



# 3GPP RAN/NAS Cause Codes Support

- [Feature Summary and Revision History, on page 1](#)
- [Feature Description, on page 1](#)
- [How it Works, on page 3](#)

## 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. | 2021.02.0 |

## Feature Description

cnSGW-C supports RAN/NAS cause codes as defined in *3GPP TS 29.274, version 15.4.0, section 8.103, RAN/NAS Cause*.

cnSGW-C transparently transmits the RAN/NAS Release Cause IE provided by the MME to the PGW for further propagation towards the PCRF.



**Note** GTP-based S5/S8 and S11 are supported.

The following table lists the RAN/NAS Cause codes.

**Table 3: RAN/NAS Cause Codes**

| Octets         | Bits                                                                           |   |   |   |            |   |   |   |
|----------------|--------------------------------------------------------------------------------|---|---|---|------------|---|---|---|
|                | 8                                                                              | 7 | 6 | 5 | 4          | 3 | 2 | 1 |
| 1              | Type = 172 (decimal)                                                           |   |   |   |            |   |   |   |
| 2–3            | Length = n                                                                     |   |   |   |            |   |   |   |
| 4              | Spare                                                                          |   |   |   | Instance   |   |   |   |
| 5              | Protocol Type                                                                  |   |   |   | Cause Type |   |   |   |
| 6 to m         | Cause Value                                                                    |   |   |   |            |   |   |   |
| (m+1) to (n+4) | One or more octets from these octets are present, only if explicitly specified |   |   |   |            |   |   |   |

The Protocol Type field is encoded with the specified values for the RAN/NAS Cause as follows:

**Table 4: Protocol Type**

| Protocol Type | Values (Decimal) |
|---------------|------------------|
| S1AP Cause    | 1                |
| EMM Cause     | 2                |
| ESM Cause     | 3                |
| <spare>       | 4–15             |

The Cause Value field (and the associated RAN cause subcategory) is transferred over the S1-AP interface. The field is encoded in one octet as a binary integer.

**Table 5: Cause Type**

| Cause Type          | Values (Decimal) |
|---------------------|------------------|
| Radio Network Layer | 0                |
| Transport Layer     | 1                |
| NAS                 | 2                |
| Protocol            | 3                |
| Miscellaneous       | 4                |

| Cause Type | Values (Decimal) |
|------------|------------------|
| <spare>    | 5–15             |

For EMM and ESM Causes, the Cause Value field contains the cause value as specified in *3GPP TS 24.301*. If the Protocol is S1AP, the cause value contains the specified value as in *3GPP TS 36.413*.

## How it Works

This section describes how this feature works.

## Call Flows

This section describes the key call flows for the RAN/NAS Cause Codes feature.

### Create Bearer Procedure Call Flow

This section describes the create bearer procedure call flow.

**Figure 1: Create Bearer Procedure Call Flow**

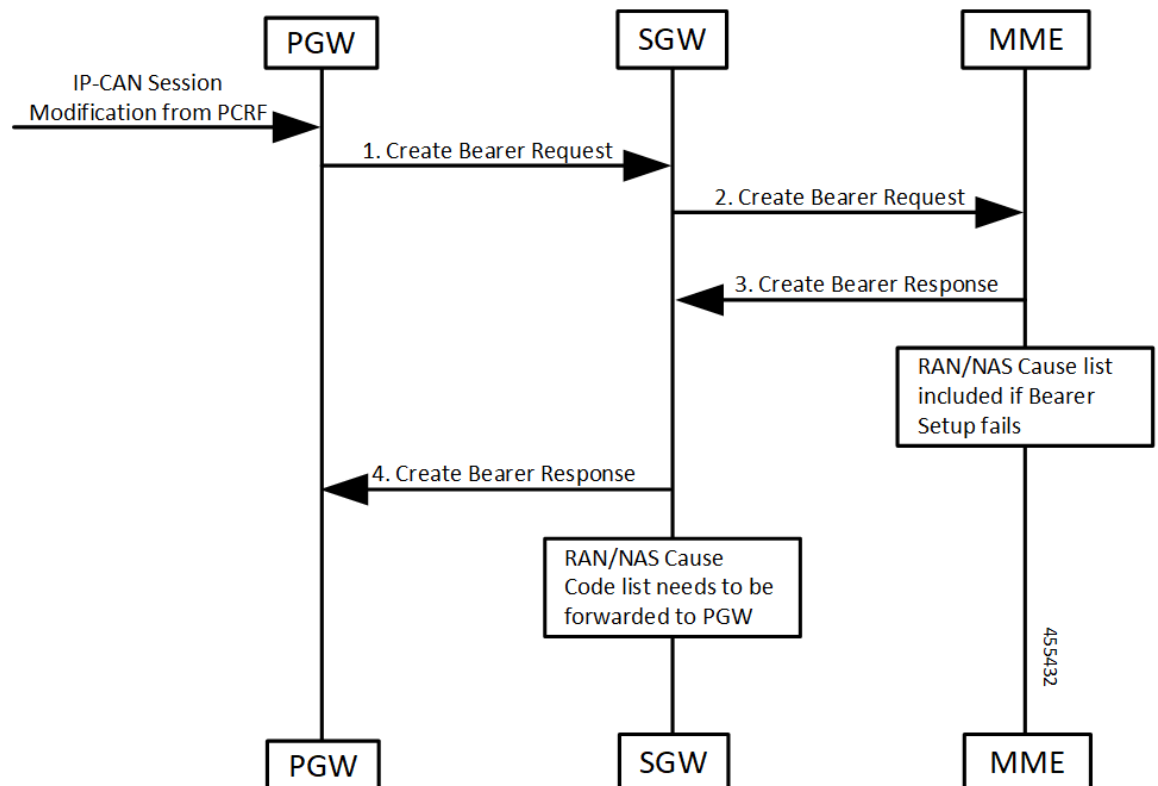


Table 6: Create Bearer Procedure Call Flow Description

| Step | Description                                                                                                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | PGW receives IP-CAN session modification request from PCRF.<br>PGW creates the Create Bearer Request message and sends it to SGW (cnSGW-C).       |
| 2    | SGW (cnSGW-C) forwards the Create Bearer Request message request to MME.                                                                          |
| 3    | MME generates a Create Bearer Response message towards SGW (cnSGW-C).<br>If bearer setup fails, then the RAN/Cause list included in the response. |
| 4    | SGW (cnSGW-C) forwards the Create Bearer Response message to PGW.<br>It includes RAN/NAS Cause Code list.                                         |

## Update Bearer Procedure Call Flow

This section describes the update bearer procedure call flow.

Figure 2: Update Bearer Procedure Call Flow

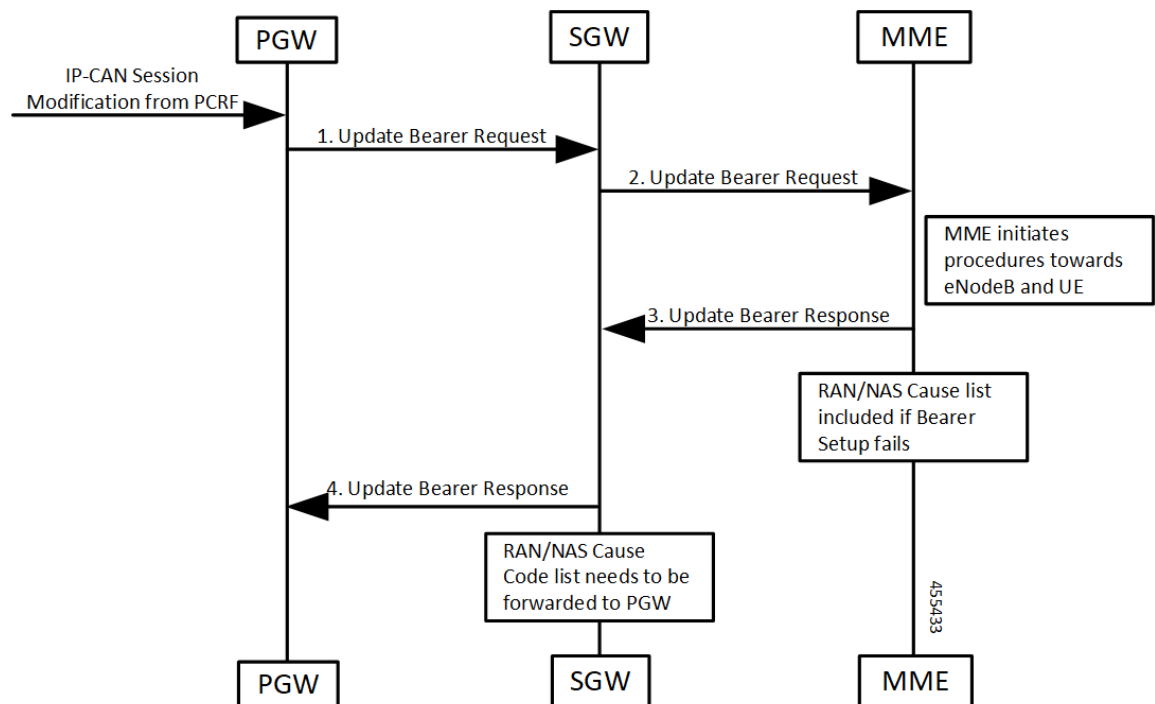


Table 7: Update Bearer Procedure Call Flow Description

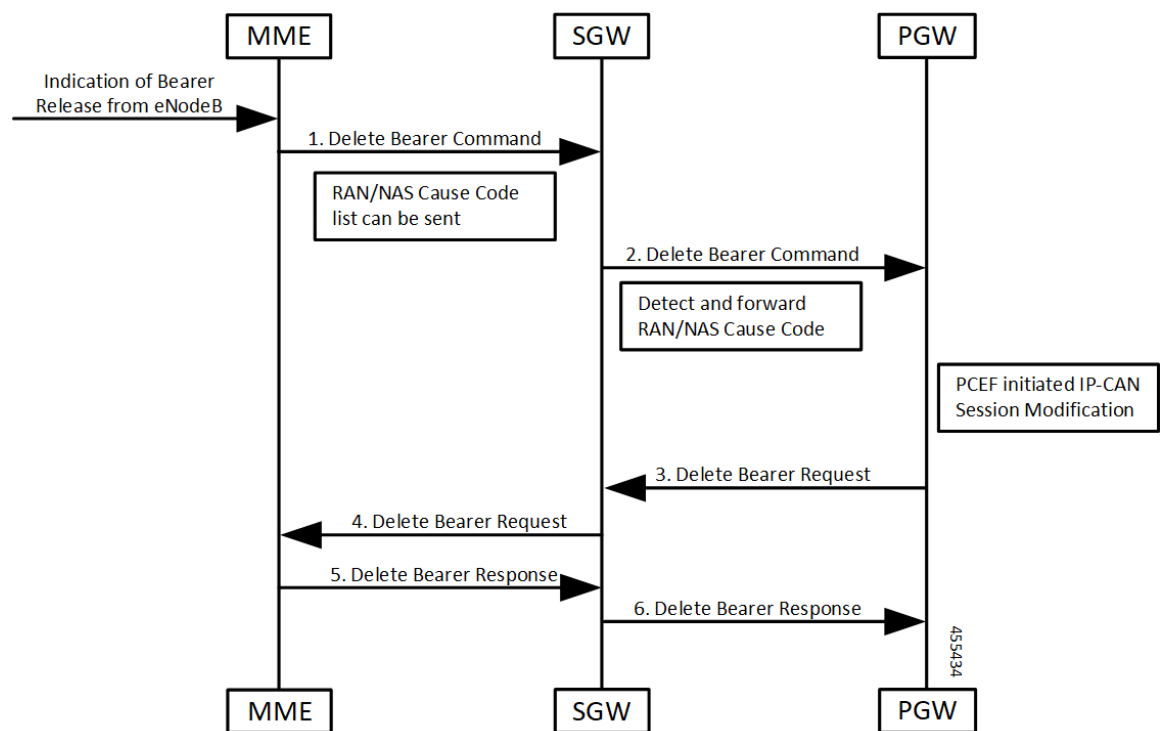
| Step | Description                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------|
| 1    | PGW receives IP-CAN session modification request from PCRF.<br>PGW creates the Update Bearer Request message to SGW (cnSGW-C). |

| Step | Description                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2    | SGW (cnSGW-C) forwards the Update Bearer Request message to MME.                                                                                             |
| 3    | MME generates an Update Bearer Response message towards SGW (cnSGW-C).<br>If this bearer modification fails, then the RAN/NAS list included in the response. |
| 4    | SGW (cnSGW-C) forwards the Update Bearer Response message to PGW.                                                                                            |

## Delete Bearer Command Procedure Call Flow

This section describes the delete bearer command procedure call flow.

**Figure 3: Delete Bearer Command Procedure Call Flow**



**Table 8: Delete Bearer Command Procedure Call Flow Description**

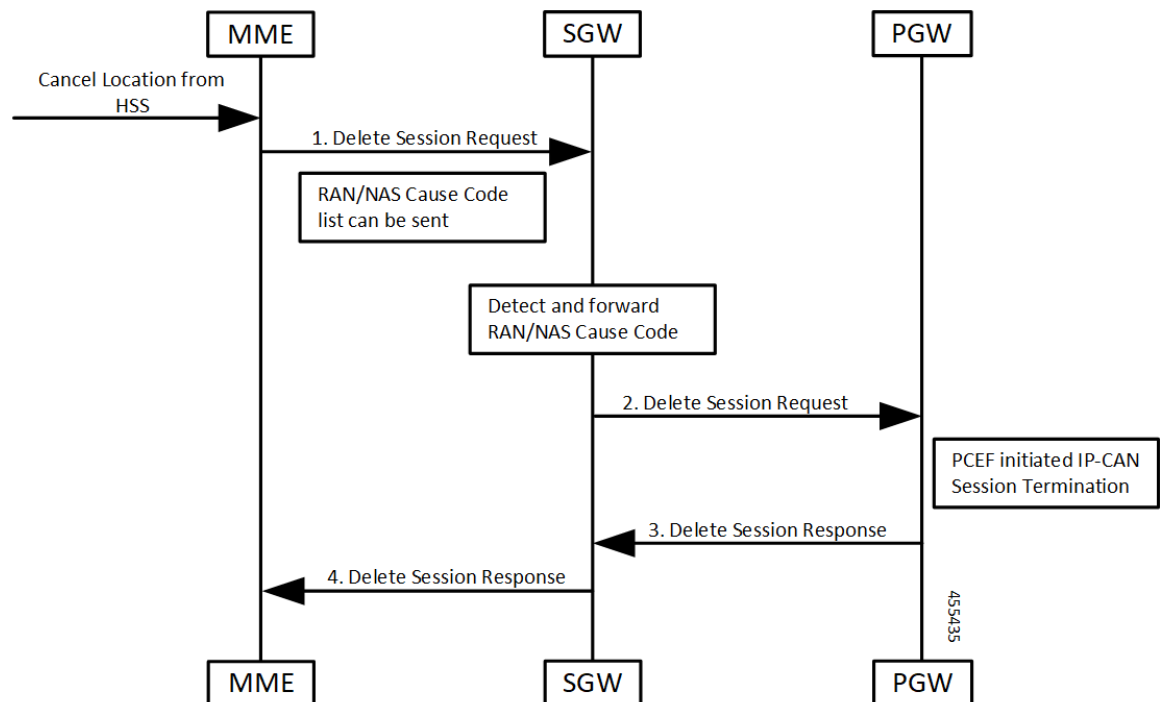
| Step | Description                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | MME receives an indication of Bearer Release from eNodeB request.<br>MME creates Delete Bearer Command message to SGW (cnSGW-C).<br>It includes RAN/NAS cause code list. |
| 2    | SGW (cnSGW-C) forwards the Delete Bearer Command message request to PGW.<br>It detects and forwards RAN/NAS cause code list.                                             |

| Step | Description                                                                                                                  |
|------|------------------------------------------------------------------------------------------------------------------------------|
| 3    | PGW sends the Delete Bearer Request message to SGW (cnSGW-C).<br>PGW receives IP-CAN session modification request from PCEF. |
| 4    | SGW (cnSGW-C) generates a Delete Bearer Request message towards MME.                                                         |
| 5    | MME generates a Delete Bearer Response message towards SGW (cnSGW-C).                                                        |
| 6    | SGW (cnSGW-C) further sends the Delete Bearer Response message to PGW.                                                       |

## Delete Session Procedure Call Flow

This section describes the delete session procedure call flow.

**Figure 4: Delete Session Procedure Call Flow**



**Table 9: Delete Session Procedure Call Flow Description**

| Step | Description                                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | MME receives an indication of Cancel Location from HSS.<br>MME creates Delete Session Request message to SGW (cnSGW-C).<br>It includes RAN/NAS cause code list. |
| 2    | SGW (cnSGW-C) forwards the Delete Session Request message request to PGW.<br>It detects and forwards RAN/NAS cause code list.                                   |

| Step | Description                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------|
| 3    | PGW sends the Delete Session Response message to SGW (cnSGW-C).<br>PGW receives IP-CAN session modification request from PCEF. |
| 4    | SGW (cnSGW-C) generates a Delete Session Response message towards MME.                                                         |

