**3GPP TSG- Meeting #**

**, ,15-22**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **xxx** | **rev** |  | **Current version:** | **17.2.0** |  |
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| *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** |

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| ***Title:*** | Clarification of NSAC | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNS\_Ph2 | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | |  |
|  | *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 can be 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:*** | | This CR resolves some critical issues that have been discussed in SA2#147e | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clarifies that when EPS counting is active for a S-NSSAI, the AMF counting is not activated. it lso clarifie that subscription data controls the feature and tha Proxying is used to support roaming and also zoning without PDU session drop. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The NSAC feature is not complete nor easily deployable | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.7, 5.15.6, 5.15.11, 6.2.28, 6.3.22 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

FIRST CHANGE

### 4.2.7 Reference points

The 5G System Architecture contains the following reference points:

**N1:** Reference point between the UE and the AMF.

**N2:** Reference point between the (R)AN and the AMF.

**N3:** Reference point between the (R)AN and the UPF.

**N4:** Reference point between the SMF and the UPF.

**N6:** Reference point between the UPF and a Data Network.

**N9:** Reference point between two UPFs.

The following reference points show the interactions that exist between the NF services in the NFs. These reference points are realized by corresponding NF service-based interfaces and by specifying the identified consumer and producer NF service as well as their interaction in order to realize a particular system procedure.

**N5:** Reference point between the PCF and an AF or TSN AF.

**N7:** Reference point between the SMF and the PCF.

**N8:** Reference point between the UDM and the AMF.

**N10:** Reference point between the UDM and the SMF.

**N11:** Reference point between the AMF and the SMF.

**N12:** Reference point between AMF and AUSF.

**N13:** Reference point between the UDM and Authentication Server function the AUSF.

**N14:** Reference point between two AMFs.

**N15:** Reference point between the PCF and the AMF in the case of non-roaming scenario, PCF in the visited network and AMF in the case of roaming scenario.

**N16:** Reference point between two SMFs, (in roaming case between SMF in the visited network and the SMF in the home network).

**N16a:** Reference point between SMF and I-SMF.

**N17:** Reference point between AMF and 5G-EIR.

**N18:** Reference point between any NF and UDSF.

**N19:** Reference point between two PSA UPFs for 5G LAN-type service.

**N22:** Reference point between AMF and NSSF.

**N23:** Reference point between PCF and NWDAF.

**N24:** Reference point between the PCF in the visited network and the PCF in the home network.

**N27:** Reference point between NRF in the visited network and the NRF in the home network.

**N28:** Reference point between PCF and CHF.

**N29:** Reference point between NEF and SMF.

**N30:** Reference point between PCF and NEF.

NOTE 1: The functionality of N28 and N29 and N30 reference points are defined in TS 23.503 [45].

**N31:** Reference point between the NSSF in the visited network and the NSSF in the home network.

NOTE 2: In some cases, a couple of NFs may need to be associated with each other to serve a UE.

**N32:** Reference point between SEPP in the visited network and the SEPP in the home network.

NOTE 3: The functionality of N32 reference point is defined in TS 33.501 [29].

**N33:** Reference point between NEF and AF.

**N34:** Reference point between NSSF and NWDAF.

**N35:** Reference point between UDM and UDR.

**N36:** Reference point between PCF and UDR.

**N37:** Reference point between NEF and UDR.

**N38:** Reference point between I-SMFs.

**N40:** Reference point between SMF and the CHF.

**N41:** Reference point between AMF and CHF in HPLMN.

**N42:** Reference point between AMF and CHF in VPLMN.

NOTE 4: The functionality of N40, N41 and N42 reference points are defined in TS 32.240 [41].

**N43:** Reference point between PCFs.

NOTE 5: The functionality of N43 reference point is defined in TS 23.503 [45].

NOTE 6: The reference points from N44 up to and including N49 are reserved for allocation and definition in TS 32.240 [41].

**N50:** Reference point between AMF and the CBCF.

**N51:** Reference point between AMF and NEF.

**N52:** Reference point between NEF and UDM.

**N55:** Reference point between AMF and the UCMF.

**N56:** Reference point between NEF and the UCMF.

**N57:** Reference point between AF and the UCMF.

NOTE 7: The Public Warning System functionality of N50 reference point is defined in TS 23.041 [46].

**N58:** Reference point between AMF and the NSSAAF.

**N59:** Reference point between UDM and the NSSAAF.

**N80:** Reference point between AMF and NSACF.

**N81:** Reference point between SMF and NSACF.

**N82:** Reference point between NSACF and NEF.

**N83:** Reference point between AUSF and NSSAAF.

**N84:** Reference point between TSCTSF and PCF.

**N85:** Reference point between TSCTSF and NEF.

**N86:** Reference point between TSCTSF and AF.

**N87:** Reference point between TSCTSF and UDR.

**N88:** Reference point between two NSACFs in same PLMN.

**N89:** Reference point between two NSACFs in differnt PLMN.

The reference points to support SMS over NAS are listed in clause 4.4.2.2.

The reference points to support Location Services are listed in TS 23.273 [87].

The reference points to support SBA in IMS (N5, N70 and N71) are described in TS 23.228 [15].

The reference points to support AKMA (N61, N62 and N63) are described in TS 33.535 [124].

The reference points to support 5G ProSe are described in TS 23.304 [128].

The reference points to support 5G multicast-broadcast services are described in TS 23.247 [129].

The reference points to Support Uncrewed Aerial Systems (UAS) connectivity, identification and tracking are described in TS 23.256 [136].

MORE CHANGES

### 5.15.6 Network Slicing Support for Roaming

For roaming scenarios:

- If the UE only uses standard S-NSSAI values, then the same S-NSSAI values can be used in VPLMN as in the HPLMN.

- If the VPLMN and HPLMN have an SLA to support non-standard S-NSSAI values in the VPLMN, the NSSF of the VPLMN maps the Subscribed S-NSSAIs values to the respective S-NSSAI values to be used in the VPLMN. The S-NSSAI values to be used in the VPLMN are determined by the NSSF of the VPLMN based on the SLA. The NSSF of the VPLMN need not inform the HPLMN of which values are used in the VPLMN.

Depending on operator's policy and the configuration in the AMF, the AMF may decide the S-NSSAI values to be used in the VPLMN and the mapping to the Subscribed S-NSSAIs.

- The UE constructs Requested NSSAI and provides the mapping of S-NSSAIs of the Requested NSSAI to HPLMN S-NSSAIs if the mapping is stored in the UE, as described in clause 5.15.5.2.1.

- The NSSF in the VPLMN determines the Allowed NSSAI without interacting with the HPLMN.

- the HPLMN may provide NSSRG Information as part of the Subscription information as described in clause 5.15.12.

- The Allowed NSSAI in the Registration Accept includes S-NSSAI values used in the VPLMN. The mapping information described above is also provided to the UE with the Allowed NSSAI as described in clause 5.15.4.

- If the S-NSSAI values are subject to NSAC, this is indicated in subscription information and the AMF or SMF in VPLMN triggers a request for network slice admission control for these S-NSSAI values as described in clause 5.15.11.3.

- In PDU Session Establishment procedure, the UE includes both:

(a) the S-NSSAI that matches the application (that is triggering the PDU Session Request) within the NSSP in the URSP rules or within the UE Local Configuration as defined in clause 6.1.2.2.1 of TS 23.503 [45]; the value of this S NSSAI is used in the HPLMN; and

(b) an S-NSSAI belonging to the Allowed NSSAI that maps to (a) using the mapping of the Allowed NSSAI to HPLMN S-NSSAIs; the value of this S-NSSAI is used in the VPLMN.

For the home routed case, the V-SMF sends the PDU Session Establishment Request message to the H-SMF along with the S-NSSAI with the value used in the HPLMN (a). If the S-NSSAI values are subject to NSAC, the V-SMF or H-SMF triggers a request for network slice admission control for these S-NSSAI values as described in clause 5.15.11.3.

- When a PDU Session is established, the CN provides to the AN the S-NSSAI with the value from the VPLMN corresponding to this PDU Session, as described in clause 5.15.5.3.

- The Network Slice instance specific network functions in the VPLMN are selected by the VPLMN by using the S-NSSAI with the value used in the VPLMN and querying an NRF that has either been pre-configured, or provided by the NSSF in the VPLMN. The Network Slice specific functions of the HPLMN (if applicable) are selected by the VPLMN by using the related S-NSSAI with the value used in the HPLMN via the support from an appropriate NRF in the HPLMN, identified as specified in clause 4.17.5 of TS 23.502 [3] and, for SMF in clause 4.3.2.2.3.3 of TS 23.502 [3].

MORE CHANGES

### 5.15.11 Network Slice Admission Control

#### 5.15.11.0 General

Depending on its configuration, a Network Slice Admission Control Function (NSACF) may monitor and control the number of registered UEs per Network Slice and/or the number of UEs with at least one PDU session in a network slice and/or the number of PDU Sessions per network slice for the network slices that are subject to Network Slice Admission Control (NSAC). A NSACF is also configured with information indicating which access type is subject to NSAC for the S-NSSAI (i.e. 3GPP Access Type, Non-3GPP Access Type, or both).

The subscription information the AMF receives from the UDM may include for the S-NSSAIs in the subscription information whether NSAC applies and whether EPS counting applies.

The NSACF also provides event-based Network Slice status notifications and reports to the consumer NF (e.g. AF).

Multiple NSACFs may be deployed in a network. . A PLMN may have one or more service areas and o

Depending on its role, a NSACF may be configured with a maximum number of UEs per network slice and/or a maximum number of UEs with at least pone PDU session and/or the maximum number of PDU Sessions per network slice which are allowed to be served by each network slice that is subject to NSAC. The Action associated to reachign a maximum value may be to reject a UE registration or to reject a PDU session or an operator may rather configure the NSACF to just generate charging events upon reaching the maximum value.

If multiple NSACFs are configured in a PLMN for a network slice associated with a S-NSSAI, a NSACF may be configured with a maximum number of UEs and/or a maximum number of UEs with at least one PDU session in a network slice and/or a maximum number of PDU Sessions specific for the service area and the Network Slice. To ensure that a single counter applies across service areas for the number of UEs per Network Slice and/or the number of UEs with at least one PDU session in a network slice and/or the number of PDU Sessions per network slice for a S-NSSAI, an operator may designate one NSACF to act as primary NSACF across all service areas for a S-NSSAI and the other NSACFs act as proxy towards this NSACF for the S-NSSAI. In this case the configuration of the maximum values allowed for this S-NSSAI is only in this NSACF.

Subject to operator policy and national/regional regulations, the AMF may exempt from NSAC the network slices which are used for Emergencyservices, for Critical or for Priority services (e.g. MCS, MPS) may be exempted from NSAC and in this case

Alternatively, if a S-NSSAI is subject to NSAC but the UE performs emergency registrations or uses PDU sessions for priority services (e.g. MCS, MPS) in the Network Slice associated with this S-NSSAI, the AMF and SMF may skip the NSAC procedure or ignore the results of the NSAC procedure (depending on whether the operator policy is to still count these UEs or sessions, despite not enforcing NSAC for these)

#### 5.15.11.1 Maximum number of UEs per network slice admission control

The NSACF maykeep track of the current number of UEs registered for a network slice so that it can ensure it does not exceed the maximum number of UEs allowed to register with the network slice.

Since the UE may register or deregister for an S-NSSAI via 3GPP access and/or non-3GPP access as described in clause 5.15.5.2.1, the AMF provides the Access Type to the NSACF when triggering a request to increase or decrease the current number of UEs registered with a S-NSSAI. The NSACF may take the Access Type into account for increasing and decreasing the number of UEs per network slice bystoring the UE ID with the associated one or more Access Type(s), i.e. the NSACF is able to add or remove a registration for the UE ID for each Access Type and trigger the increase or decrease of the current number of UEs registered with a S-NSSAI based on a policy that takes the access type into account.

NOTE: For example, if the NSACF is configured to apply NSAC for 3GPP Access Type only, the NSACF counts registration via 3GPP access type only. If the NSACF is configured to apply NSAC for both Access Types, and the UE newly registers via 3GPP access while the UE is already registered via non-3GPP access (or vice versa), the NSACF updates the UE ID entry with both 3GPP Access Type and non-3GPP Access Type and the NSACF may count the UE once or twice based on its policy.

The NSACF maintains a list of UE IDs registered with a network slice that is subject to NSAC. When an event related to a UE causes the current number of UEs registered with a network slice to increase, the NSACF first checks whether the UE Identity is already in the list of UEs registered with that network slice. If it is already registered for the same access type, the NSACF does not increment the counter. If it is not registered for the same access type, but it is for the other, the counter is incremented based on the NSACF policy. If not registered with any access type, the NSACF checks whether the maximum number of UEs per network slice for that network slice has already been reached and if it has been reached, the NSACF applies admission control policies and may indicate the S-NSSAI is not available and not increment the counter, or generate a charging event and update the counter and add the UE-ID to the list of registered UEs

The AMF, for S-NSSAIs in the Allowed NSSAI for which NSAC applies and that are not subject to counting in EPC, triggers a request to NSACF for maximum number of UEs per network slice admission control when the UE's registration status for a network slice subject to NSAC is changing, i.e. during the UE Registration procedure in clause 4.2.2.2.2 of TS 23.502 [3], UE Deregistration procedure in clause 4.2.2.3 of TS 23.502 [3], Network Slice-Specific Authentication and Authorisation procedure in clause 4.2.9.2 of TS 23.502 [3], AAA Server triggered Network Slice-Specific Re-authentication and Re-authorization procedure in clause 4.2.9.3 of TS 23.502 [3], and AAA Server triggered Slice-Specific Authorization Revocation in clause 4.2.9.4 of TS 23.502 [3].

#### 5.15.11.2 Maximum number of PDU sessions per network slice admission control

The NSACF may keep track of the current number of PDU Sessions per network slice so that it can ensure it does not exceed the maximum number of PDU session allowed to be served by the network slice. When an event related to a UE causes the current number of PDU sessions established within the network slice is to increase, the NSACF checks whether the maximum number of PDU sessions per network slice for that network slice has already been reached, and if it has, the NSACF applies admission control policies.

The anchor SMF triggers a request to NSACF for maximum number of PDU sessions per network slice control during PDU session establishment/release procedures in clauses 4.3.2 and 4.3.4 of TS 23.502 [3].

The SMF provides the Access Type to the NSACF when triggering a request to increase or decrease the number of PDU Sessions. The NSACF takes Access Type into account for increasing and decreasing the current number of PDU Sessions depending on the applicability of the Access Type for the NSAC for maximum number of PDU Sessions for the S-NSSAI.

NOTE: I-SMF does not interact with NSCAF.

#### 5.15.11.2a Maximum number of UEs with at least one PDU sessions per network slice admission control

The NSACF, for S-NSSAIs subject to NSAC with EPS counting enabled, may keep track of the current number of UEs with at least one PDU Sessions per network slice so that it can ensure it does not exceed the maximum number UEs with at least one PDU session allowed to be served in the network slice. When an event related to a UE causes the current number of PDU sessions established within the network slice is to increase, the NSACF checks whether the maximum number of UEs with at least one PDU sessions per network slice for that network slice has already been reached, and if it has, the NSACF applies admission control policies.

The anchor SMF+PGW-c triggers a request to NSACF for maximum number of PDU sessions as defined in clause 5.15.11.2 which may cause the NSACF to perform per network slice control of number of UEs with at least one PDU session during PDU session establishment/release procedures in clauses 4.3.2 and 4.3.4 of TS 23.502 [3].

The SMF provides the Access Type to the NSACF when triggering a request to increase or decrease the number of PDU Sessions. The NSACF takes Access Type into account for increasing and decreasing the current number of UEs with at least one PDU Sessions.

#### 5.15.11.3 Network Slice Admission Control for Roaming

##### 5.15.11.3.1 General

In the case of roaming, depending on operator's policy, a roaming agreement or an SLA between the VPLMN and the HPLMN, NSAC for S-NSSAIs subject to NSAC in the subscription data for roaming UEs can be performed by the VPLMN or by the HPLMN.

##### 5.15.11.3.2 Maximum number of UEs per network slice admission control in roaming

For network slice admission control of roaming UEs for maximum number of UEs per network slice, the following principles shall apply:

- the admission control is based on proxying the NSAC interactions of the V-NSACF with the H-NSACF for the HPLMN S-NSSAI.

- the AMF triggers a request to a V-NSACF in the VPLMN which handles the PLMN ID and S-NSSAI of the HPLMN to perform the proxy NSACF towards the H-NSACF of the HPLMN S-NSSAI.

- the H-NSACF may take into account the VPLMN PLMN ID for NSAC decisions.

NOTE 1: Subject to operator roaming agrement, a NSACF of VPLMN may locally enforce a configured maximum number of UEs for the HPLMN NSSAI, rather than using the proxy-based method. This approach is no further specified.

NOTE 2: The VPLMN NSACF may collect charging data for NSAC to be used in the VPLMN

##### 5.15.11.3.3 Maximum number of PDU sessions per network slice admission control in roaming

For network slice admission control of roaming UEs for maximum number maximum number of PDU Sessions per network slice, the following principles shall be used:

- for LBO PDU sessions, the admission control is based on proxying the NSAC interactions of the V-NSACF with the H-NSACF for the HPLMN S-NSSAI.

- for LBO PDU sessions, the SMF triggers a request to a V-NSACF in the VPLMN which handles the PLMN ID and S-NSSAI of the HPLMN to perform the proxy NSACF towards the H-NSACF of the HPLMN S-NSSAI.

- for LBO PDU sessions, the H-NSACF may take into account the VPLMN PLMN ID for NSAC decisions.

for Home Routed PDU sessions, the SMF in the HPLMN intracts with the NSACF for the S-NSSAI of the PDU session.

- the LBO and Home Routed PDU sessions for the same HPLMN S-NSSAI are subject to NSAC by the same HPLMN NSACF.

NOTE 1: Subject to operator roaming agrement, a NSACF of VPLMN may locally enforce a configured maximum number of LBO PDU sessions for the HPLMN S-NSSAI rather than using the proxy-based method. This approach is no further specified.

NOTE 2: The VPLMN NSACF may collect charging data for NSAC to be used in the VPLMN

#### 5.15.11.4 Network Slice status notifications and reports to a consumer NF

A consumer NF (e.g. AF) can subscribe with the NSACF for Network Slice status notifications and reports. Upon such subscription, the NSACF can provide event-based notifications and reports to the consumer NF (e.g. to AF via NEF) related to the current number of UEs registered for a network slice or the current number of PDU Sessions established on a network slice or both.

#### 5.15.11.5 Support of Network Slice Admission Control and Interworking with EPC

When EPS counting is configured for a S-NSSAI, the counting of UEs in the Network Slice associated with this S-NSSAI is based only on counting only the UEs which have at least one PDU session established, and it is performed by the SMF+PGW-c(s) triggering a request to increase or decrease the number of the PDU sessions in NSACF.

When EPS counting is configured for a S-NSSAI, any NSAC of UEs registered in the network slice involving the AMF is disabled for this S-NSSAI.

The UDM indicates in subscription information whether EPS counting is configured for a S-NSSAI and whether the S-NSSAI is subject to NSAC.

The AMF is involved in the NSAC for the UEs registered in a netork slice only for S-NSSAI subject to NSAC if the subscription data does not indicate that EPS counting is activated.

If EPS counting is required for a network slice, this is included in NSAC-related information associated with the S-NSSAI in the UE subscription information. If so, the Network Slice Admission Control for maximum number of UEs with at least one PDU session and/or for maximum number of PDU Sessions per network slice is performed at the time of PDN connection establishment in case of EPC interworking. This is achieved by invoking the Nnsacf\_NSAC\_NumOfPDUsUpdate service operation from the SMF+PGW-c, as described in TS 23.502 [2].

To support the NSAC for maximum number of UEs with at least one PDU session in the network slice and/or for maximum number of PDU Sessions per network slice in EPC, the SMF+PGW-C detects which network slice is subject to NSAC and that EPS counitng applies, based on subscription information it receives from the UDM. During PDN connection establishment in EPC, the SMF+PGW-C selects an S-NSSAI associated with the PDN connection as described in clause 5.15.7.1. If the selected S-NSSAI by the SMF+PGW-C is subject to the NSAC and EPS counting, the SMF+PGW-C triggers interaction with NSACF to check the availability of the network slice by invoking NSAC procedure for number of PDU Session (as described in clause 4.11.5.9 of TS 23.502 [3]), before the SMF+PGW-C provides the selected S-NSSAI to the UE. If the network slice is available, the SMF+PGW-C continues to proceed with the PDN connection establishment procedure.

The NSACF performs the following for checking network slice availability prior to returning a response to the SMF+PGW-C:

- For NSAC for number of UEs with at least one PDU session, if the UE identity is already included in the list of UE IDs registered with a network slice, or the UE identity is not included in the list of UE IDs registered with a network slice and the current number of UE registration did not reach the maximum number, the NSACF responds to the SMF+PGW-C with the information that the network slice is available. The NSACF includes the UE identity in the list of UE IDs if not already on the list and increases the current number of UE registration. Otherwise, the NSACF returns a response indicating that the maximum number of UEs with at least one PDU session in the with the network slice has been reached.

- For NSAC for number of PDU Sessions, if the current number of PDU sessions is below the maximum number, the NSACF responds to the SMF+PGW-C with the information that the network slice is available. The NSACF increases the current number of PDU sessions. Otherwise, the NSACF returns the response indicating that the maximum number with the network slice has been reached.

If the maximum number of UEs with at least one PDU session and/or the maximum number of PDU sessions has already been reached, unless operator policy implements a different action, the SMF+PGW-C rejects the PDN connection.

NOTE 1: As an implementation option, if the APN is mapped to more than one S-NSSAI and the first selected S-NSSAI is not available (e.g. either current number of UE registration reached maximum or current number of PDU sessions reached maximum), then based on the operator policy the PGW-C+SMF can try another S-NSSAI mapped to the APN for the PDN connection establishment procedure.

If the establishmentof a new PDN Connections is with a different SMF+PGW-C from the SMF+PGW-C used for already existing PDN connection associated with the same S-NSSAI, each SMF+PGW-C will send a request for update (e.g. increase or decrease) to the NSACF. The NSACF may maintain a registration entry per SMF+PGW-C for the same UE ID.

The SMF+PGW-C provides the Access Type to the NSACF when triggering a request to increase or decrease the number of PDU Sessions for an S-NSSAI.

NOTE 2: The SMF+PGW-C determines the Access Type based on the RAT type parameter in the PMIP or GTP message received from the ePDG; or alternatively it can internally determine the Access Type based on the source node (e.g. SGW) sending the request for the PDN Connection establishment.

When EPS counting is performed for a network slice, and the UE with ongoing PDN connection(s) moves from EPC to 5GC, session continuity is guaranteed from NSAC standpoint, as the admission was granted at the time of PDN connection establishment, i.e. the number of PDU session and/or UEs with at least one PDU session is not counted again in 5GC (i..e. the steps to trigger SMF+PGW-c(s) interaction with the NSACF for the conting of PDU sessions related to the ongoing PDU sessions are not taken, nor the AMF is involved in any interaction to affect the number of UEs which are registerd in the Network Slice). Similarly, when the UE with ongoing PDU session(s) moves from 5GC to EPC, session continuity is guaranteed from NSAC standpoint as the admission of the PDN Connection(s) to the network slice was already granted at the time of PDU Session establishment in 5GC (i..e. the steps to trigger SMF+PGW-c(s) interaction with the NSACF for the conting of PDU sessions related to the ongoing PDU sessions are not taken) and the AMF is not involved in any interaction to affect the number of UEs which are registerd in the Network Slice.

When EPS counting is performed, if the PDN connection associated with S-NSSAI is released in EPC, the SMF+PGW-C triggers a request to update (i.e. decrease) to the number of PDU sessions per network slice. The NSACF decreases the current number of removes the UE identity from the list of UE IDs if the PDN connection(s) associated with the S-NSSAI are all released in EPC (if so, the number of UEs with at least one PDU session in the network slice is decreased).

NOTE 3: Network Slice Admission Control in EPC is not performed for the attachment without PDN connectivity (i.e. the MME does not interact with a NSACF).

If EPS counting is not required for a network slice, the Network Slice Admission Control for maximum number of UEs and/or for maximum number of PDU Sessions per network slice is performed when the UE moves from EPC to 5GC, i.e. when the UE performs mobility Registration procedure from EPC to 5GC (Network Slice Admission Control for maximum number of UEs per network slice) and/or when the PDN connections are handed over from EPC to 5GC (Network Slice Admission Control for maximum number of PDU Sessions per network slice). The SMF+PGW-C is detects that NSAC applies but EPS counting does not apply, based on subscription information it receives from the UDM.. The PDN connection interworking procedure is performed as described in clause 5.15.7.1. Mobility from EPC to 5GC does not guarantee all active PDU Session(s) can be transferred to the 5GC in certain circumstances when either the current number of UE registration or the current number of PDU sessions would exceed the maximum number when the UE moves from EPC to 5GC.

NOTE 4: Given that session continuity is not guaranteed when EPS counting is not required, it is recommended for services which require the session continuity to support EPS counting.

MORE CHANGES

### 6.2.28 NSACF

The Network Slice Admission Control Function (NSACF) supports the following functionality:

- Support of monitoring and controlling the number of registered UEs per network slice.

- Support of monitoring and controlling the number of established PDU Sessions per network slice.

- Support of monitoring and controlling the number of UEs with at least one established PDU Session per network slice.

- Support of event based Network Slice status notification and reports to a consumer NF.

The details of the NSACF functionality are defined in clause 5.15.11.

MORE CHANGES

### 6.3.22 NSACF discovery and selection

The NF consumers shall utilise the NRF to discover NSACF instance(s) unless NSACF information is available by other means, e.g. locally configured in NF consumers.

If the NSACF NF consumer is the AMF, the NSACF selection function in the AMF selects an NSACF instance based on the available NSACF instances, which are obtained from the NRF or locally configured in the AMF.

The following factors may be considered by the NF consumer for NSACF selection:

- S-NSSAI(s).

- NSACF Serving Area information. The NSACF service area is related to the location of the NF consumer.

NOTE: Each Serving Area is unique and unambiguously identified.

- NSACF service capabilities:

- Support monitoring and controlling the number of registered UEs per network slice for the network slice that is subject to NSAC.

- Support monitoring and controlling the number of UEs with at least one established PDU Session per network slice for the network slice that is subject to NSAC.

- Support monitoring and controlling the number of established PDU Sessions per network slice for the network slice that is subject to NSAC.

In the case of delegated discovery and selection in SCP, the NSACF NF consumer shall send all available factors to the SCP.

MORE CHANGES

### 7.2.27 NSACF Services

The following NF services are specified for NSACF:

Table 7.2.27-1: NF Services provided by NSACF

| Service Name | Description | Reference in TS 23.502 [3] |
| --- | --- | --- |
| Nnsacf\_NSAC | This service enables consumer NF to check the availability per network slice and update the number of UEs registered with a network slice, the number of UEs with at least one PDU session in a network slice or the number of PDU Sessions established in a network slice. | 5.2.21.2 |
| Nnsacf\_SliceEventExposure | This service enables consumer NF(s) to subscribe and get notified of the event as described in clause 5.15.11.4. | 5.2.21.4 |
| Nnsacf\_SliceStatus | This service enables consumer NF(s) to retrieve the network slice status information related to the number of UEs registered for a network slice, the number of UEs with at least one PDU session in a network slice or the number of PDU Sessions established in a network slice. | 5.2.21.5 |

END OF CHANGES