



# Multiple PDN Attach or Detach Procedures

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## Feature Summary and Revision History

### Summary Data

*Table 1: Summary Data*

Applicable Product(s) or Functional Area	cnSGW-C
Applicable Platform(s)	SMI
Feature Default Setting	Enabled - Always-on
Related Documentation	Not Applicable

### Revision History

*Table 2: Revision History*

Revision Details	Release
First introduced.	2020.03.0

## Feature Description

cnSGW-C handles the following functionalities:

- UE-requested PDN connection
- UE-requested PDN disconnection

- PGW-initiated PDN disconnection
- Admin-initiated disconnection.

## How it Works

This section describes how this feature works.

## Call Flows

This section describes the key call flows for this feature.

### UE-requested PDN Connection Call Flow

This section describes the UE-requested PDN connection call flow.

Figure 1: UE-requested PDN Connection Call Flow

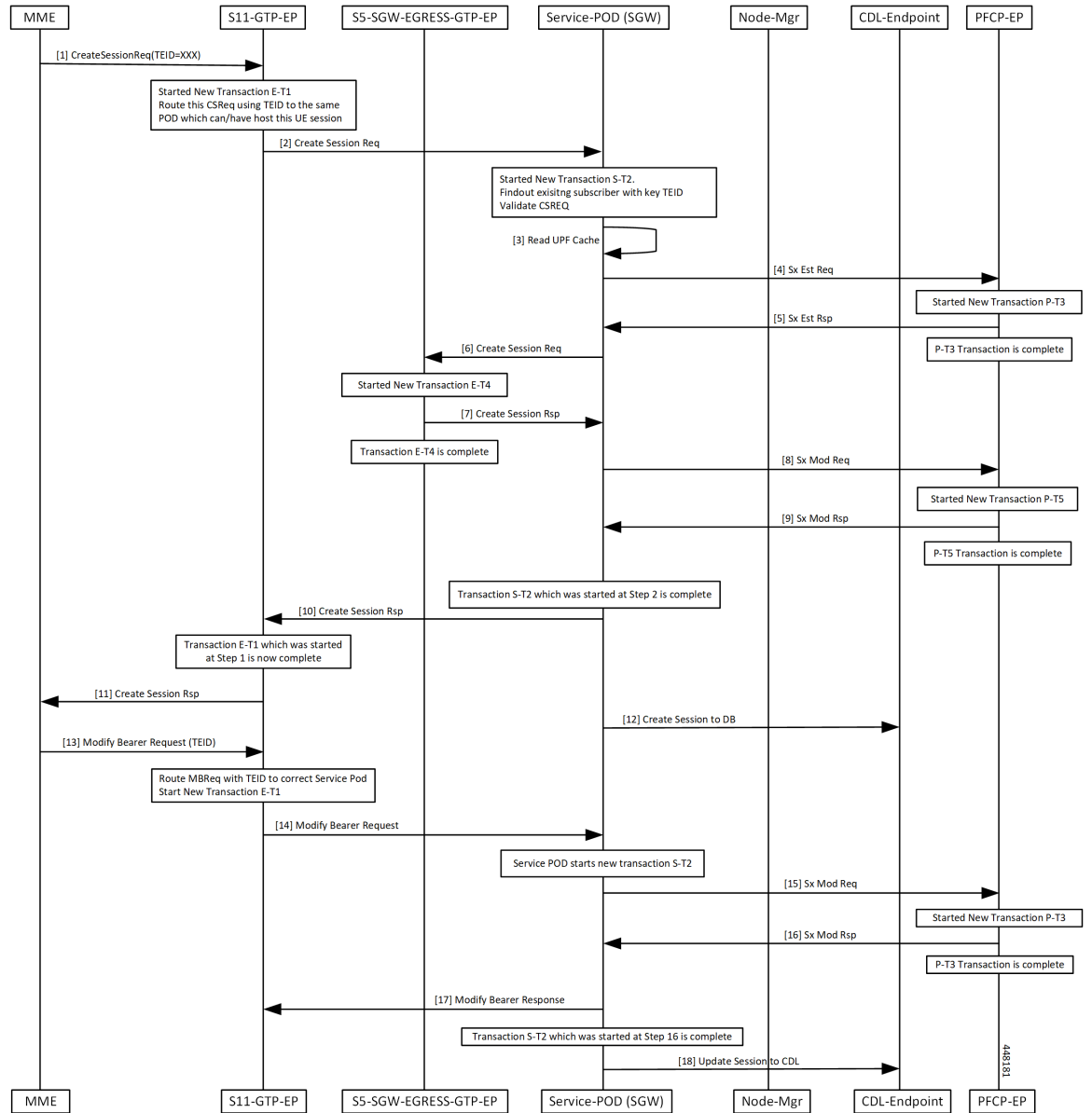


Table 3: UE-requested PDN Connection Call Flow Description

Step	Description
1	The MME sends the Create Session Request for a new PDN connection to the S11-GTP-EP with a nonzero TEID.

Step	Description
2	<p>The E-T1 transaction is started.</p> <p>The S11-GTP-EP decodes the received UDP message and converts the message into the gRPC message. Based on the IMSI value, the message is forwarded to the respective SGW-service pod which handles the UE session.</p> <p>The SGW-service pod receives the Create Session Request from the S11-GTP-EP.</p>
3	<p>The S-T2 transaction is started.</p> <p>The SGW-service pod finds the subscriber context based on the local ingress TEID, and validates the Create Session Request content and updates the PDN and subscriber information.</p> <p>The SGW-service pod reads the UPF cache to provide the selected UPF.</p>
4	<p>The SGW-service pod sends the Sx Establishment Request to the PFCP-EP.</p>
5	<p>The P-T3 transaction is started.</p> <p>The PFCP-EP sends the Sx Establishment Response to the SGW-service pod.</p>
6	<p>The P-T3 transaction is completed.</p> <p>The SGW-service pod sends the Create Session Request to the S5-SGW-EGRESS-GTP-EP with S11-U and S5-U TEID details.</p>
7	<p>The E-T4 transaction is started.</p> <p>The Create Session Response is validated and the S5-U remote TEID is updated in the PDN.</p> <p>The S5-SGW-EGRESS-GTP-EP sends the Create Session response to the SGW-service pod.</p>
8	<p>The E-T4 transaction is completed.</p> <p>The SGW-service pod sends the Sx Modify Request to the PFCP-EP.</p>
9	<p>The P-T5 transaction is started.</p> <p>The PFCP-EP sends the Sx Modify Response to the SGW-service pod on expiry of the timer T5.</p>
10	<p>The P-T5 and S-T2 transaction is completed.</p> <p>The GTP-EP receives the Create Session Response from the SGW-service pod.</p>
11	<p>The E-T1 transaction is completed.</p> <p>The MME receives the Create Session Response from the S11-GTP-EP.</p>
12	<p>The SGW-service pod updates the created session in CDL endpoint (database) with new PDN information.</p>
13	<p>The MME sends the Modify Bearer Request with TEID to the S11-GTP-EP.</p>
14	<p>The E-T1 transaction is started.</p> <p>The S11-GTP-EP routes the Modify Bearer Request to the SGW-service pod.</p> <p>The S11-GTP-EP sends the Modify Bearer Request to the SGW-service pod.</p>

Step	Description
15	The S-T2 transaction is started. The SGW-service pod sends the Sx Modify Request to the PFCP-EP pod on expiry of the timer S-T2.
16	The P-T3 transaction is started. The PFCP-EP sends the Sx Modify Response to the SGW-service pod on expiry of the timer T3.
17	R-T3 transaction is completed. The SGW-service pod sends the Modify Bearer Response to the MME.
18	S-T2 transaction is completed The SGW-service pod sends the update session to the CDL endpoint.

## UE-requested or the MME-requested PDN Disconnection Call Flow

This section describes the UE or the MME-requested PDN disconnection call flow.

Figure 2: UE-requested or the MME-requested PDN Disconnection Call Flow

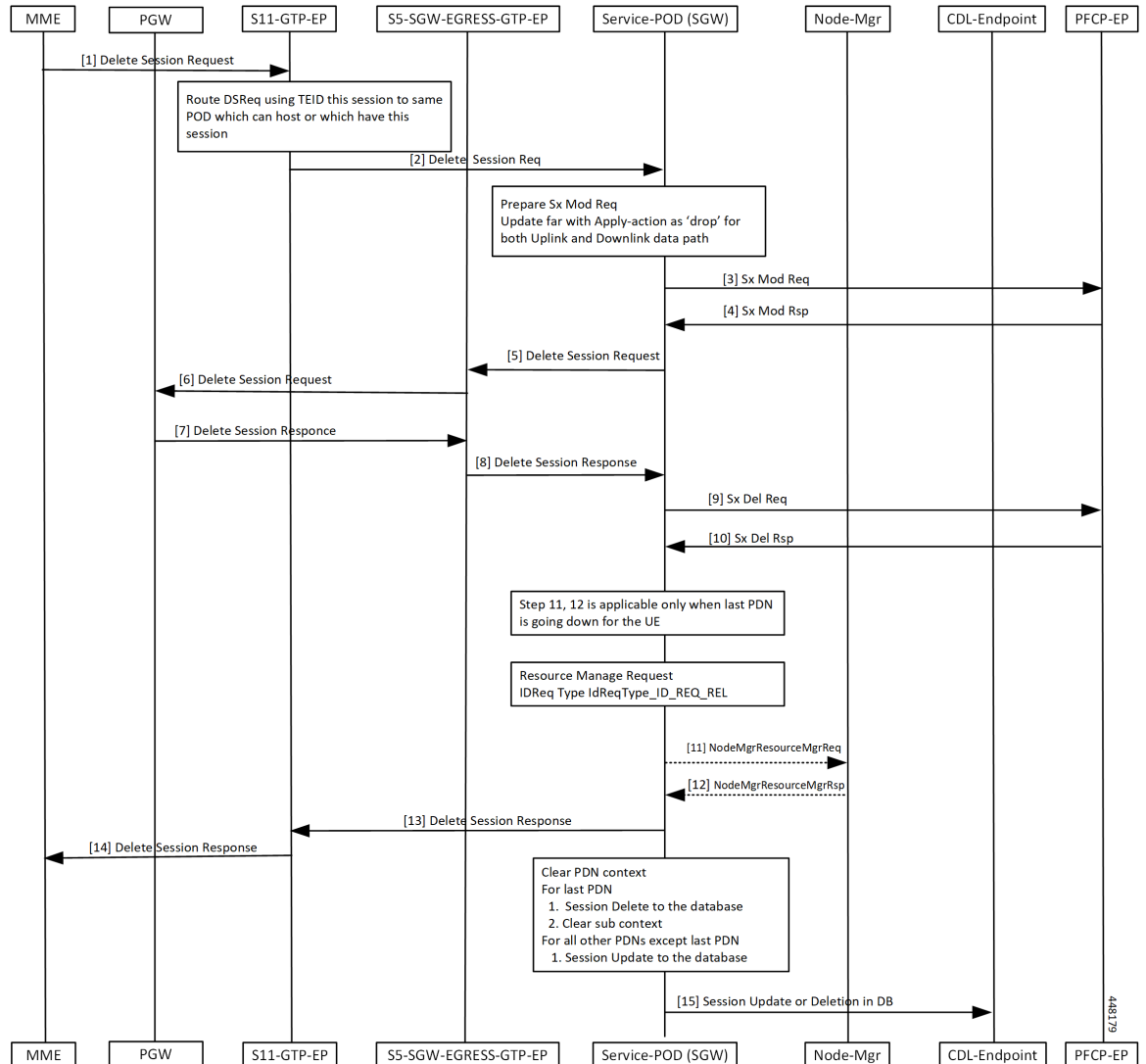


Table 4: UE-requested or the MME-requested PDN Disconnection Call Flow Description

Step	Description
1	The MME sends the Delete Session Request to the S11-GTP-EP for other PDN disconnection.
2	The GTP-EP decodes the received UDP message and converts the message into the gRPC message. Based on the TEID value, the gRPC message is forwarded to the SGW-service pod which can handle the UE session.
3	The SGW-service pod finds the subscriber context information as per the local ingress TEID. The SGW-service pod validates the Delete Session Request content. The SGW-service pod sends the Sx Modify Request to the PFCP-EP with apply action as DROP to drop the uplink or downlink packets at the SGW-U.

Step	Description
4	The PFCP-EP sends the Sx Modify Response to the SGW-service pod.
5	The SGW-service pod forwards the Delete Session Request to the S5-SGW-EGRESS-GTP-EP.
6	The S5-SGW-EGRESS-GTP-EP forwards the Delete Session Request to the PGW through the UDP proxy.
7	The PGW sends the Delete Session Response to the S5-SGW-EGRESS-GTP-EP.
8	The S5-SGW-EGRESS-GTP-EP forwards the Delete Session Response to the SGW-service pod.
9	The SGW-service pod validates the Delete Session Response, and sends the Sx Delete Request to the PFCP-EP.
10	The SGW-service pod receives the Sx Delete Session Response from the PFCP-EP.
11	For the last PDN, the SGW-service pod sends the NodeMgrResourceManager Request for the ID release to the NodeManager.
12	The Node Manager releases the ID and sends the acknowledgment to the SGW-service pod.
13	The SGW-service pod sends the Delete Session Response to the S11-GTP-EP.
14	The S11-GTP-EP forwards the Delete Session Response to the MME.
15	The SGW-service pod <ul style="list-style-type: none"> <li>• Updates the session in database for the delete PDN information for other than the last PDN</li> <li>• Sends the delete session message to the database for the last PDN</li> </ul>

## PGW-requested Disconnection Call Flow

This section describes the PGW-requested disconnection call flow.

Figure 3: PGW-requested Disconnection Call Flow

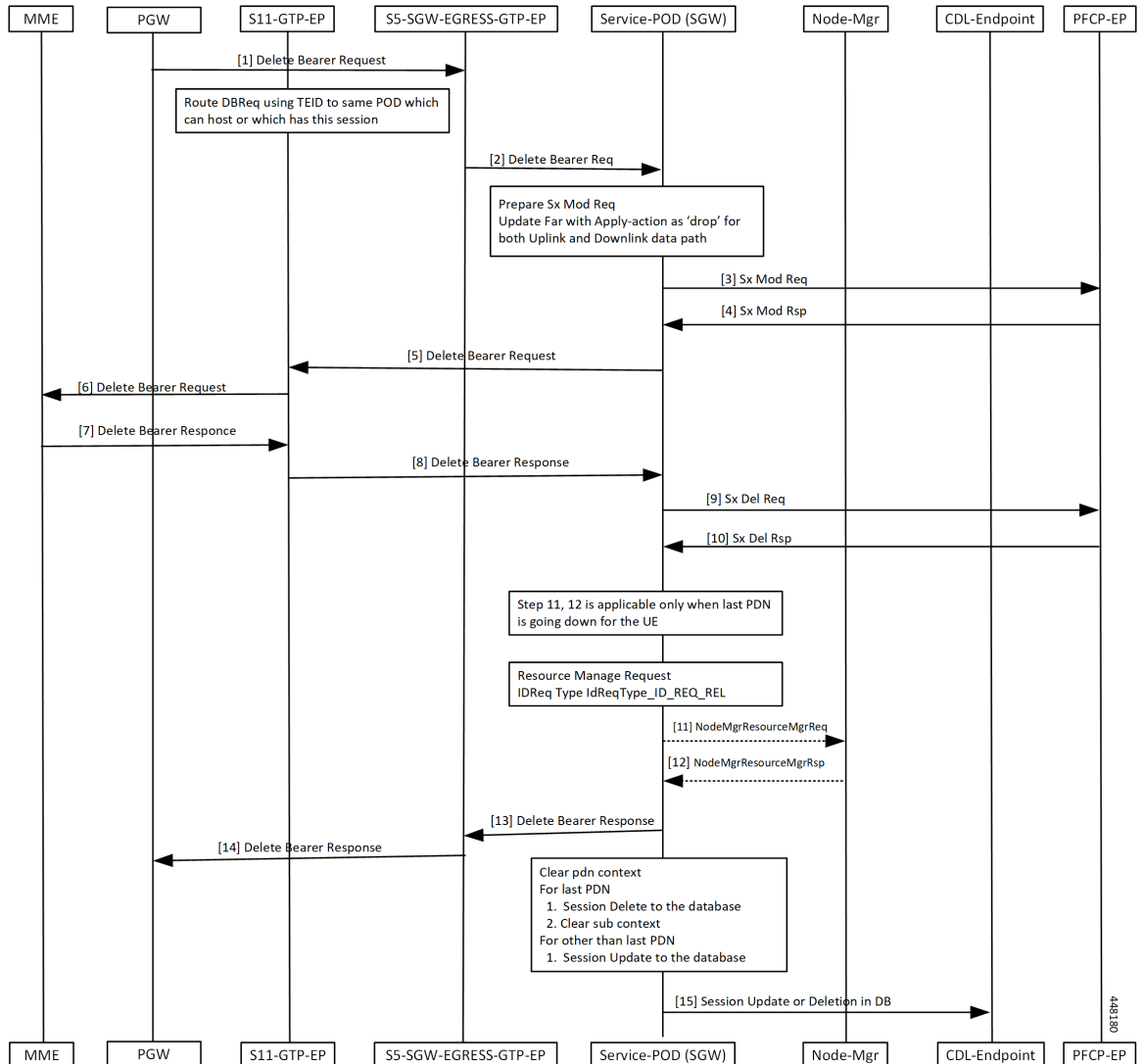


Table 5: PGW-requested Disconnection Call Flow Description

Step	Description
1	The PGW sends the Delete Bearer Request to the S11-GTP-EP for other PDN disconnection.
2	The GTP-EP decodes the received UDP message and converts the message into the gRPC message. Based on the TEID value, the gRPC message is forwarded to the SGW-service pod which can handle the UE session.
3	The SGW-service pod finds the subscriber context information as per the local ingress TEID. The SGW-service pod validates the Delete Bearer Request content. The SGW-service pod sends the Sx Modify Request to the PFCP-EP with apply action as DROP to drop the uplink or downlink packets at the SGW-U.



Step	Description
4	The PFCP-EP sends the Sx Modify Response to the SGW-service pod.
5	The SGW-service pod forwards the Delete Bearer Request to the S5-SGW-EGRESS-GTP-EP.
6	The S5-SGW-EGRESS-GTP-EP forwards the Delete Bearer Request to the PGW through the UDP proxy.
7	The PGW sends the Delete Bearer Response to the S5-SGW-EGRESS-GTP-EP.
8	The S5-SGW-EGRESS-GTP-EP forwards the Delete Bearer Response to the SGW-service pod.
9	The SGW-service pod validates the Delete Bearer Response, and sends the Sx Delete Request to the PFCP-EP.
10	The SGW-service pod receives the Sx Delete Bearer Response from the PFCP-EP.
11	For the last PDN, the SGW-service pod sends the NodeMgrResourceManager Request for the ID release to the NodeManager.
12	The Node Manager releases the ID and sends the acknowledgment to the SGW-service pod.
13	The SGW-service pod sends the Delete Bearer Response to the S11-GTP-EP.
14	The S11-GTP-EP forwards the Delete Bearer Response to the MME.
15	The SGW-service pod <ul style="list-style-type: none"> <li>• Updates the Bearer in database for the delete PDN information for other than the last PDN</li> <li>• Sends the delete Bearer message to the database for the last PDN</li> </ul>

