GTPU Path Failure

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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	

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

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 Purge PDN locally
		Dedicated	Send SxSessionModification (Remove TrafficEndpoint) Purge Bearer locally
	Signal Peer	Default	Send SxSessionModificationRequest (FAR Action=DROP) Send DBReq to MME and DSReq to PGW Send SxSessionDeletionRequest
		Dedicated	Send DBReq to MME and DBCmd to PGW (Async) 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

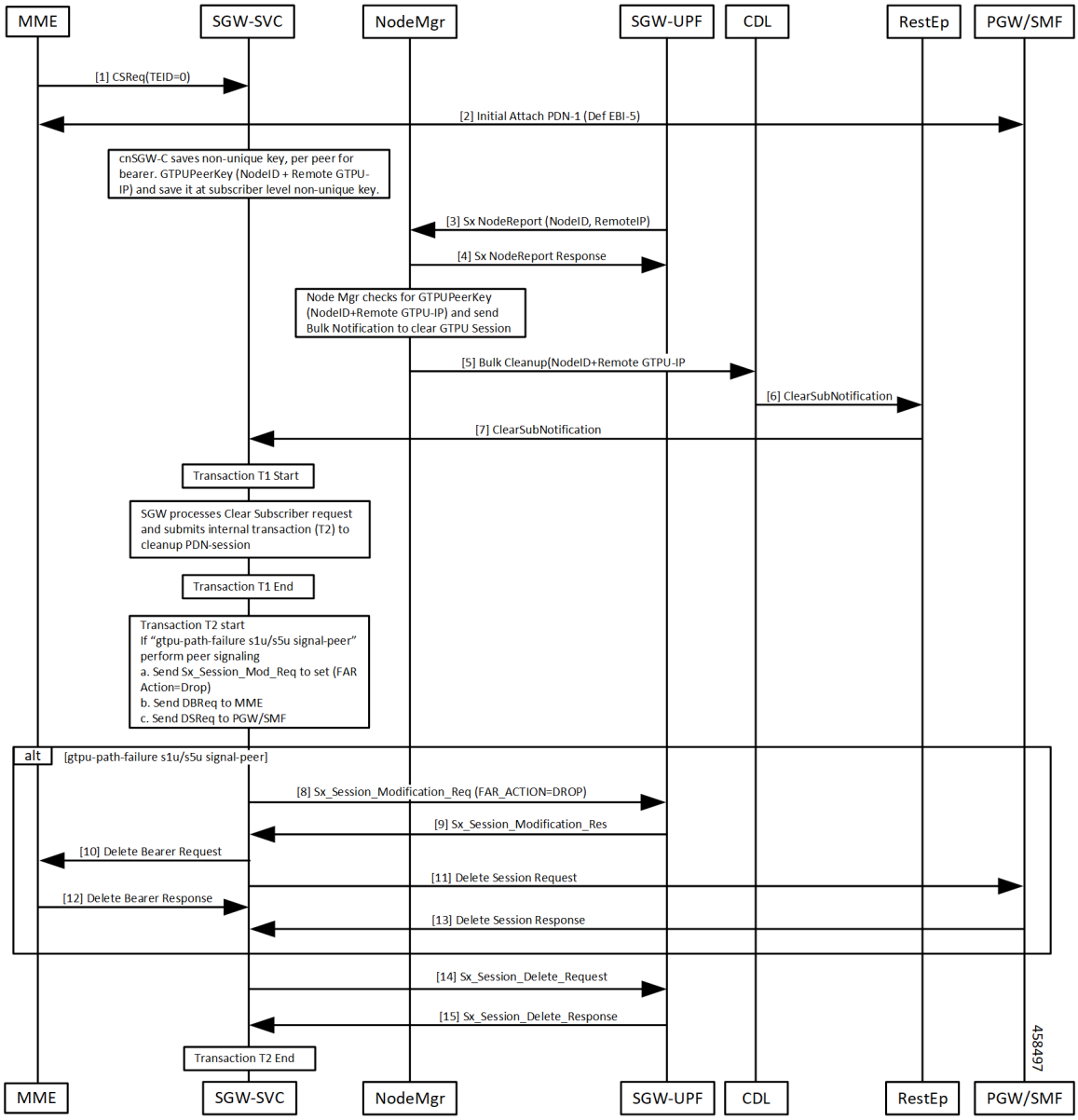

Table 4: Path Failure for Default Bearer Call Flow Description

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. • Node Manager responds with NodeReportResponse. • Initiate Bulk Cleanup request to CDL.
6, 7	• CDL sends ClearSubNotification to RestEp. • RestEP forwards it to cnSGW-C.
8–13	cnSGW-C processes Clear Subscriber Request. If GTPU peer IP received is for default bearer, submit internal transaction (T2) to clean up PDN. If CLI `gtpu-path-failure s1u/s5u signal-peer` • Send Sx_Session_Report_Request to UPF to set FAR ACTION=DROP. • Send Delete Bearer Req to MME. • Send Delete Session Request to PGW.
14, 15	• Send Sx_Session_Delete_Request. • 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. • Node Manager responds with NodeReportResponse. • Initiate Bulk Cleanup request to CDL.

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