



# Indirect Forwarding Tunnel

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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

SAEGW supports Indirect Forwarding Tunnel (IDFT) procedures for creation and deletion, which are applicable for Pure-S and Collapsed calls with multi-PDN and multi-bearers. This feature is applicable for IDFT support with and without S-GW relocation and collision scenarios.

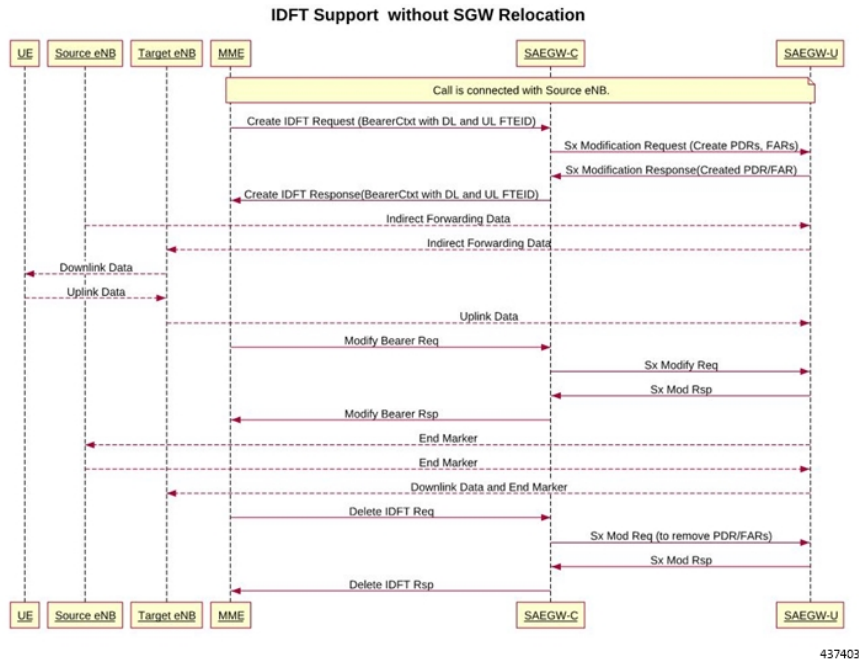


**Note** The IDFT in CUPS is a CLI-controlled feature. By default, the IDFT feature in CUPS is disabled.

# How It Works

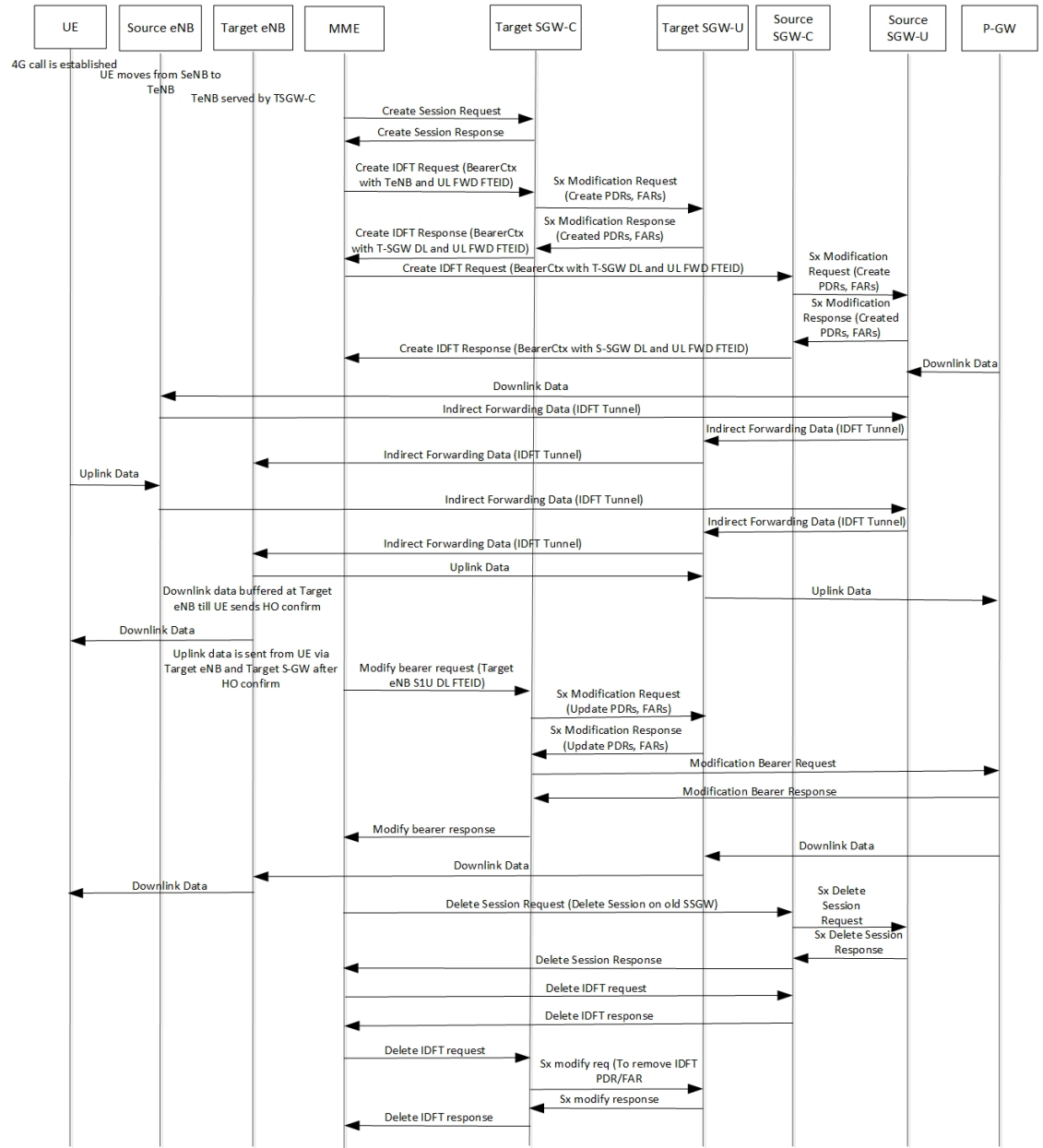
## Call Flow

The following call flow illustrates, at a high-level, the IDFT support without S-GW Relocation.



The following call flow illustrates the IDFT support with S-GW Relocation.

Figure 1: IDFT Support with S-GW Relocation



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The above call flow describes the IDFT tunnels establishment and deletion with S-GW relocation and without MME change.

If IDFT tunnels are not deleted by MME, then S-GW initiates the local delete of IDFT tunnels.

This feature supports the following scenarios for the Pure-S and Collapse calls:

- S-GW relocation with same MME
- S-GW relocation with same MME and different eNodeB
- S-GW relocation with different MME

- S1-based eNodeB Handoff
- EUTRAN to UTRAN Handoff




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**Note** S4 interface is not supported in CUPS. Hence any EUTRAN to UTRAN handoffs (and vice-versa) involving S4 interface is also not supported.

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- EUTRAN to UTRAN Handoff with S-GW relocation
- UTRAN to EUTRAN Handoff
- UTRAN to EUTRAN Handoff with S-GW relocation
- Sx transaction timeout during IDFT setup or removal
- Pending Sx transaction (event from PCRF or OCS) and IDFT request comes in
- Create Bearer Request (CBR) during Active IDFT
- Update Bearer Request (UBR) during Active IDFT
- Delete Bearer Request (DBR) during Active IDFT
- Modify Bearer Request (MBR) behavior on other PDN during Active IDFT
- Source MME path failure
- Target MME path failure
- MME path failure with NTSR enabled
- eGTP-C S5 path failure
- eGTP-C S5 path failure with P-GW restart notification enabled
- Sx path failure (clean IDFT and calls)
- Abort session (clear sub all, local abort, and so on.)
- CBR, UBR on other PDN during Active IDFT
- DBR on other PDN/bearer during Active IDFT
- S1-u path failure for target eNodeB
- S-GW path failure for target S-GW
- S1-u error indication on the default bearer while Active IDFT
- S1-u error indication on the dedicated bearer while Active IDFT
- S1-u error indication from the target S-GW to source S-GW bearer
- S1-u error indication from the target eNodeB to target S-GW bearer

## Supported Functionality

The IDFT feature supports the following functionality:

- Create IDFT request for Collapsed, Pure-S, combination of Collapsed and Pure-S multi-PDN calls with multiple bearers.
- Data transfer on downlink and uplink IDFT bearers.
- Deletion of IDFT request from MME. Also, timer-based deletion of IDFT bearer after expiration of a default value of 100 seconds, if the MME does not send an IDFT request for deletion.
- Deletion of IDFT PDN, including Clear/Delete subscribers from MME/P-GW, when normal PDN goes down.
- Sx-Path failure handling in case of Pure-S and collapsed calls during IDFT Active/ IDFT Create Sx-Pending state.
- Message interaction and collision during IDFT PDN establishment or deletion with any other procedure.
- S11/S5 and Sx Path Failure Handling on non-IDFT PDN is now supported when IDFT PDN is Active.



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**Important**

Transport GTP-U address capability is assumed to be same across eNodeB and S-GW.

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## Configuring Indirect Forwarding Tunnel

This section describes the CLI commands available in support of IDFT feature.

### Enabling Indirect Forwarding Tunnel Feature

On Control Plane, use the following CLI commands to enable or disable the IDFT feature.

```
configure  
  context context_name  
    sgw-service service_name  
      [ default | no ] egtp idft-support  
    end
```

**NOTES:**

- **idft-support**: Enables/Disables the IDFT feature in CUPS.
- By default, the IDFT feature is disabled and this CLI command is applicable on run-time change.

## Verifying the Indirect Forwarding Tunnel Feature

### show sgw-service name <service\_name>

On Control Plane, the output of this CLI command has been enhanced to display if the IDFT feature is enabled or disabled.

- IDFT-Feature Support for CUPS : Enabled/Disabled

## Monitoring and Troubleshooting

This section provides information regarding the CLI commands available in support of monitoring and troubleshooting the feature.

### Show Commands Input and/or Outputs

This section provides information regarding show commands and their outputs in support of the feature.

### show subscribers saegw-only full all

On Control Plane, use this command to see the IDFT Local and Remote TEID data. The following is a sample output:

```
Indirect Fwding   : Active
DL fwd local   addr: 209.165.200.228           DL fwd remote   addr: 209.165.200.226

DL fwd local   teid: [0x80028004]             DL fwd remote   teid: [0x2002d2e5]
UL fwd local   addr: 209.165.200.228           UL fwd remote   addr: 209.165.200.226

UL fwd local   teid: [0x8002a004]             UL fwd remote   teid: [0x20042bca]
```

### show subscribers user-plane-only callid <call-id> pdr all

On User Plane, use this command to see the PDR or FAR created for IDFT. The following is a sample output:



**Important** IDFT PDRs will have ACCESS as the source and destination interface type.

```
+-----Source Interface:      (C) - Core          (A) - Access
|-----Type                  (P) - CP-function   (.) - Unknown
|
|+-----Destination Interface: (C) - Core          (A) - Access
||-----Type                 (P) - CP-function   (.) - Unknown
||
||
||+----Rule-Type:             (S) - Static        (P) - Predefined
|||----Type                   (D) - Dynamic        (.) - Unknown
|||
|||
vvv   PDR-ID   Associated FAR-ID   Associated URR-ID(s)   Associated QER-ID(s)
---   -
ACS   0x0001   0x8001             n/a                    0x80000001
CAS   0x0002   0x8002             n/a                    0x80000001
```

```

ACD 0x0003      0x0003      0x00000007      0x00000002
                               n/a           0x80000003
CAD 0x0004      0x0004      0x00000007      0x00000002
                               n/a           0x80000003
CAD 0x0005      0x0005      0x00000000      n/a
ACD 0x0006      0x0006      0x00000000      n/a
CAD 0x0007      0x0007      0x00000000      n/a
ACD 0x0008      0x0008      0x00000000      n/a
AAD 0x0009      0x0009      0x00000000      n/a
AAD 0x000A      0x000A      0x00000000      n/a
AAD 0x000B      0x000B      0x00000000      n/a
AAD 0x000C      0x000C      0x00000000      n/a
    
```

Total subscribers matching specified criteria: 1

## show subscribers user-plane-only full all



**Important** Data statistics on IDFT PDRs are captured in the same way as existing PDR statistics. However, it is captured with a limitation – Statistics for DL and UL IDFT will be incremented in Pkts-Down and Bytes-Down category.

The following is sample output:

```

Static & Predef Rule Match stats:
Rule Name      Pkts-Down  Bytes-Down  Pkts-Up    Bytes-Up    Hits      Match-Bypassed
FP-Down (Pkts/Bytes)  FP-Up (Pkts/Bytes)
-----
catchall      0           0           0           3           1368      3             0
              0/0         0/0
Dynamic Rule Match stats:
PDR Id      Pkts-Down  Bytes-Down  Pkts-Up    Bytes-Up    Hits      Match-Bypassed
FP-Down (Pkts/Bytes)  FP-Up (Pkts/Bytes)
-----
0x0004      2           856         0           0           2         0             0/0
              0/0
0x000b      2           856         0           0           2         0             0/0
              0/0
0x000c      2           168         0           0           2         0             0/0
              0/0
    
```

show subscribers user-plane-only full all