**3GPP TSG-SA2 Meeting #153E(e-meeting)**[***S2-220xxx***](file:///C%3A%5CUsers%5Cecembpa%5CDownloads%5CDocs%5CS2-2106965.zip)***x***

**Electronic, October 10 – 17, 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.501** | **CR** |  | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Application Function influence SFC support |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | SFC |  | ***Date:*** | 2022-09-30 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | As agreed in conclusion of FS\_SFC study, it is proposed to add the AF influence SFC support function.  |
|  |  |
| ***Summary of change:*** | Add the description to support the AF influence service function chain handling. |
|  |  |
| ***Consequences if not approved:*** | The AF can’t request the SFC handling for some traffic within a PDU session. |
|  |  |
| ***Clauses affected:*** | 3, 5.6.x(new), 6.2.10 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
| ***Management*** |  |
| ***Other comments:*** | 5.6.7. |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

5GC 5G Core Network

5G DDNMF 5G Direct Discovery Name Management Function

5G LAN 5G Local Area Network

5GS 5G System

5G-AN 5G Access Network

5G-AN PDB 5G Access Network Packet Delay Budget

5G-EIR 5G-Equipment Identity Register

5G-GUTI 5G Globally Unique Temporary Identifier

5G-BRG 5G Broadband Residential Gateway

5G-CRG 5G Cable Residential Gateway

5G GM 5G Grand Master

5G NSWO 5G Non-Seamless WLAN offload

5G-RG 5G Residential Gateway

5G-S-TMSI 5G S-Temporary Mobile Subscription Identifier

5G VN 5G Virtual Network

5QI 5G QoS Identifier

ADRF Analytics Data Repository Function

AF Application Function

AKMA Authentication and Key Management for Applications

AnLF Analytics Logical Function

AMF Access and Mobility Management Function

AS Access Stratum

ATSSS Access Traffic Steering, Switching, Splitting

ATSSS-LL ATSSS Low-Layer

AUSF Authentication Server Function

BMCA Best Master Clock Algorithm

BSF Binding Support Function

CAG Closed Access Group

CAPIF Common API Framework for 3GPP northbound APIs

CH Credentials Holder

CHF Charging Function

CN PDB Core Network Packet Delay Budget

CP Control Plane

DAPS Dual Active Protocol Stacks

DCCF Data Collection Coordination Function

DCS Default Credentials Server

DL Downlink

DN Data Network

DNAI DN Access Identifier

DNN Data Network Name

DRX Discontinuous Reception

DS-TT Device-side TSN translator

EAC Early Admission Control

ePDG evolved Packet Data Gateway

EBI EPS Bearer Identity

EUI Extended Unique Identifier

FAR Forwarding Action Rule

FN-BRG Fixed Network Broadband RG

FN-CRG Fixed Network Cable RG

FN-RG Fixed Network RG

FQDN Fully Qualified Domain Name

GBA Generic Bootstrapping Architecture

GEO Geostationary Orbit

GFBR Guaranteed Flow Bit Rate

GIN Group ID for Network Selection

GMLC Gateway Mobile Location Centre

GPSI Generic Public Subscription Identifier

GUAMI Globally Unique AMF Identifier

HMTC High-Performance Machine-Type Communications

HR Home Routed (roaming)

IAB Integrated access and backhaul

IMEI/TAC IMEI Type Allocation Code

IPUPS Inter PLMN UP Security

I-SMF Intermediate SMF

I-UPF Intermediate UPF

LADN Local Area Data Network

LBO Local Break Out (roaming)

LEO Low Earth Orbit

LMF Location Management Function

LoA Level of Automation

LPP LTE Positioning Protocol

LRF Location Retrieval Function

MBS Multicast/Broadcast Service

MBSF Multicast/Broadcast Service Function

MBSTF Multicast/Broadcast Service Transport Function

MB-SMF Multicast/Broadcast Session Management Function

MB-UPF Multicast/Broadcast User Plane Function

MEO Medium Earth Orbit

MFAF Messaging Framework Adaptor Function

MCX Mission Critical Service

MDBV Maximum Data Burst Volume

MFBR Maximum Flow Bit Rate

MICO Mobile Initiated Connection Only

MINT Minimization of Service Interruption

ML Machine Learning

MPS Multimedia Priority Service

MPTCP Multi-Path TCP Protocol

MTLF Model Training Logical Function

N3IWF Non-3GPP InterWorking Function

N5CW Non-5G-Capable over WLAN

NAI Network Access Identifier

NEF Network Exposure Function

NF Network Function

NGAP Next Generation Application Protocol

NID Network identifier

NPN Non-Public Network

NR New Radio

NRF Network Repository Function

NSAC Network Slice Admission Control

NSACF Network Slice Admission Control Function

NSAG Network Slice AS Group

NSI ID Network Slice Instance Identifier

NSSAA Network Slice-Specific Authentication and Authorization

NSSAAF Network Slice-specific and SNPN Authentication and Authorization Function

NSSAI Network Slice Selection Assistance Information

NSSF Network Slice Selection Function

NSSP Network Slice Selection Policy

NSSRG Network Slice Simultaneous Registration Group

NSWO Non-Seamless WLAN offload

NSWOF Non-Seamless WLAN offload Function

NW-TT Network-side TSN translator

NWDAF Network Data Analytics Function

ONN Onboarding Network

ON-SNPN Onboarding Standalone Non-Public Network

PCF Policy Control Function

PDB Packet Delay Budget

PDR Packet Detection Rule

PDU Protocol Data Unit

PEI Permanent Equipment Identifier

PER Packet Error Rate

PFD Packet Flow Description

PNI-NPN Public Network Integrated Non-Public Network

PPD Paging Policy Differentiation

PPF Paging Proceed Flag

PPI Paging Policy Indicator

PSA PDU Session Anchor

PTP Precision Time Protocol

PVS Provisioning Server

QFI QoS Flow Identifier

QoE Quality of Experience

RACS Radio Capabilities Signalling optimisation

(R)AN (Radio) Access Network

RG Residential Gateway

RIM Remote Interference Management

RQA Reflective QoS Attribute

RQI Reflective QoS Indication

RSN Redundancy Sequence Number

SA NR Standalone New Radio

SBA Service Based Architecture

SBI Service Based Interface

SCP Service Communication Proxy

SD Slice Differentiator

SEAF Security Anchor Functionality

SEPP Security Edge Protection Proxy

SF Service Function

SFC Service Function Chaining

SFP Service Function Path

SMF Session Management Function

SMSF Short Message Service Function

SN Sequence Number

SNPN Stand-alone Non-Public Network

S-NSSAI Single Network Slice Selection Assistance Information

SO-SNPN Subscription Owner Standalone Non-Public Network

SSC Session and Service Continuity

SSCMSP Session and Service Continuity Mode Selection Policy

SST Slice/Service Type

SUCI Subscription Concealed Identifier

SUPI Subscription Permanent Identifier

SV Software Version

TA Tracking Area

TAI Tracking Area Identity

TNAN Trusted Non-3GPP Access Network

TNAP Trusted Non-3GPP Access Point

TNGF Trusted Non-3GPP Gateway Function

TNL Transport Network Layer

TNLA Transport Network Layer Association

TSC Time Sensitive Communication

TSCAI TSC Assistance Information

TSCTSF Time Sensitive Communication and Time Synchronization Function

TSN Time Sensitive Networking

TSN GM TSN Grand Master

TSP Traffic Steering Policy

TT TSN Translator

TWIF Trusted WLAN Interworking Function

UAS NF Uncrewed Aerial System Network Function

UCMF UE radio Capability Management Function

UDM Unified Data Management

UDR Unified Data Repository

UDSF Unstructured Data Storage Function

UL Uplink

UL CL Uplink Classifier

UPF User Plane Function

URLLC Ultra Reliable Low Latency Communication

URRP-AMF UE Reachability Request Parameter for AMF

URSP UE Route Selection Policy

VID VLAN Identifier

VLAN Virtual Local Area Network

W-5GAN Wireline 5G Access Network

W-5GBAN Wireline BBF Access Network

W-5GCAN Wireline 5G Cable Access Network

W-AGF Wireline Access Gateway Function

\* \* \* \* Next change \* \* \* \*

### 5.6.7a Application Function influence on Service Function Chain

Application Function influence on Service Function Chain enables the AF to request the steering of application traffic to a pre-defined chain of N6 service functions deployed by the operator or a 3rd party service provider.

Application Function influence on Service Function Chain applies to the non-roaming and to the Home-routed roaming scenario i.e. to cases where the involved entities (PCF, SMF, and PSA UPF) are located at the Home PLMN and the AF has an agreement with the Home PLMN.

In the non-roaming scenario Application Function influence on Service Function Chain and Application Function influence on traffic routing (as defined in clause 5.6.7.1) can be applicable to the same traffic simultaneously.

The AF requests may contain the information as described in the Table 5.6.7a-1:

Table 5.6.7a-1: Information elements contained in AF request

|  |  |  |  |
| --- | --- | --- | --- |
| Information Name | Applicable for PCF or NEF (NOTE 1)  | Applicable for NEF only | Category |
| Traffic Description(NOTE 2) |  |
| Target UE Identifier(s) (NOTE 2) |
| Spatial Validity Condition(NOTE 2) |
| AF transaction identifier(NOTE 2) |
| SFC identifier(s)(NOTE 3) | Indicates the pre-defined Service Function Chain(s) in downlink and/or uplink. | N/A | Mandatory |
| NOTE 1: When the AF request targets existing or future PDU Sessions of multiple UE(s) or of any UE and is sent via the NEF, as described in clause 6.3.7.2, the information is stored in the UDR by the NEF and notified to the PCF by the UDR.NOTE 2: The parameter is the same as the respective one defined in the table 5.6.7-1.NOTE 3: If two SFC identifiers are provided, then one is for the uplink direction, while the other one is for the downlink direction |

The SFC identifier(s) corresponds to a pre-defined Service Function Chain policy in the PCF. The AF request may include separate SFC identifiers for Uplink and Downlink direction of the user traffic.

For the PDU Session that corresponds to the AF request, the PCF provides the SMF with a PCC rule that is generated or updated based on the AF request. The PCF sets in this PCC rule the traffic steering policy identifier(s) according to the pre-defined Service Function Chain policy that corresponds to the SFC identifier(s) requested by the AF.

The PCF actions related to the other parameters in Table 5.6.7a-1 are the same as for the Application Function influence on traffic routing (as defined in clause 5.6.7.1).

When the PCC rule is activated or updated with the traffic steering policy identifier(s), the SMF takes the information in the PCC rule into account as following:

- If only traffic steering policy identifier(s) for N6-LAN Traffic Steering Enforcement Control is included in the PCC rule, SMF derives the forwarding policy identifier (uplink and/or downlink) within the FAR based on the authorized the traffic steering policy identifier(s).

- If both the AF influenced Traffic Steering Enforcement Control information and N6-LAN Traffic Steering Enforcement Control information are included in the PCC rule:

- If the traffic steering policy identifier for N6-LAN Traffic Steering Enforcement Control is for downlink, the SMF generates two PDR and FAR pairs for the downlink direction. One PDR and FAR pair is associated with the downlink N6-LAN traffic steering. The other PDR and FAR is associated with the traffic routing to a local network handling. The SMF shall set the parameters in the two PDRs in such a way that the traffic is handled by both PDRs and first by the PDR associated with the traffic routing to a local network handling.

- If the traffic steering policy identifier for N6-LAN Traffic Steering Enforcement Control is for uplink, the SMF generates two PDR and FAR pairs for the uplink direction. One PDR and FAR pair is associated with uplink N6-LAN traffic steering. The other PDR and FAR is associated with the uplink traffic routing to a local network handling. The SMF shall set the parameters in the two PDRs in such a way that the traffic is handled by both PDRs and first by the PDR associated with the N6-LAN traffic steering.

The SMF provisions or updates the N4 rules to the UPF (PSA) by initiating the N4 session establishment or modification procedure.

\* \* \* \* Next change \* \* \* \*

### 6.2.10 AF

The Application Function (AF) interacts with the 3GPP Core Network in order to provide services, for example to support the following:

- Application Function influence on traffic routing (see clause 5.6.7);

- Accessing Network Exposure Function (see clause 5.20);

- Interacting with the Policy framework for policy control (see clause 5.14);

- Time synchronization service (see clause 5.27.1.8);

- IMS interactions with 5GC (see clause 5.16).

- Application Function influence on Service Function Chain (see clause 5.6.x).

Based on operator deployment, Application Functions considered to be trusted by the operator can be allowed to interact directly with relevant Network Functions.

Application Functions not allowed by the operator to access directly the Network Functions shall use the external exposure framework (see clause 7.3) via the NEF to interact with relevant Network Functions.

The functionality and purpose of Application Functions are only defined in this specification with respect to their interaction with the 3GPP Core Network.

\* \* \* \* End of change \* \* \* \*