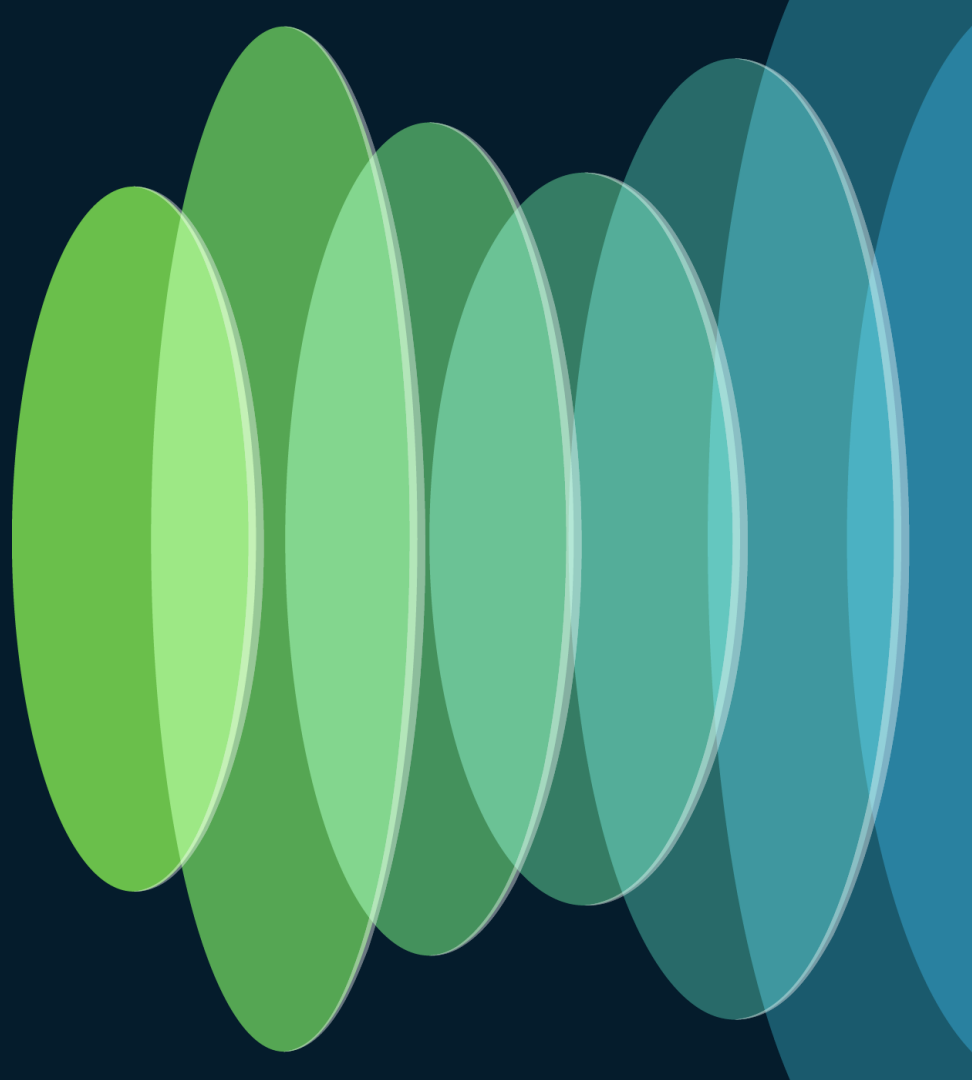
Conclusion

Conclusion

- SRv6 is fully ready for brownfield deployments

- SRv6 uSID is the only reasonable format

- SRv6 uSID supported across cisco platform

- SRv6 uSID supported across vendors

Complete Your Session Evaluations

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SR Learning Path

Session ID	Title	Session Type	Speakers	Schedule and location
TECSPG-1000	Segment Routing Masterclass	Technical Seminar	Jose Liste Jakub Horn	Jun 2 | 9:00 am – 1:00 pm L2, Breakers BH
BRKMPL-2203	Introduction to SRv6 uSID Technology	Breakout	Jakub Horn	Jun 3 | 10:30 am – 12:00 pm L3, South Seas B
BRKMPL-2135	Preparing for a Successful Segment Routing Deployment –	Breakout	Jose Liste	Jun 3 |10:30 am – 12:00 pm L2, Surf EF
BRKENT-1520	Segment Routing Innovations in IOS XE	Breakout	Jason Yang Sumant Mali	Jun 3 | 9:30 am – 10:30 am L3, Palm D
BRKMPL-2131	Deploying VPNs over Segment Routed Networks Made Easy	Breakout	Krishnan Thirukonda	Jun 3 | 01:00 PM / LL, Tradewinds DEF
BRKMPL-2043	Simplify Your Journey to SR and SRv6 with Cisco Crosswork Automation	Breakout	Sujay Murthy Eric Ortheau	Jun 4 | 04:00 PM / LL, Tradewinds ABC

SR Learning Path

Session ID	Title	Session Type	Speakers	Schedule and location
BRKSPG-2474	Reduced Resolution Time with Svc-centric Approach to Troubleshooting	Breakout	Paola Arosio	
LTRSPG-2006	Explore the Power of SRv6: Unleashing the Potential of Next-Generation Networking	Instructor-led Lab	Jakub Horn Marius Stoica Alex Kiritchenko	Jun 5 | 8:00 am - 12:00 pm Luxor - L1, Lotus 3
BRKMPL-2133	Circuit-Style Segment Routing and Service Emulation -	Breakout	Thomas Wang	Jun 5 | 4:00 pm - 5:00 pm L2, Surf CD
BRKSPG-2263	Design, Deploy and Manage Transport Slices using SDN Controller and Assurance	Breakout	Sujay Murthy	Jun 6 | 09:30 AM / LL, Tradewinds ABC
BRKSPG-2870	Automate Transport Service Provisioning, Optimization, and Assurance with SDN Controller	Breakout	Deepak Bhargava	Jun 6 | 01:00 PM / L3, South Seas J
LABMPL-1201	SRv6 Basics	Walk-in Lab	Luc De Ghein	
LABSP-3393	Implementing Segment Routing v6 (SRv6) Transport on NCS 55xx/5xx and Cisco 8000: Advanced -	Walk-in Lab	Paban Sarma Gautam Renjen Alexey Babaytsev	
LABSPG-3000	Configure and Implement BGP-EVPN with Segment Routing using NCS 55xx/5xx Platforms	Walk-in Lab	Tejas Lad Paban Sarma	

Thank you