

# SRv6 User Plane in Mobile Core

A Smooth Migration of Mobile Core User Plane from GTP to SRv6

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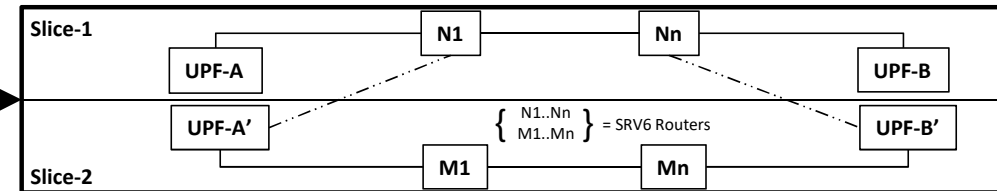
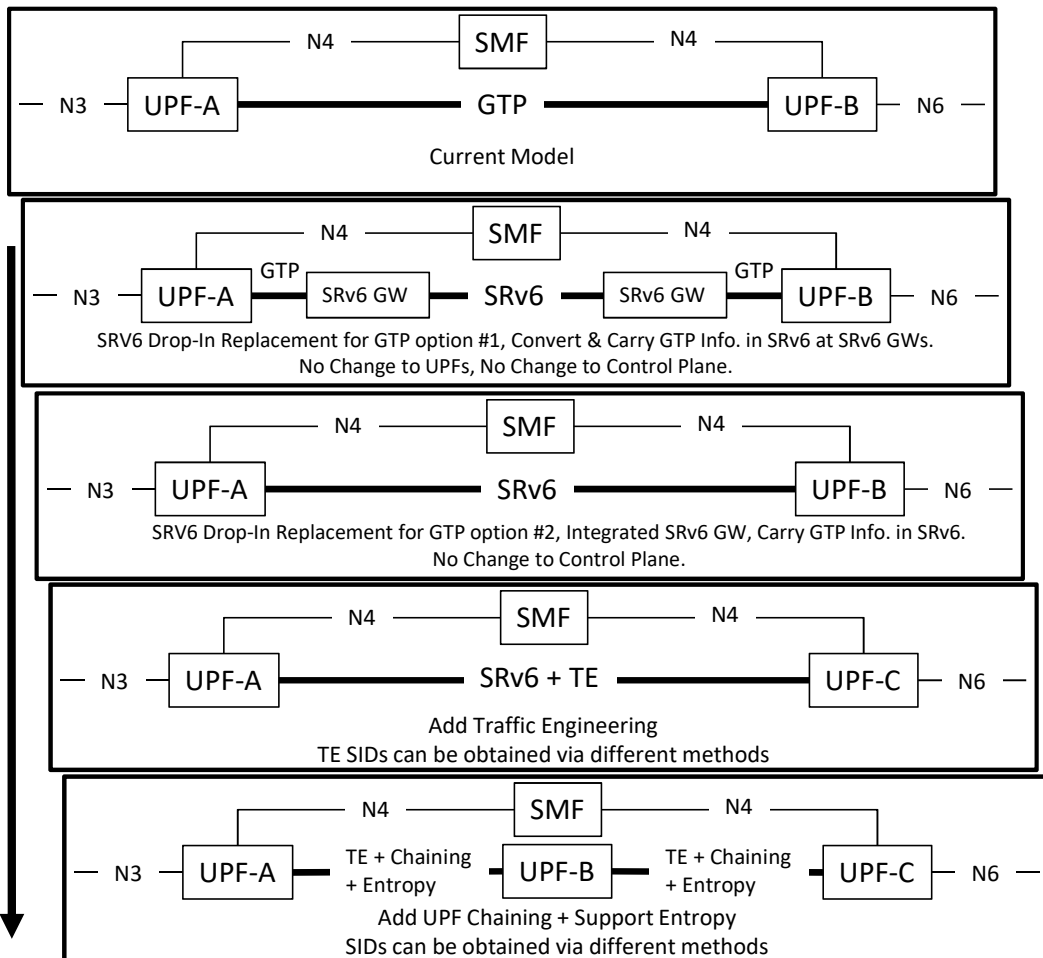
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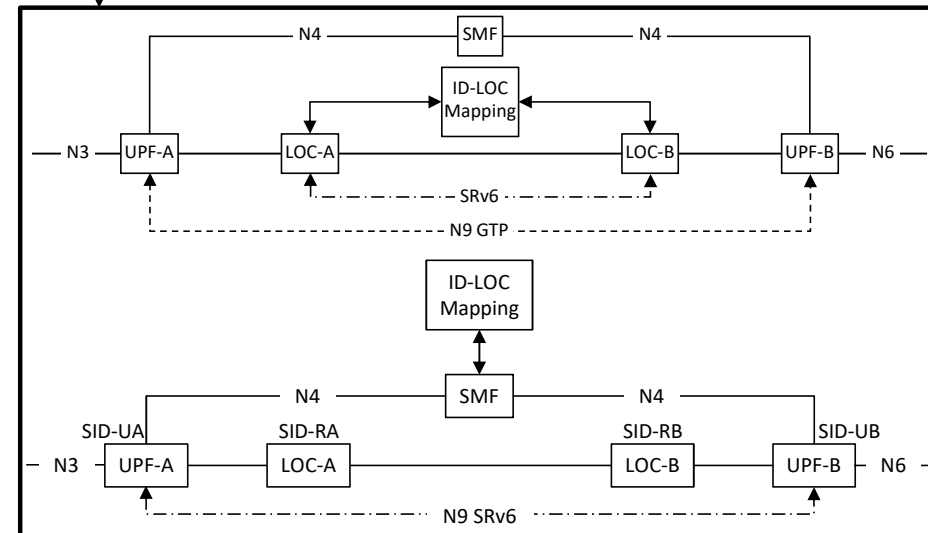
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# SRv6: A Smooth Transition & Pragmatic Approach to Change the User Plane in Mobile Core

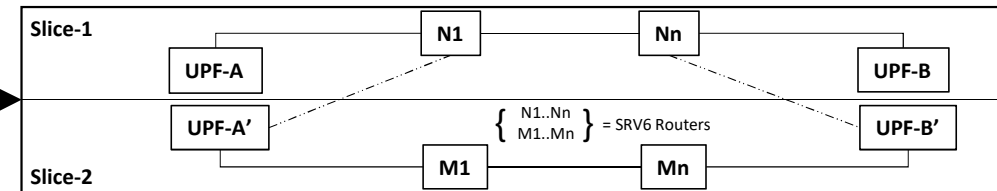
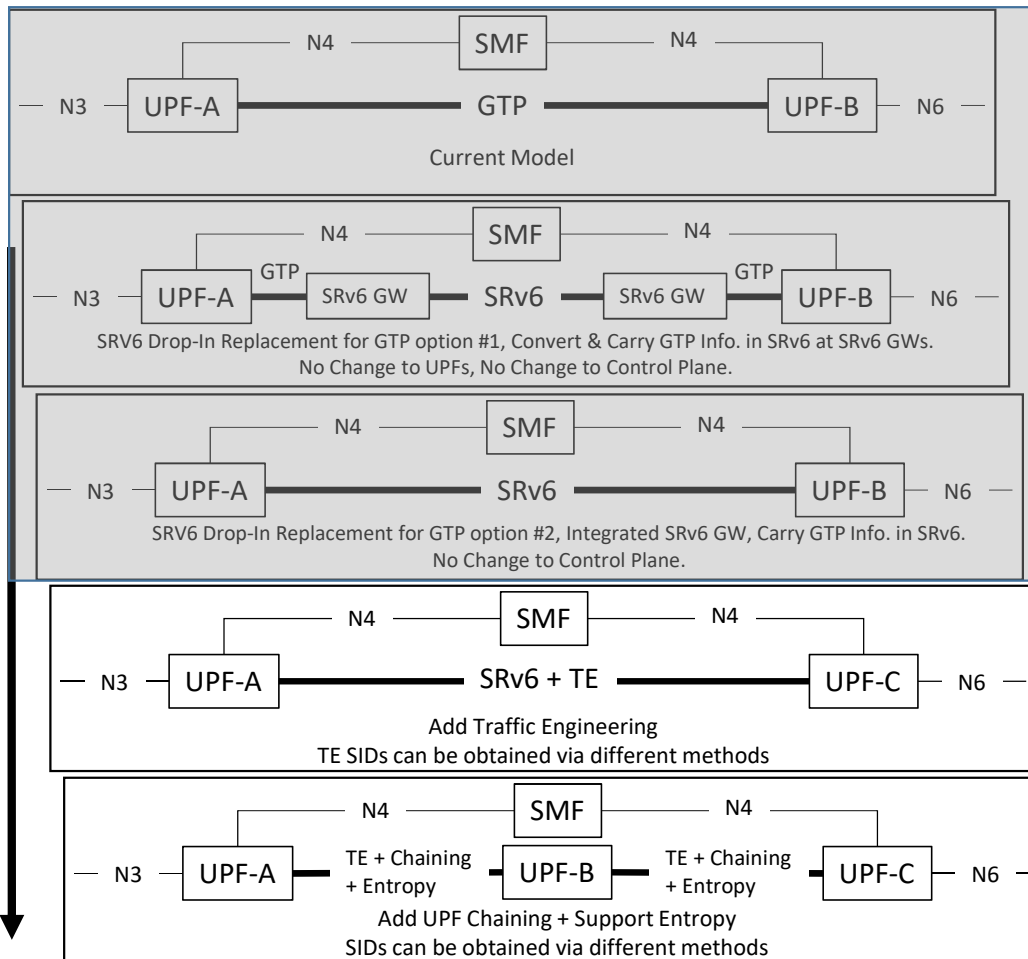


## Toward Advanced Mobility with SRv6

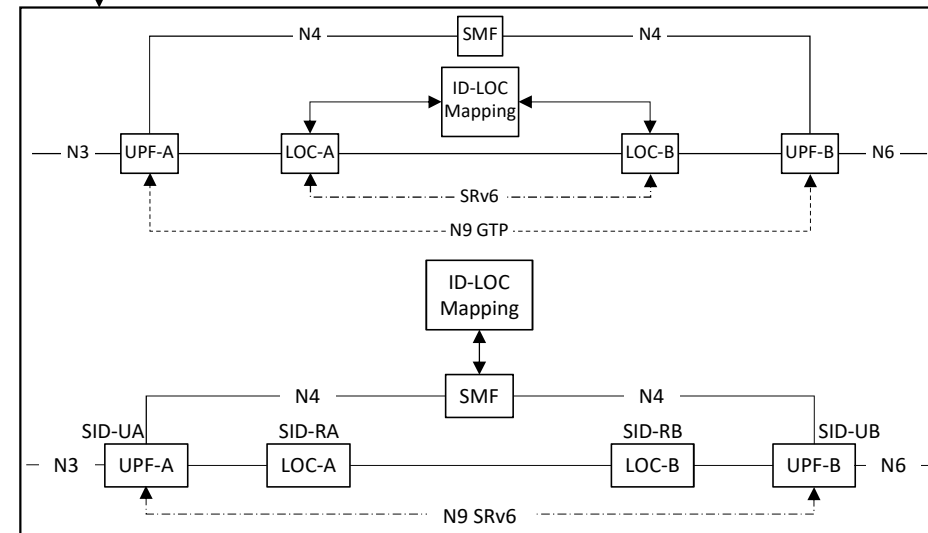


1. Drop in SRv6 to replace GTP-U in data plane without changing the control plane.
2. Gradually introduce SRv6 features as needed.
3. Optionally add advanced mobility support either at global, 5G slice level, or for a particular set of flows

# Phase 1: Drop in SRv6 to Replace GTP-U Between UPFs Without Changing 3GPP Control Plane

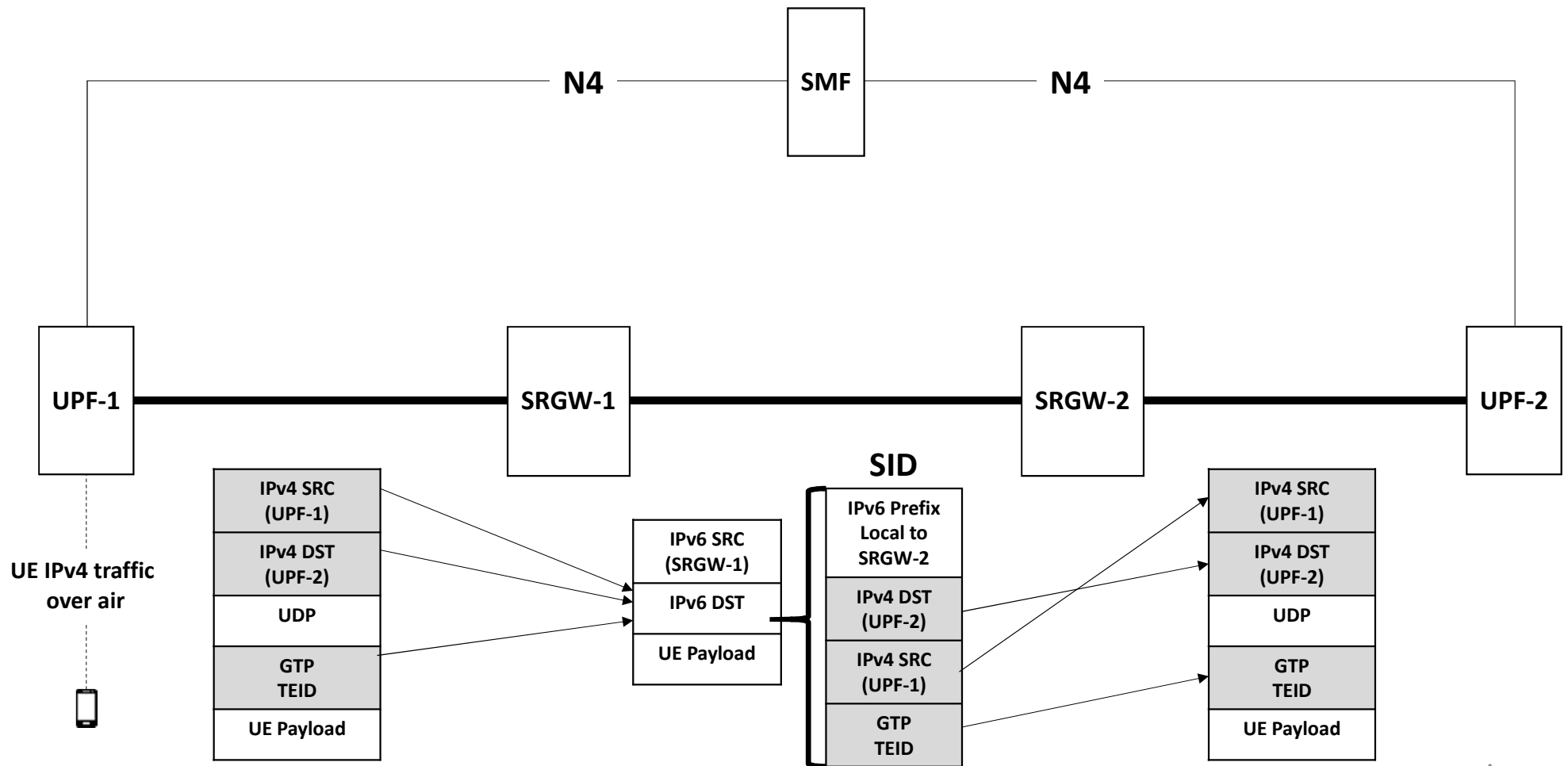


## Toward Advanced Mobility with SRv6

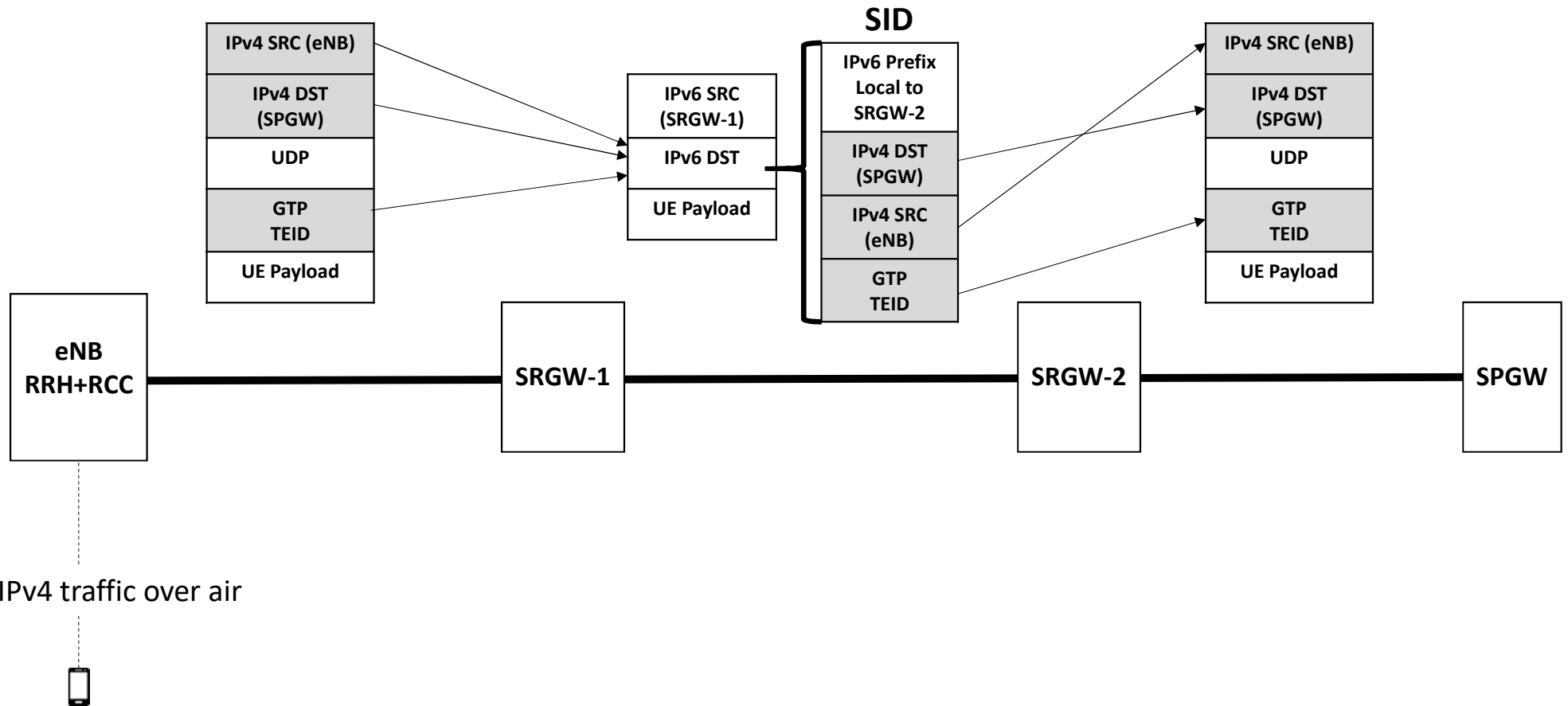


1. Drop in SRv6 to replace GTP-U in data plane without changing the control plane.
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## Migration from IPv4 to SRv6 in a Nutshell (5G)



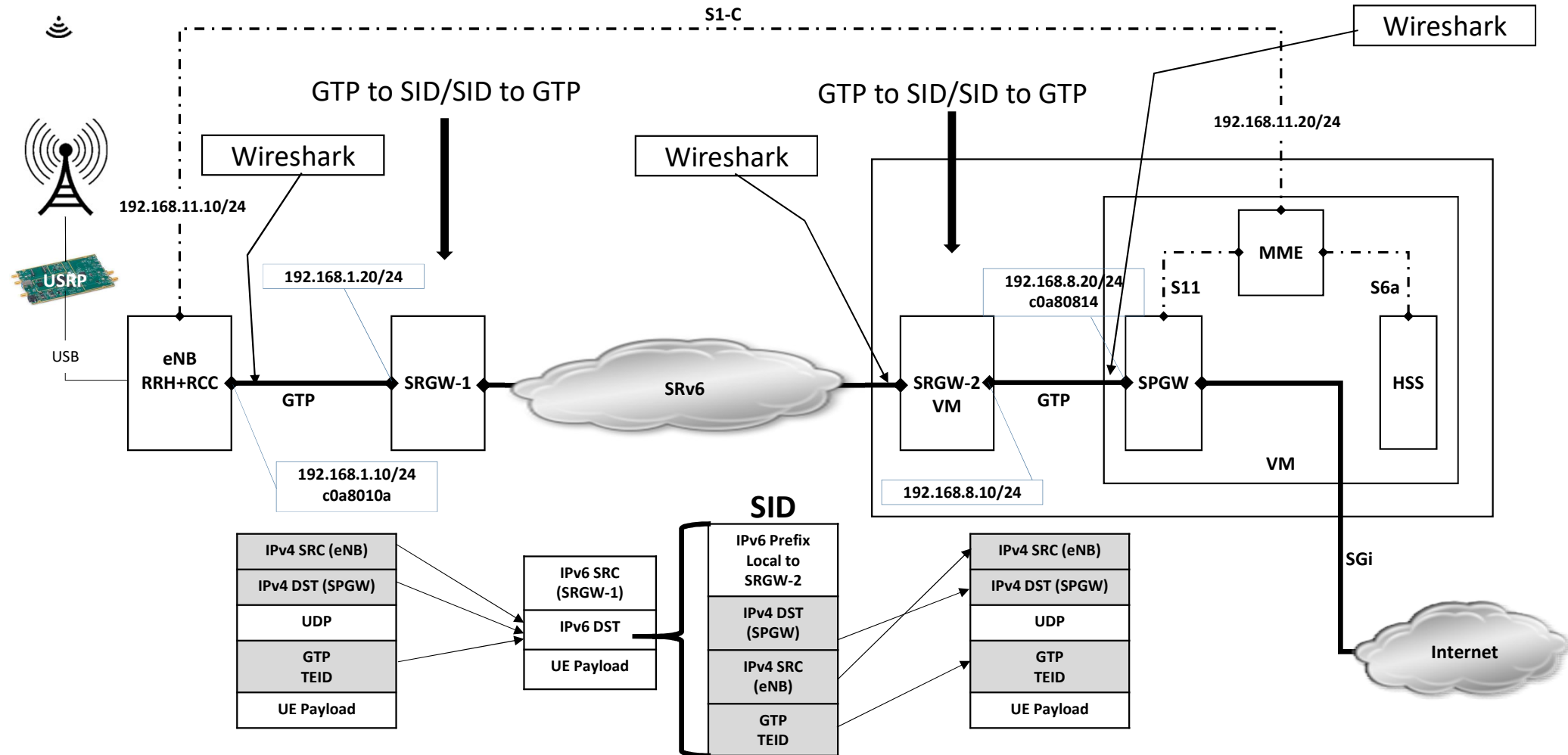
## Migration from IPv4 to SRv6 in a Nutshell (LTE)



# Demo: SRv6 User Plane + Existing 3GPP Control Plane

## Single Segment: No need for Segment Routing Header

Phone on Slice #1  
172.16.0.4/12



# Packet Trace: ICMP ping request from the phone to the internet

Wireshark packet capture from eNB: Tx. The packet list shows an ICMP Echo (ping) request from 172.16.0.4 to 172.217.0.238. The packet details pane shows the following structure:

- Frame 6586: 134 bytes on wire (1072 bits), 134 bytes captured (1072 bits) on interface 0
- Ethernet II, Src: Universa\_49:55:fb (cc:52:af:49:55:fb), Dst: HuaweiTe\_37:18:1f (c8:1f:be:37:18:1f)
- Internet Protocol Version 4, Src: 192.168.1.10, Dst: 192.168.8.20
- User Datagram Protocol, Src Port: 2152, Dst Port: 2152
- GPRS Tunneling Protocol
  - Flags: 0x30
  - Message Type: T-PDU (0xff)
  - Length: 84
  - TEID: 0x00000002
  - T-PDU Data: 450000545d4c400040018381ac100004acd900ee0800769b...
- Internet Protocol Version 4, Src: 172.16.0.4, Dst: 172.217.0.238
- Internet Control Message Protocol (UE Payload)

eNB: Tx

Wireshark packet capture from SRGW-2: Rx. The packet list shows an ICMP Echo (ping) request from 172.16.0.4 to 172.217.0.238. The packet details pane shows the following structure:

- Frame 6560: 138 bytes on wire (1104 bits), 138 bytes captured (1104 bits) on interface 0
- Ethernet II, Src: Micro-St\_be:44:76 (44:8a:5b:be:44:76), Dst: PcsCo\_01:10:00:00:00:00
- Internet Protocol Version 6, Src: fd01::, Dst: fd02:0:c0a8:814:c0a8:10a:0:2
- Traffic Class: 0x00 (DSO)
- Flow Label: 0x000000
- Payload Length: 84
- Next Header: IPIP (4)
- Hop Limit: 63
- Source: fd01::
- Destination: fd02:0:c0a8:814:c0a8:10a:0:2
- Internet Protocol Version 4, Src: 172.16.0.4, Dst: 172.217.0.238
- Internet Control Message Protocol (UE Payload)

SRGW-2: Rx

Wireshark packet capture from SPGW: Rx. The packet list shows an ICMP Echo (ping) request from 172.16.0.4 to 172.217.0.238. The packet details pane shows the following structure:

- Frame 6588: 134 bytes on wire (1072 bits), 134 bytes captured (1072 bits) on interface 0
- Ethernet II, Src: PcsCompu\_1f:ee:d9 (08:00:27:1f:ee:d9), Dst: PcsCompu\_dd:40:00:00:00:00:00
- Internet Protocol Version 4, Src: 192.168.1.10, Dst: 192.168.8.20
- User Datagram Protocol, Src Port: 2152, Dst Port: 2152
- GPRS Tunneling Protocol
  - Flags: 0x30
  - Message Type: T-PDU (0xff)
  - Length: 84
  - TEID: 0x00000002 (2)
  - T-PDU Data: 450000545d4c400040018381ac100004acd900ee0800769b...
- Internet Protocol Version 4, Src: 172.16.0.4, Dst: 172.217.0.238
- Internet Control Message Protocol (UE Payload)

SPGW: Rx



# Packet Trace: ICMP ping reply from the internet to the phone

No.	Time	Source	Destination	Protocol	Length	Info
6586	891.929615190	172.16.0.4	172.217.0.238	GTP <L	134	Echo (ping) request id=0...
6587	891.940893365	172.217.0.238	172.16.0.4	GTP <L	134	Echo (ping) reply id=0...
6590	892.927684581	172.16.0.4	172.217.0.238	GTP <L	134	Echo (ping) request id=0...
6591	892.939522500	172.217.0.238	172.16.0.4	GTP <L	134	Echo (ping) reply id=0...
6592	893.941664326	172.16.0.4	172.217.0.238	GTP <L	134	Echo (ping) request id=0...
6593	893.953674736	172.217.0.238	172.16.0.4	GTP <L	134	Echo (ping) reply id=0...
6594	894.937678550	172.16.0.4	172.217.0.238	GTP <L	134	Echo (ping) request id=0...
6595	894.949065879	172.217.0.238	172.16.0.4	GTP <L	134	Echo (ping) reply id=0...

Frame 6587: 134 bytes on wire (1072 bits), 134 bytes captured (1072 bits) on interface 0  
 Ethernet II, Src: HuaweiTe\_37:18:1f (c8:1f:be:37:18:1f), Dst: Universa\_49:55:fb (cc:52:af:49:55:fb)  
 Internet Protocol Version 4, Src: 192.168.8.20, Dst: 192.168.1.10  
 User Datagram Protocol, Src Port: 2152, Dst Port: 2152  
 GPRS Tunneling Protocol  
 Flags: 0x30  
 Message Type: T-PDU (0xff)  
 Length: 84  
 TEID: 0xca6fe0dd  
 T-PDU Data: 45000054cb2e400030b1189facd900eeac10000400007e9b...  
 Internet Protocol Version 4, Src: 172.217.0.238, Dst: 172.16.0.4  
 Internet Control Message Protocol  
 UE Payload

eNB: Rx

No.	Time	Source	Destination	Protocol	Length	Info
6560	891.9146...	172.16.0.4	172.217.0.238	ICMP	138	Echo (ping)...
6561	891.9257...	172.217.0.238	172.16.0.4	ICMP	138	Echo (ping)...
6564	892.9127...	172.16.0.4	172.217.0.238	ICMP	138	Echo (ping)...
6565	892.9243...	172.217.0.238	172.16.0.4	ICMP	138	Echo (ping)...
6566	893.9266...	172.16.0.4	172.217.0.238	ICMP	138	Echo (ping)...
6567	893.9385...	172.217.0.238	172.16.0.4	ICMP	138	Echo (ping)...
6568	894.9226...	172.16.0.4	172.217.0.238	ICMP	138	Echo (ping)...
6569	894.9338...	172.217.0.238	172.16.0.4	ICMP	138	Echo (ping)...

Frame 6561: 138 bytes on wire (1104 bits), 138 bytes captured (1104 bits) on interface 0  
 Ethernet II, Src: PcsCompu\_3c:bc:db (08:00:27:3c:bc:db), Dst: Micro...  
 Internet Protocol Version 6, Src: fd02::, Dst: fd01:0:c0a8:10a:c0a8:0110 ... = Version: 6  
 .... 0000 0000 .... = Traffic Class: 0x00 (DS...)  
 .... 0000 0000 0000 0000 0000 = Flow Label: 0x00000  
 Payload Length: 84  
 Next Header: IPIP (4)  
 Hop Limit: 63  
 Source: fd02::  
 Destination: fd01:0:c0a8:10a:c0a8:814:ca6f:e0dd  
 Internet Protocol Version 4, Src: 172.217.0.238, Dst: 172.16.0.4  
 Internet Control Message Protocol  
 UE Payload

SRGW-2: Tx

No.	Time	Source	Destination	Protocol	Length	Info
6588	891.9252...	172.16.0.4	172.217.0.238	GTP ...	134	Echo (ping) request ...
6589	891.9360...	172.217.0.238	172.16.0.4	GTP ...	134	Echo (ping) reply ...
6592	892.9233...	172.16.0.4	172.217.0.238	GTP ...	134	Echo (ping) request ...
6593	892.9346...	172.217.0.238	172.16.0.4	GTP ...	134	Echo (ping) reply ...
6594	893.9373...	172.16.0.4	172.217.0.238	GTP ...	134	Echo (ping) request ...
6595	893.9487...	172.217.0.238	172.16.0.4	GTP ...	134	Echo (ping) reply ...
6596	894.9333...	172.16.0.4	172.217.0.238	GTP ...	134	Echo (ping) request ...
6597	894.9441...	172.217.0.238	172.16.0.4	GTP ...	134	Echo (ping) reply ...

Frame 6589: 134 bytes on wire (1072 bits), 134 bytes captured (1072 bits) on interface 0  
 Ethernet II, Src: PcsCompu\_dd:47:b7 (08:00:27:dd:47:b7), Dst: PcsCompu\_1f:ee...  
 Internet Protocol Version 4, Src: 192.168.8.20, Dst: 192.168.1.10  
 User Datagram Protocol, Src Port: 2152, Dst Port: 2152  
 GPRS Tunneling Protocol  
 Flags: 0x30  
 Message Type: T-PDU (0xff)  
 Length: 84  
 TEID: 0xca6fe0dd (3396329693)  
 T-PDU Data: 45000054cb2e400030b1189facd900eeac10000400007e9b...  
 Internet Protocol Version 4, Src: 172.217.0.238, Dst: 172.16.0.4  
 Internet Control Message Protocol  
 UE Payload

SPGW: Tx