



The bridge to possible

SRv6 Addressing

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Content

- SRv6 Addressing Requirements
- Area Addressing and Summarization
- Flexible Algorithms
- Loopback and Interfaces

SRv6 Addressing Requirements

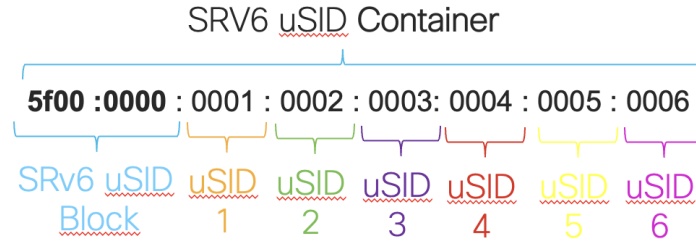
- Simple
 - Operationally
- Hierarchical
 - Summarization
- Extensible
 - Allow growth
- TE Efficient
- ULA/GUA/5F
- SRv6 addressing is independent of loopback/link addressing!!
 - **It is about Locators only**

ULA-GUA-5F

- **ULA Unique Local FC00:/7**
 - Most deployments
 - Very flexible
 - Inherent Security (Still Infrastructure ACL required)
- **GUA Global Unicast**
 - Assigned by authority (IANA , AFRNIC, APNIC, ARIN, RIPE)
 - Consumes significant portion of public address space
- **5F00::/16- RFC9602**
 - Same properties as ULA

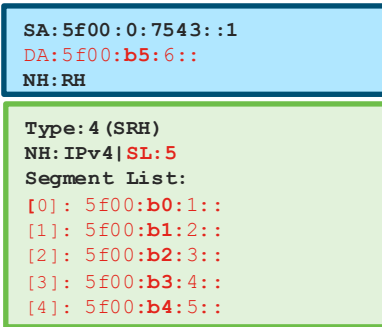
TE Compression Efficiency for uSID

- Currently all deployments and interop uses “F3216”



- uSID is the most efficient TE compression schema!

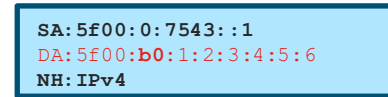
Overhead



SIDs from different blocks!

5 Containers

Very Efficient

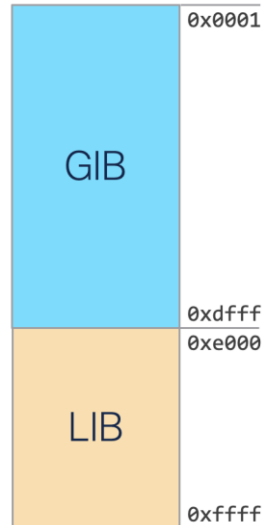


All SIDs from single block!

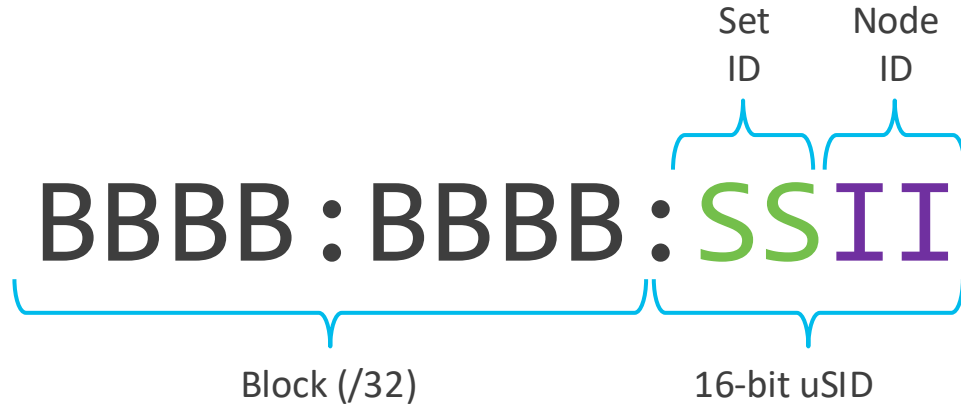
1 Container

“Small Network” = Single Block

- How much devices fits single block?
- Each SRv6 device must have single uSID assigned
- uSIDs is 16bits = 65535 unique values
- But....
- GIB= ~57k values
- Summarization can be performed on area (level boundaries)
- Each area have certain number of devices
- Unlikely to match binary boundaries
- **Single Block can be used for networks ~<35k**



Set



- Each block is split to certain number of equally sized Sets
 - /40 is very good example as it follows nibble boundary (/36 possible)
- Each area is assigned certain number of sets
- Summarization is performed on set boundary only!
- Single block has 224 /40 sets (because of LIB)

Area addressing – Example with Sets

AREA 2

2100 devices

5f00:b1:**00**00/40
5f00:b1:**01**00/40
5f00:b1:**04**00/40
5f00:b1:**05**00/40
5f00:b1:**06**00/40
5f00:b1:**07**00/40
5f00:b1:**09**00/40
5f00:b1:**0a**00/40
5f00:b1:**0d**00/40

AREA 1

350 devices

5f00:b1:**02**00/40
5f00:b1:**03**00/40

AREA 3

750 devices

5f00:b1:**08**00/40
5f00:b1:**0b**00/40
5f00:b1:**0c**00/40

← summarization

← summarization

→ summarization

→ summarization

Flexible Algorithm locators

- Independent Locator per algorithm
- Always use different block for different algorithm
 - Otherwise, LIB is shared-> limited scalability
- Use same Set and Node ID across the algorithms
 - Improves Operational simplicity
 - Same summarization rules for all algorithms
- Number of algorithms in the network will be always limited
 - 1 nibble

BBBB : BBB**A** : **SS****II**

5f00:**b1**:0209::/48 - Default Algorithm

5f00:**b2**:0209::/48 - Flexible Algorithm **128**

5f00:**b3**:0209::/48 - Flexible Algorithm **129**

Large Networks

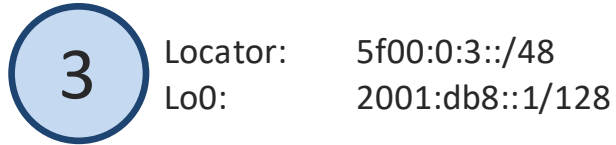
- Any network which cannot be addressed from single block
 - $\sim > 35k$ devices
- We need multiple blocks
 - Each block is assigned to “region”
- Number of regions should be size of network/35k
 - To minimize number of containers for any TE policy
 - (it is more important than geographical regions)
- Region must be encoded into the block
- Follow nibble boundary
 - Operational simplicity

Larger Networks $\sim > 35k$

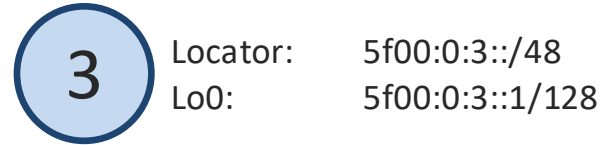
- Up to $\sim 500k$ - BBBB:BBAR:SSNN::
 - 16x35k
- Up to $\sim 8M$ BBBB:BARR:SSNN::
 - 256x35k
- Algorithm bits **always** in the beginning for scalability
 - Summarization
 - QOS

Loopback Addressing

- Independent



- From Locator



- Smaller LSP
- No loopback addressing planning
- Summarization!!

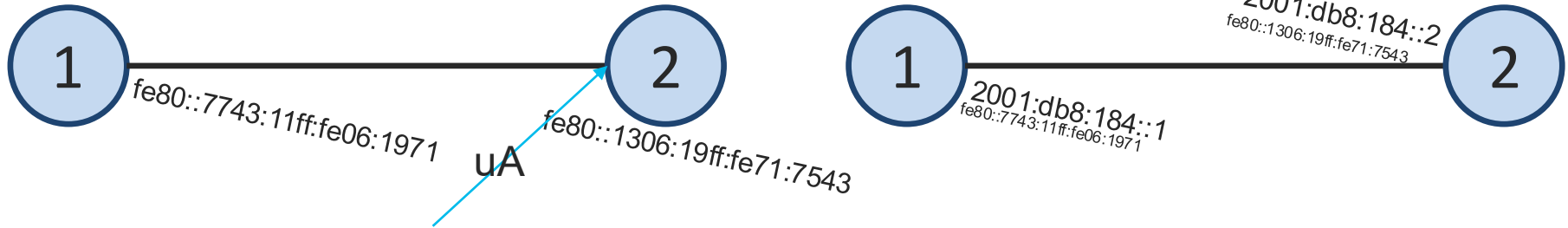
Interface Addressing

- Link Local Only

- no config
- no address planning
- new device insertion
- smaller LSP
- Interfaces not remotely reachable
- uA can be used instead for ping

- Global (ULA/GUA)

- Must be configured
- Must be planned, maintained
- Interfaces remotely reachable



```
RP/0/RP0/CPU0:r1#ping 5f00:b0:2:e000::
Sun Sep 21 22:42:23.383 UTC
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5f00:b0:2:e000::, timeout is 2 seconds:
```

```
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/7 ms
```

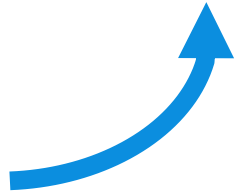
Conclusion for SRv6 Addressing

- Use Private space 5f or ULA (GUA supported)
- Optimize for TE
- <~35k devices – single block per algorithm
- <~500k devices – maximize span of block
- Sets are very helpful to make addressing simple and scalable
- Loopbacks from locators – simplification
- LL only is possibility

Simplicity Always Prevails



Furthermore, with more scale and functionality





The bridge to possible