

# MUP

## A Mobile User Plane Network Evolution using Segment Routing

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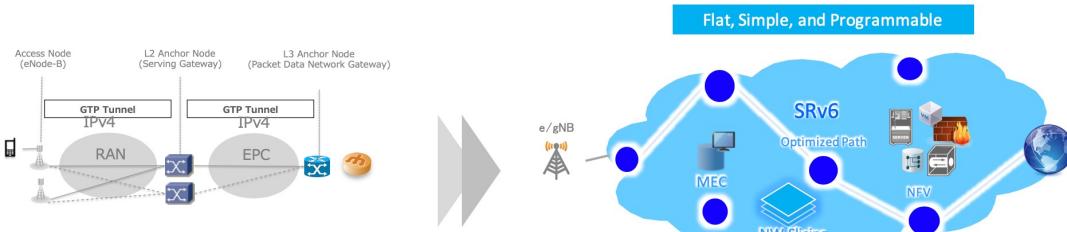


# 5 Years Ago

MPLS+SDN+NFWORLD  
©PARIS2018

## What if SRv6 Becomes An Alternative of GTP-U Tunnel?

- Well fragmented to RAN, EPC and SGi.
- Per-session tunnel creation and handling.
- Non-optimal data-path.
- IPv6 integrates networks of the mobile and others.
- A SID represents data-plane role and function.



# 4 Years Ago

SoftBank

mobile the Internet energy robot Corporation Company / IR

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Company / IR news Company information Growth strategy IR information CSR Human resource measures and recruitment

Press release 2019

## Started operation of "SRv6 (segment routing IPv6)" in mobile IP network

New Technologies for Network Innovation in the 5G Era

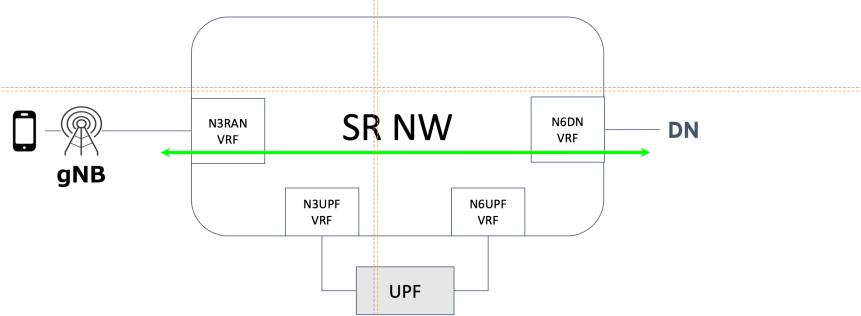
April 24, 2019 Softbank Corporation

SOFTBANK CORP. (Hereinafter referred to as "SOFTBANK") is a new technology that realizes simpler and scalable network configuration in mobile IP networks and implements various functions for the 5th generation mobile communication system (5G) era. We introduced SRv6 (segment routing IPv6) and began full-scale operation on a commercial network from April 2019.

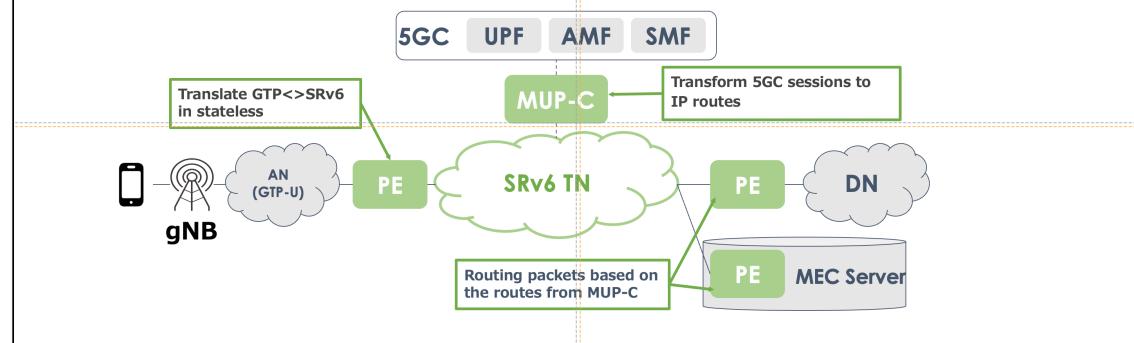
# MPLSWC2022 in Last Year

MPLS SD&AI  
NET  
WORLD22

What if We Could Do This.. SRv6MUP!



SRv6 MUP Architecture.. No Change 5G, Just Plug-in



# THIS YEAR

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News Company Info Vision and Strategy Investor Relations Sustainability

## SoftBank Corp. Starts SRv6 MUP Field Trial in Commercial 5G Network

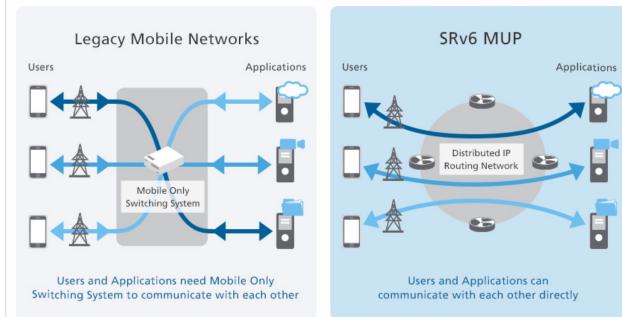
February 24, 2023 SoftBank Corp.

SoftBank Corp. ("SoftBank") today announced that it has started a field trial of Segment Routing IPv6 Mobile User Plane (SRv6 MUP<sup>1</sup>) in its commercial 5G Network. The trial started on February 13, 2023. SoftBank-led SRv6 MUP can deliver 5G Multi-access Edge Computing (MEC) and network slicing with unprecedented cost-efficiency and operational advantages over legacy technologies. SoftBank is pursuing an accelerated introduction of SRv6 MUP in its commercial services.

SoftBank will exhibit an advanced demonstration of MEC and network slicing on SRv6 MUP, proving the operational ease of delivering network slicing to MEC when SRv6 MUP is used instead of conventional mobile user plane (U-plane) technologies. The demo will be hosted in the booth<sup>2</sup> of Arrcus Inc. at Mobile World Congress Barcelona (MWC Barcelona) in Spain from February 27 to March 2, 2023. MWC Barcelona is the largest and most influential event for the connectivity ecosystem.

SoftBank will continue the development of SRv6 MUP to deliver highly efficient MEC and network slicing in collaboration with other operators and different industry players around the world.

### Image of SRv6 MUP



The diagram illustrates the difference between Legacy Mobile Networks and SRv6 MUP. In the Legacy Mobile Networks section, three mobile phones connect to a central 'Mobile Only Switching System' via towers, which then connect to applications. A note states: "Users and Applications need Mobile Only Switching System to communicate with each other". In the SRv6 MUP section, the same three mobile phones connect directly to the applications via a 'Distributed IP Routing Network'. A note states: "Users and Applications can communicate with each other directly".

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[https://www.softbank.jp/en/corp/news/press/sbkk/2023/20230224\\_01/](https://www.softbank.jp/en/corp/news/press/sbkk/2023/20230224_01/)

# MUP Work in Progress in IETF together with the partners



SoftBank

Workgroup: Internet Engineering Task Force  
Internet-Draft:  
[draft-mhkk-dmm-srv6mup-architecture-05](#)  
Published: 13 March 2023  
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Expires: 14 September 2023

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## Mobile User Plane Architecture using Segment Routing for Distributed Mobility Management

### Abstract

This document defines the Mobile User Plane (MUP) architecture using Segment Routing (SR) for Distributed Mobility Management. The requirements for Distributed Mobility Management described in [[RFC7333](#)] can be satisfied by routing fashion.

# IETF 116 Yokohama

25-31 March 2023



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# BGP-MUP Interop Hackathon at IETF116



BBSakuraNetworks



古河電工



SoftBank



## Hackathon Plan

Let's implement a new BGP SAFI and do the Interop together.

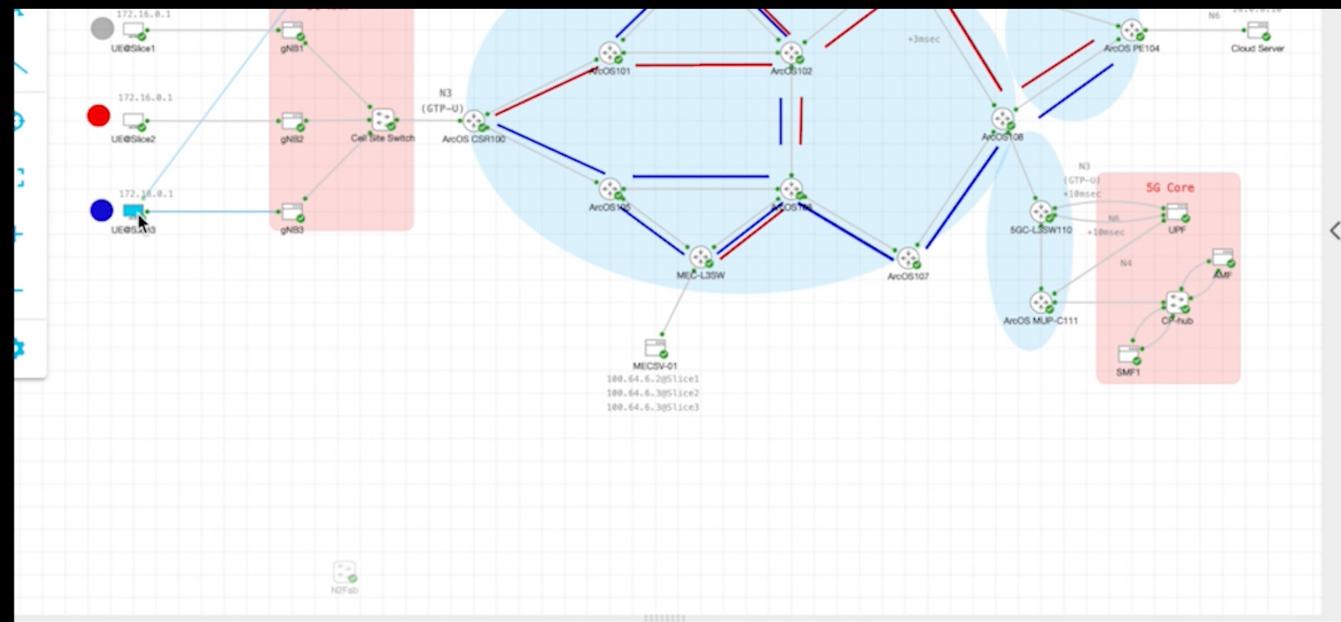
- MUP Architecture and BGP-MUP SAFI
    - <https://datatracker.ietf.org/doc/draft-mhkk-dmm-safis-architecture/>
    - <https://datatracker.ietf.org/doc/draft-mpmz-bess-mup/>
  - Participated BGP developers
    - Arrcus
    - Cisco
    - ExaBGP
    - FRR
    - Furukawa
    - GoBGP
    - (Open BMP)

<https://github.com/IETF-Hackathon/ietf116-project-presentations/blob/pdfs-from-html/ietf-116-hackathon-bgp-mup-safi-interop.pdf>

# Demo Movie “MUP for 5G/IP Slicing with MEC”

SoftBank





NODE INFO   SIMULATE   CONNECTIVITY   **CONSOLE**   VNC   EDIT CONFIG   INTERFACES   SERIAL L >

```
bytes from 20.0.6.10: seq=53229 ttl=42 time=47.431 ms
bytes from 20.0.6.10: seq=53230 ttl=42 time=47.362 ms
bytes from 20.0.6.10: seq=53231 ttl=42 time=47.743 ms
bytes from 20.0.6.10: seq=53232 ttl=42 time=34.231 ms
bytes from 20.0.6.10: seq=53233 ttl=42 time=2.859 ms
bytes from 20.0.6.10: seq=53234 ttl=42 time=2.688 ms
bytes from 20.0.6.10: seq=53235 ttl=42 time=2.906 ms
bytes from 20.0.6.10: seq=53236 ttl=42 time=3.245 ms
bytes from 20.0.6.10: seq=53237 ttl=42 time=2.651 ms
bytes from 20.0.6.10: seq=53238 ttl=42 time=2.684 ms
bytes from 20.0.6.10: seq=53239 ttl=42 time=2.661 ms
bytes from 20.0.6.10: seq=53240 ttl=42 time=2.643 ms
bytes from 20.0.6.10: seq=53241 ttl=42 time=2.992 ms
bytes from 20.0.6.10: seq=53242 ttl=42 time=2.754 ms
bytes from 20.0.6.10: seq=53243 ttl=42 time=2.881 ms
bytes from 20.0.6.10: seq=53244 ttl=42 time=3.566 ms
bytes from 20.0.6.10: seq=53245 ttl=42 time=2.603 ms
bytes from 20.0.6.10: seq=53246 ttl=42 time=2.908 ms
bytes from 20.0.6.10: seq=53247 ttl=42 time=3.218 ms
bytes from 20.0.6.10: seq=53248 ttl=42 time=3.052 ms
bytes from 20.0.6.10: seq=53249 ttl=42 time=2.626 ms
```

MUP Disabled

MUP Enabled

## UE3@Slice\_Blue

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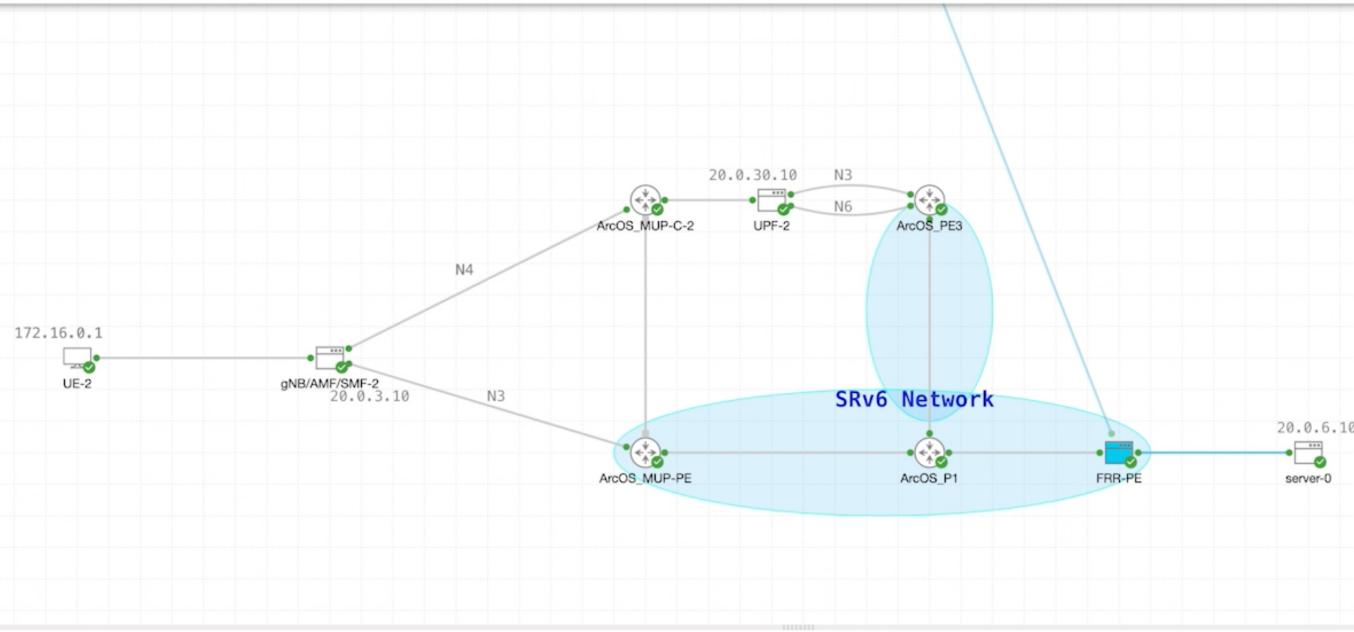


# Demo Movie “MUP Interop for Normal VPN PE”



SoftBank





NODE INFO

SIMULATE

CONNECTIVITY

CONSOLE

VNC

EDIT CONFIG

INTERFACES

SERIAL LINE 0

DOWNLOAD HISTORY

SETTINGS

```
redistribute ipv6 static level-2
exit
!
segment-routing
  sr6
    locators
      locator default
        prefix fcbb:bb00:254::/48 block-len 32 node-len 16 func-bits 16
      exit
    !
    exit
  !
  exit
!
end
inserthostname-here# show ver
FRRouting 8.5.git (inserthostname-here) on Linux(5.15.0-69-generic).
Copyright 1996-2005 Kunihiro Ishiguro, et al.
configured with:
  '--prefix=/usr' '--sbindir=/usr/lib/frr' '--sysconfdir=/etc/frr' '--libdir=/usr/lib' '--localstatedir=/var/run/frr' '--enable-rpki' '--enable-vtysh' '--enable-multipath=64' '--enable-vty-group=frrvty' '--enable-user=frr' '--enable-group=frr' '--enable-pcre2posix' 'CC=gcc' 'CXX=g++'
inserthostname-here# Copyright © 2023 SoftBank Corp. all rights reserved.
inserthostname-here#
```

# Thank you

## Question/Comments?

EoF