Service Request Procedure

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	AMF
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.	2021.04.0

Feature Description

The AMF supports the Service Request procedure, used by a UE in CM-IDLE state or the 5GC, to request the establishment for a secure connection to an AMF. The Service Request procedure is also used when the

UE is in CM-IDLE and in CM-CONNECTED state to activate a User Plane connection for an established PDU Session.

Limitations

The following is the known limitation of this feature.

- Authentication is not done for service request.

How it Works

This section describes how this feature works.

Call Flows

This section describes the key call flows of Service Request Procedure feature.

UE Triggered Service Request

The UE in CM-IDLE state initiates the Service Request procedure to send uplink signaling messages, user data, or as a response to a network paging request. After receiving the Service Request message, the AMF performs authentication. After the establishment of the signaling connection to an AMF, the UE or network sends signaling messages, for example, PDU Session establishment from UE to the SMF, through the AMF.

The Service Request procedure is used by a UE in CM-CONNECTED state to request activation of User Plane connection for PDU Sessions and to respond to a NAS Notification message from the AMF.

For any Service Request, the AMF responds with a Service Accept message to synchronize PDU Session status between UE and network, if necessary. If the Service Request cannot be accepted by the network, the AMF responds with a Service Reject message to UE. The Service Reject message includes an indication or cause-code requesting the UE to perform Registration Update procedure. The Service Reject message is sent for unknown subscriber or if the TAC in Service Request does not match the last known user location.

Idle Mode Call Flow

The following section describes Idle Mode call flow for Service Request triggered by UE in Idle mode.
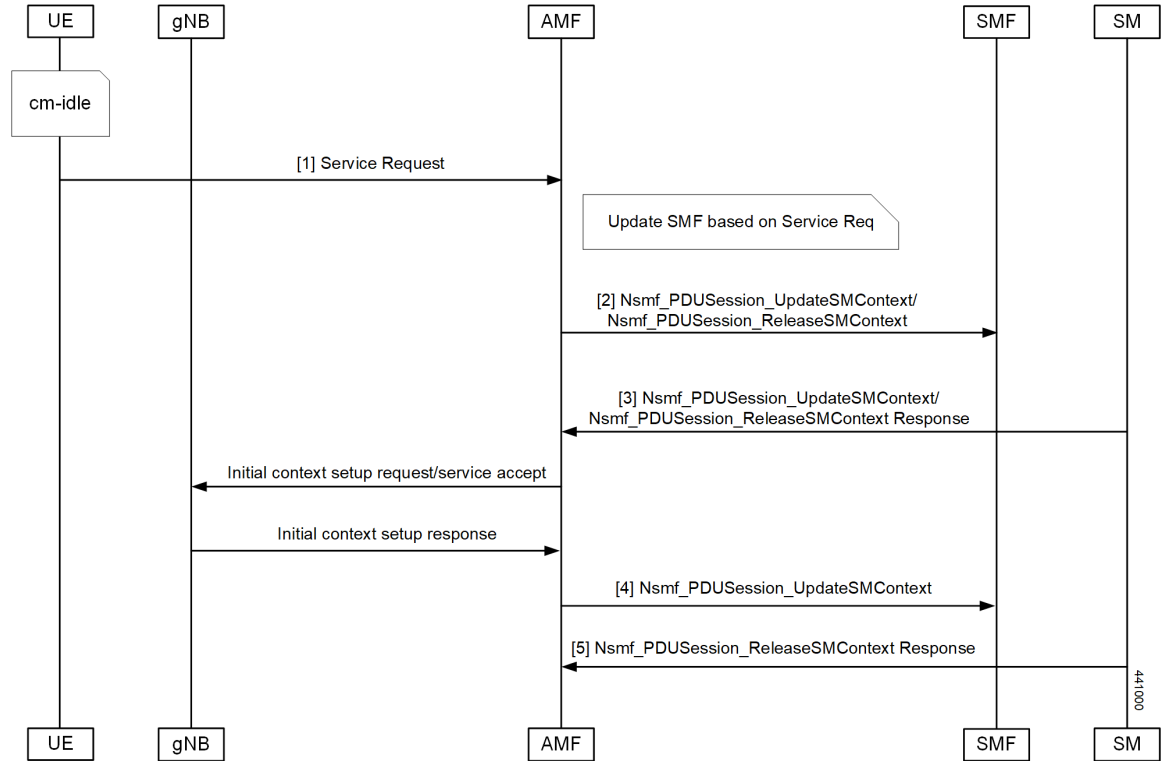
Figure 1: Idle Mode Call Flow

Table 3: Idle Mode Call Flow Description

Step	Description
1	UE initiates Service Request procedure by sending Service Request to (R)AN : AN message (AN parameters, Service Request (List Of PDU Sessions To Be Activated, List Of Allowed PDU Sessions, security parameters, PDU Session status)). The Service Request message is sent in INITIAL UE Message.
2	AMF determines the PDU Session(s) to be activated and sends an Nsmf_PDUSession_UpdateSMContext Request to SMF(s) associated with the PDU Session(s) with upCnxState set to "ACTIVATING". AMF also initiates PDU Session Release procedure in the network for the PDU Sessions whose PDU Session ID(s) were indicated by the UE as not available in the PDU Session status.
3	For a PDU Session that the SMF has determined to accept the activation of UP connection, the SMF sends Nsmf_PDUSession_UpdateSMContext Response with N2 SM information to the AMF. The N2 SM information contains information that the AMF provides to the NG-RAN. If SMF rejects the activation of UP of the PDU Session, it sends Nsmf_PDUSession_UpdateSMContext Response with cause.

Step	Description
4	AMF to (R)AN: If the Service Request was triggered in CM-IDLE state, AMF sends Initial Context Setup Request with the N2 SM information received from SMF, MM NAS Service Accept and the other required parameters.
	If the Service Request was triggered in CM-CONNECTED state, AMF sends PDU Session Resource Setup Request with N2 SM information received from SMF and MM NAS Service Accept.
	MM NAS Service Accept includes PDU Session status in AMF. If the activation of UP of a PDU Session is rejected by an SMF, then the MM NAS Service Accept includes the PDU Session ID and the cause why the User Plane resources were not. Any local PDU Session Release during the Service Request procedure is indicated to the UE via the Session Status.
	If there are multiple PDU Sessions that involves SMF update, AMF waits for response from all SMFs before sending N2 SM information and MM NAS Service Accept to the RAN.
5	AMF receives N2 Request Ack and if this contains N2 SM information, then it sends Nsmf_PDUSession_UpdateSMContext Request per PDU Session with this information to the SMF.

Connected Mode Call Flow

The following figure illustrates the flow for Service Request triggered by UE in Connected mode.
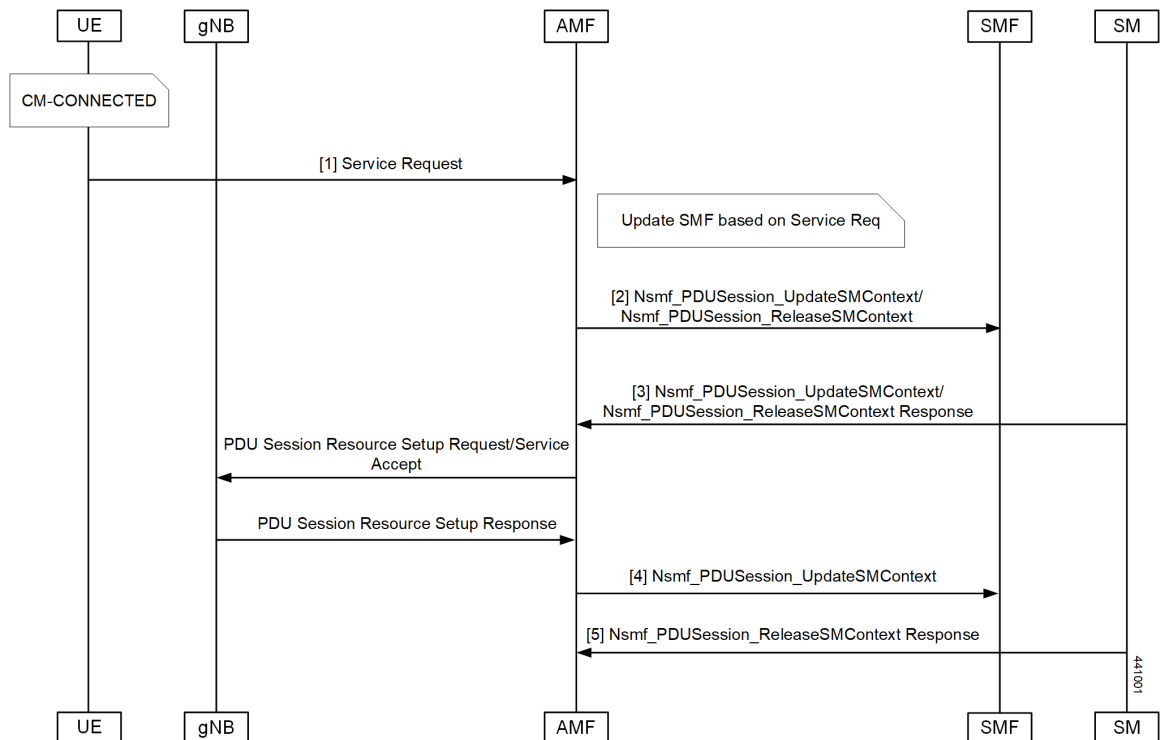
Figure 2: Connected Mode Call Flow

Table 4: Connected Mode Call Flow Description

Step	Description
1	UE initiates Service Request procedure by sending Service Request to (R)AN : AN message (AN parameters, Service Request (List Of PDU Sessions To Be Activated, List Of Allowed PDU Sessions, security parameters, PDU Session status)). The Service Request message is sent in UPLINK NAS TRANSPORT Message.
2	AMF determines the PDU Session(s) to be activated and sends an Nsmf_PDUSession_UpdateSMContext Request to SMF(s) associated with the PDU Session(s) with upCnxState set to "ACTIVATING". AMF also initiates PDU Session Release procedure in the network for the PDU Sessions whose PDU Session ID(s) were indicated by the UE as not available in the PDU Session status.
3	For a PDU Session that the SMF has determined to accept the activation of UP connection, the SMF sends Nsmf_PDUSession_UpdateSMContext Response with N2 SM information to the AMF. The N2 SM information contains information that the AMF provides to the NG-RAN. If SMF rejects the activation of UP of the PDU Session, it sends Nsmf_PDUSession_UpdateSMContext Response with cause.
4	AMF to (R)AN: If the Service Request was triggered in CM-IDLE state, AMF sends Initial Context Setup Request with the N2 SM information received from SMF, MM NAS Service Accept and the other required parameters. If the Service Request was triggered in CM-CONNECTED state, AMF sends PDU Session Resource Setup Request with N2 SM information received from SMF and MM NAS Service Accept. MM NAS Service Accept includes PDU Session status in AMF. If the activation of UP of a PDU Session is rejected by an SMF, then the MM NAS Service Accept includes the PDU Session ID and the cause why the User Plane resources were not. Any local PDU Session Release during the Service Request procedure is indicated to the UE via the Session Status. If there are multiple PDU Sessions that involves SMF update, AMF waits for response from all SMFs before sending N2 SM information and MM NAS Service Accept to the RAN.
5	AMF receives N2 Request Ack and if this contains N2 SM information, then it sends Nsmf_PDUSession_UpdateSMContext Request per PDU Session with this information to the SMF.

OAM Support

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

Statistics

The following statistics are available in support of the Service Request Procedure feature:

- Number of Service Requests Received

- Number of Service Accepts Sent

- Number of Service Rejects Sent