

Nexthop Forwarding Support IPv4/v6 Address

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Revision History

Note Revision history details are not provided for features introduced before release 21.24.

Revision Details	Release
First introduced	Pre 21.24

Feature Description

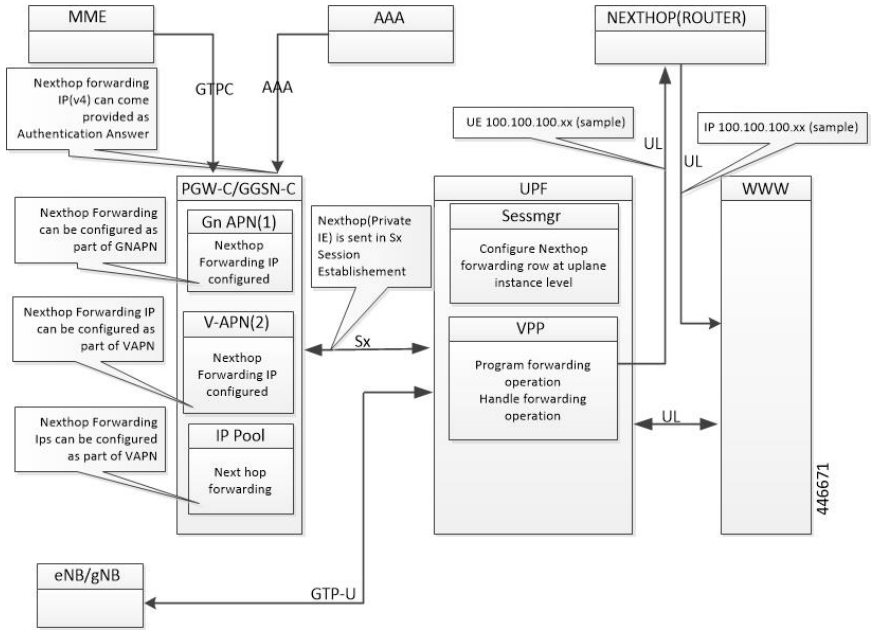
In uplink direction at CUPS UPF, UE IP and the GI IP might be in a different subnet and the routing path is defined to allow the uplink packet forward accordingly.

How It Works

Architecture

The following illustration provides EGCI-based P-GW UP Selection Solution overview.

Figure 1: Nexthop Forwarding



Configuration Priority

Configuration	Priority
AAA (Only IPv4)	1
APN (Gn/VAPN)	2
IP Pool	3

Configuration Use Cases

Case	IP Type	AAA	APN	IP Pool	Nexthop IP Selection
Nexthop supplied Only in AA message over AAA	IPv4	209.165.200.225	Not configured	Not configured	Nexthop Address Selected from AAA: IPv4: 209.165.200.225 IPv6: NA
	IPv6	Not supported	Not configured	Not configured	
Nexthop that is supplied in AA message over AAA + IPv4 configured in APN and IP Pool	IPv4	209.165.200.225	209.165.201.1	50.50.50.50	Nexthop Address is selected from AAA: IPv4: 209.165.200.225 IPv6: NA
	IPv46	Not supported	Not configured	Not configured	

Case	IP Type	AAA	APN	IP Pool	Nexthop IP Selection
IPv4 and IPv6 configured in APN only	IPv4	Not configured	209.165.201.1	Not configured	Nexthop Address is selected from APN: IPv4: 209.165.200.225 IPv6: 9001::3
	IPv6	Not supported	9001::3	Not configured	
IPv4 and IPv6 configured in IP Pool only	IPv4	Not configured	Not configured	50.50.50.50.	Nexthop Address is selected from IP Pool: IPv4: 209.165.200.225 IPv6 : 5002::5
	IPv6	Not configured	Not configured	5002::5	
IPv4 available over AAA + IPv4 and IPv6 configure on APN and IP Pool	IPv4	209.165.200.225	209.165.201.1	50.50.50.50	Nexthop IPv4 is selected from AAA: 209.165.200.225 Nexthop IPv6 selected from APN : 9001::3
	IPv6	Not Supported	9001::3	5002::5	
IPv4 available over AAA + IPv4 and IPv6 configure on IP Pool	IPv4	209.165.200.225	Not configured	50.50.50.50	Nexthop IPv4 is selected from AAA: 209.165.200.225 Nexthop IPv6 selected from IP Pool: 5002::5
	IPv6	Not Supported	Not configured	5002::5	
IPv4 available over AAA + IPv4 and IPv6 configure on APN.	IPv4	209.165.200.225	209.165.201.1	Not configured	Nexthop IPv4 is selected from AAA: 209.165.200.225 Nexthop IPv6 selected from APN: 9001::3
	IPv6	Not Supported	9001::3	Not configured	

Interface

Following Private IEs are introduced in SX Session Establishment message.

238	PFCP_IE_NEXTHOP	PFCP_IE_NEXTHOP								Sx Session Establishment Request	Private IE : CUPS: nexthop forwarding support-IPv4 /IPv6 address
		BITS									
		Octets	7	6	5	4	3	2	1		
		1 to 2	Type = 238 (decimal)								
		3 to 4	Length = n								
		5 to 10	PFCP_IE_NEXTHOP_ID								
		11-14	PFCP_IE_NEXTHOP_IP								

239	PFCP_IE_NEXTHOP_ID	PFCP_IE_NEXTHOP_ID								1. Inside create far IE of Sx Session Establishment Request	Private IE : CUPS: nexthop forwarding support-IPv4 /IPv6 address
		BITS								2. Inside PFCP_IE_NEXTHOP IE of Sx Session Establishment Request	
		Octets	7	6	5	4	3	2	1	PFCP_IE_NEXTHOP of Sx Session Establishment Request	
		1 to 2	Type = 239 (decimal)								
		3 to 4	Length = 5								
		5 to 10									

<table>
<tr><td rowspan="9">240</td><td>PFCP_IE_NEXTHOP_IP</td><td colspan="9">PFCP_IE_NEXTHOP_IP</td><td></td><td></td></tr>
<tr><td></td><td colspan="9">Bits</td><td rowspan="8">PFCP_IE_NEXTHOP of Sx Session Establishment Request</td><td rowspan="8">Private IE : CUPS: nexthop forwarding support-IPv4/ IPv6 address</td></tr>
<tr><td></td><td>Octets</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td></td></tr>
<tr><td></td><td>1 to 2</td><td colspan="8">Type = 240 (decimal)</td><td></td></tr>
<tr><td></td><td>3 to 4</td><td colspan="8">Length = n</td><td></td></tr>
<tr><td></td><td>5</td><td colspan="6">spare</td><td>V4</td><td>V6</td><td></td></tr>
<tr><td></td><td>m to m+3</td><td colspan="8">IPv4 Address</td><td></td></tr>
<tr><td></td><td>p to p+15</td><td colspan="8">IPv6 Address</td><td></td></tr>
</table>

Configuring Nexthop Forwarding Support IPv4/IPv6 Address

Configuring Nexthop Forwarding at APN Configuration Mode

Use the following CLI commands to configure Nexthop Forwarding at APN.

```
configure
   context context_name
      apn apn_name
         nexthop-forwarding-address { ipv4v6_address | ipv4_address | ipv6_address
}
         no nexthop-forwarding-address
         end
```

NOTES:

- **no**: Disables Nexthop forwarding address configuration.
- **nexthop-forwarding-address {** *ipv4v6_address* | *ipv4_address* | *ipv6_address* **}**: Configures the Nexthop forwarding address for this APN.
  - *ipv4_address* Configures IPv4 address.
  - *ipv6_address* Configures IPv6 address (supports colon-separated hexadecimal notation).

Configuring Nexthop Forwarding at IP Pool

Use the following CLI commands to configure Nexthop Forwarding at APN.

```
configure
   context context_name
```

```
[ no ] ip pool ipv4-public nexthop-forwarding-address  ipv4_address
[ no ] ip pool ipv6-public nexthop-forwarding-address  ipv6_address
end
```

NOTES:

- **no**: Disables Nexthop forwarding address configuration.
- **nexthop-forwarding-address** *ipv4_address* | *ipv6_address*: Configures the IPv4 address Nexthop forwarding address for this pool.
- **nexthop-forwarding-address** *ipv6_address*: Configures the IPv6 address Nexthop forwarding address for this pool.

Configuring Nexthop Forwarding Through AAA

Nexthop Forwarding Address can be configured through AAA. This option allows us to configure externally.

Configuring Nexthop Forwarding externally:

```
RADIUS AUTHENTICATION
  Access-Accept
   Subscriber-Nexthop-Address
```

Monitoring and Troubleshooting

This section provides information about CLI commands available for monitoring and troubleshooting the feature.

Show Commands and Outputs

This section provides information about show commands and their outputs in support of this feature.

show apn name <apn_name>

The output of this show command is enhanced to include the following fields introduced in support of this feature.

- nexthop gateway addr: Displays the configured Nexthop gateway address.

show subscriber user-plane-only full all

The output of this show command is enhanced to include the following fields introduced in support of this feature.

- Next Hop Ip Address - Displays the configured Nexthop IP address.