# GTPU Path Failure

# 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 |
|---|---|
| Support to clean session or bearer based on reported value in node-report (Node-ID and Peer Information) | 2021.02.3 |
| First introduced. | 2021.02.1 |

# Feature Description

When UPF detects a GTP-U path failure, it sends Node Report Request (with NodeID and GTPU Peer Information) to cnSGW-C. cnSGW-C clears the PDU sessions belonging to the GTP-U peer and UPF node ID.

This feature supports the following:

- Sending Node Report Success

- Cleaning session or bearer based on the reported value in node-report (Node-ID and Peer Information)

- Incrementing the relevant statistics

For more information, see the GTPU Path Failure, on page 1 chapter.

# How it Works

This section describes how this feature works.

The following table describes various actions on detecting GTPU path failure.

**Table 3: GTPU Path Failure for Node Report**

| Interface | Configuration | TEID | Action |
|---|---|---|---|
| s1u/s5u | Local Purge | Default | Send SxSessionDeletion to clean up on UPF<br><br>Purge PDN locally |
| | | Dedicated | Send SxSessionModification (Remove TrafficEndpoint)<br><br>Purge Bearer locally |
| | Signal Peer | Default | Send SxSessionModificationRequest (FAR Action=DROP)<br><br>Send DBReq to MME and DSReq to PGW<br><br>Send SxSessionDeletionRequest |
| | | Dedicated | Send DBReq to MME and DBCmd to PGW (Async)<br><br>Send SxSessionModificationRequest (Remove Traffic Endpoint) |

# Call Flows

This section describes key call flows of GTPU Path Failure.

## Path Failure for Default Bearer Call Flow

This section describes the Path Failure for Default Bearer call flow.

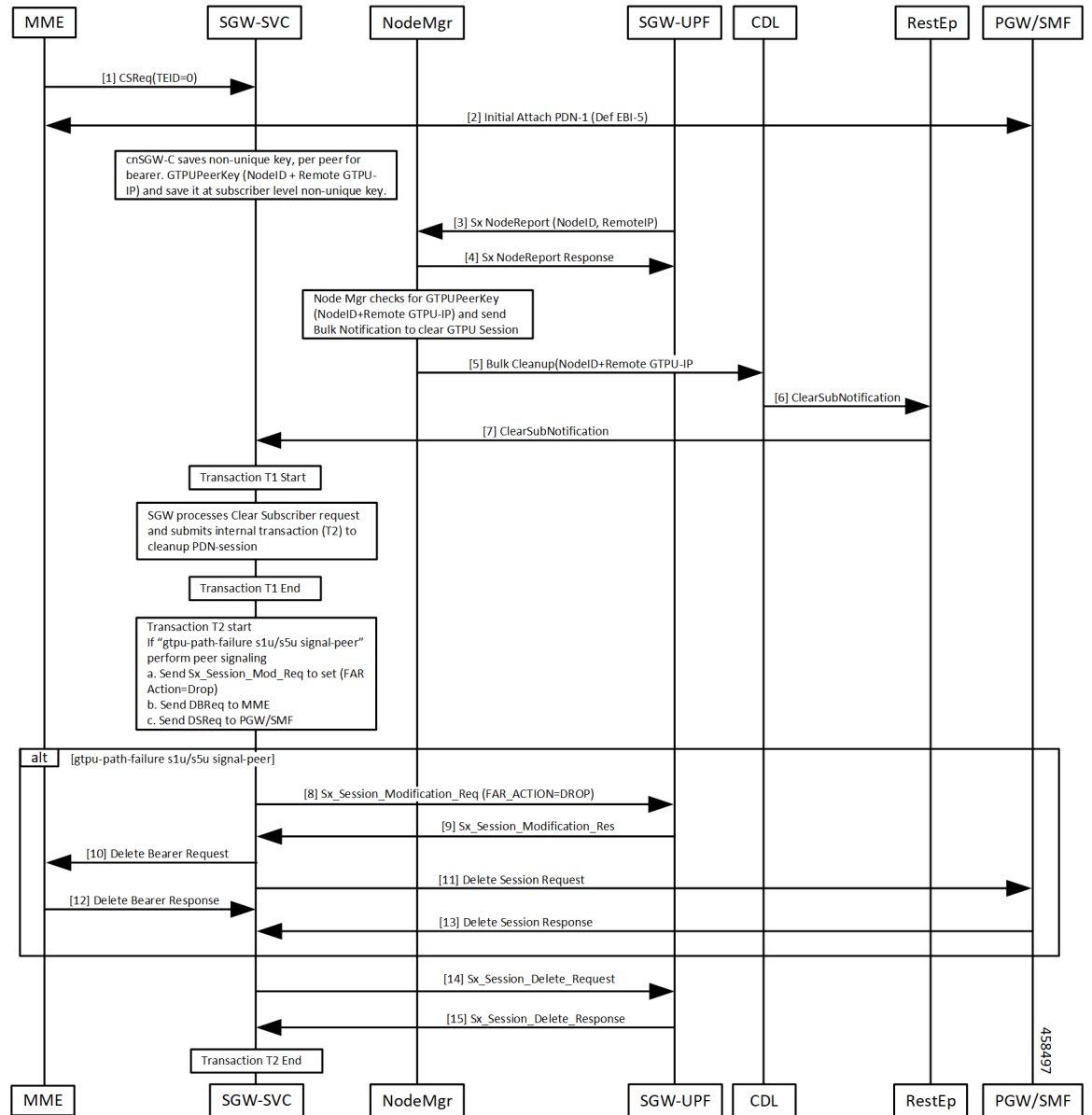*Figure 1: Path Failure for Default Bearer Call Flow*

*Table 4: Path Failure for Default Bearer Call Flow Description*

| Step | Description |
|------|-------------|
| 1, 2 | Initial attach complete. cnSGW-C saves non-unique GTPUPeerKey (NodeID:Remote GTPU-peer-IP) per bearer. |
| 3, 4 | • Path failure detected on UPF. UPF sends NodeReportRequest to Node Manager.<br>• Node Manager responds with NodeReportResponse.<br>• Initiate Bulk Cleanup request to CDL. |
| 6, 7 | • CDL sends ClearSubNotification to RestEp.<br>• RestEP forwards it to cnSGW-C. |
| 8–13 | cnSGW-C processes Clear Subscriber Request.<br>If GTPU peer IP received is for default bearer, submit internal transaction (T2) to clean up PDN.<br>If CLI `gtpu-path-failure s1u/s5u signal-peer`<br>• Send Sx_Session_Report_Request to UPF to set FAR ACTION=DROP.<br>• Send Delete Bearer Req to MME.<br>• Send Delete Session Request to PGW. |
| 14, 15 | • Send Sx_Session_Delete_Request.<br>• UPF responds with Sx_Session_Delete_Response. |

# Path Failure for Dedicated Bearer Call Flow

This section describes the Path Failure for Dedicated Bearer call flow.

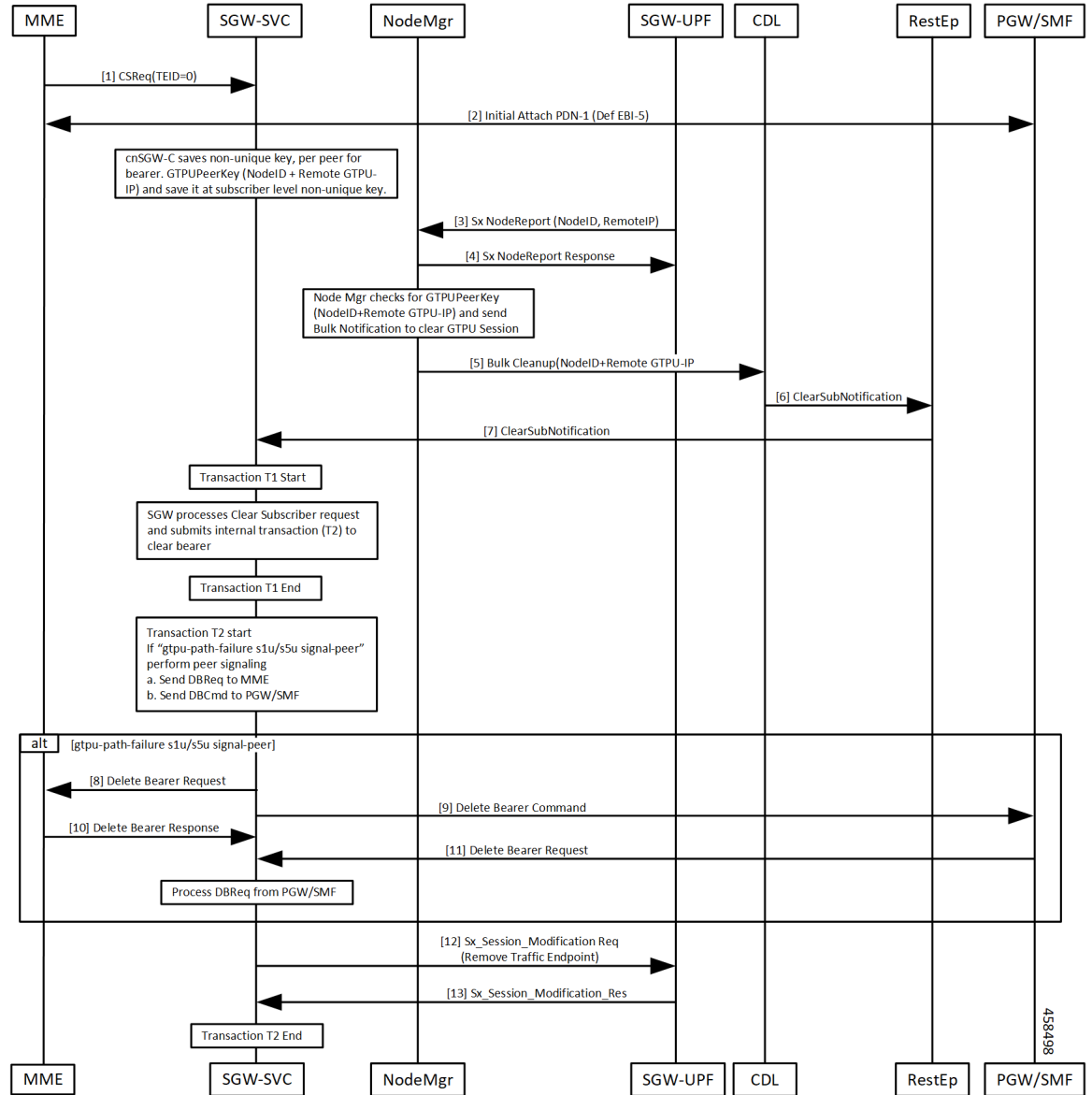*Figure 2: Path Failure for Dedicated Bearer Call Flow*



*Table 5: Path Failure for Dedicated Bearer Call Flow Description*

| Step | Description |
|------|-------------|
| 1, 2 | Initial attach complete. cnSGW-C saves non-unique GTPUPeerKey (NodeID:Remote GTPU-peer-IP) per bearer. |
| 3, 4 | • Path failure detected on UPF. UPF sends NodeReportRequest to Node Manager.<br>• Node Manager responds with NodeReportResponse.<br>• Initiate Bulk Cleanup request to CDL. |

| Step | Description |
|------|-------------|
| 6, 7 | • CDL sends ClearSubNotification to RestEp.<br><br>• RestEP forwards it to cnSGW-C. |
| 8–13 | cnSGW-C processes Clear Subscriber Request.<br><br>If GTPU peer IP received is for dedicated bearer, submit internal transaction (T2) to clean up PDN.<br><br>If CLI `gtpu-path-failure s1u/s5u signal-peer`<br><br>• Send Delete Bearer Req to MME.<br><br>• Send Delete Bearer Command to PGW. |
| 14, 15 | • Send Sx_Session_Modification_Request (Remove Traffic Endpoint).<br><br>• UPF responds with Sx_Session_Delete_Response. |

# Feature Configuration

This section describes how to configure the GTPU Path Failure feature.

To configure this feature, use the following configuration.

```
config
 profile sgw sgw_profile_name
  gtpu-path-failure
   s1u [ local-purge | signal-peer ]
   s5u [ local-purge | signal-peer ]
   end
```

**NOTES:**

- **s1u**—S1-U interface. Default is local-purge.

- **s5u**—S5-U interface. Default is local-purge.

- **local-purge**—Locally purge the affected bearers or PDNs without informing peer.

- **signal-peer**—Clear the affected bearers or PDNs with signaling towards peer.

# Configuration Example

The following is an example configuration.

```
config
   profile sgw sgw1
   gtpu-path-failure s1u local-purge
   gtpu-path-failure s5u local-purge
   end
```

# Configuration Verification

To verify the configuration:

```
show running-config profile sgw sgw1
profile sgw sgw1
sgw-charging-threshold thre1
sgw-charging-profile ch1
locality LOC1
fqdn cisco.com.apn.epc.mnc456.mcc123
charging-mode gtpp
subscriber-policy sub1
session-idle-timer 86000
ddn failure-action-drop-timer 60
ddn no-user-connect-retry-timer 60
path-failure s11 signal-peer
path-failure s5e signal-peer
gtpu-error-ind s5u signal-peer
gtpu-path-failure s1u local-purge
gtpu-path-failure s5u local-purge
```

# GTPU Path Failure OAM Support

This section describes operations, administration, and maintenance information for this feature.

# Bulk Statistics

- Node Manager Statistics

```
nodemgr_node_report_stats{app_name="smf",backlog_tmr="0",cluster="Local",data_center="DC",
instance_id="0",node_report_no_of_sess="0",node_report_peer_gtpu="209.165.201.20:209.165.201.30",
node_report_type="",service_name="nodemgr",session_tmr="0",status="attempted",
up_ep_key="209.165.201.20:209.165.201.10"} 1
```

```
nodemgr_node_report_stats{app_name="smf",backlog_tmr="1617268831815934340",cluster="Local",
data_center="DC",instance_id="0",node_report_no_of_sess="0",
node_report_peer_gtpu="209.165.201.20:209.165.201.30",node_report_type="origin",
service_name="nodemgr",session_tmr="600",status="success",
up_ep_key="209.165.201.20:209.165.201.10"} 1
```

- SGW Service Statistics

```
sgw_service_stats{app_name="smf",cluster="Local",data_center="DC",fail_reason="",
gr_instance_id="1",instance_id="0",interface="interface_sgw_egress",reject_cause="",
service_name="sgw-service",sgw_procedure_type="s5u_gtpu_path_failure_initiated",
status="attempted",sub_fail_reason=""} 1
```

```
sgw_service_stats{app_name="smf",cluster="Local",data_center="DC",fail_reason="",
gr_instance_id="1",instance_id="0",interface="interface_sgw_egress",reject_cause="",
service_name="sgw-service",sgw_procedure_type="s5u_gtpu_path_failure_initiated",
status="success",sub_fail_reason=""} 1
```

```
sgw_service_stats{app_name="smf",cluster="Local",data_center="DC",fail_reason="",
gr_instance_id="1",instance_id="0",interface="interface_sgw_ingress",reject_cause="",
service_name="sgw-service",sgw_procedure_type="s5u_gtpu_path_failure_initiated",
status="attempted",sub_fail_reason=""} 1
```

```
sgw_service_stats{app_name="smf",cluster="Local",data_center="DC",fail_reason="",
gr_instance_id="1",instance_id="0",interface="interface_sgw_ingress",reject_cause="",
service_name="sgw-service",sgw_procedure_type="s5u_gtpu_path_failure_initiated",
status="success",sub_fail_reason=""} 1
```