**3GPP TSG-SA Meeting #92-e *SP-210370***

**Online, 15th Jun 2021 - 21st Jun 2021 *(Revision of S2-2105084)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.502** | **CR** | **2762** | **rev** | **2** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | AF Session Setup and Update with Required QoS Procedure for Trusted Domain | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Tencent, CATT, Ericsson, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | Qualcomm | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_AIS, IIOT | | | | |  | ***Date:*** | | | 2021-06-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-12 (Release 12) Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The TSCTSF is introduced to handle the TSC QoS and Time synchronization related functions.  The procedures of QoS request to create/update an AF Session need to be updated with the new TSCTSF.  The AF in/outside trusted domain can send TSC QoS request to TSCTSF directly or via NEF.  The TSCTSF calculates the Requested PDB from the Requested 5GS delay and generates the TSC Assistance Container. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The selected TSCTSF by the NEF includes the UE-DS-TT residence time and calculates the Requested PDB from the Requested 5GS delay.  The TSCTSF generates the TSC Assistance Container and provides it to the PCF.  The AF in the trusted domain can directly send the TSC QoS request to the TSCTSF to establish or update an AF session.  The AF in the trusted domain can directly send the Non-TSC QoS request to the PCF to establish or update an AF session. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The TSC QoS cannot be supported and AIS cannot be supported . | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.15.6.6, 4.15.6.6a, 5.2.5.3.2, 5.2.5.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | S2-2105084 makes the following changes in clauses 4.15.6.6a and 4.15.6.6a:  - Adds the term "priority" in the following statement: " The PCF sets the PDB and MDBV according to the received Requested PDB, priority, and Burst Size received from the TSCTSF."  - Adds the sentence "If the Requested PDB is not provided, the PCF determines the PDB that matches the QoS Reference and if available, Burst Size, Priority".  It is however not explained, also not obvious from a technical perspective, how PDB and MDBV can be set based on a priority value and similarly how PDB can be determined based on burst Size and Priority.  In line with this, rev3 removes Burst size and Priority from those statements in clauses 4.15.6.6a and 4.15.6.6a.  In addition, rev3:  - aligns the naming of the Create, Update and Notify service operations of the Ntsctsf\_QoSand TSCAssistance service in clauses 4.15.6.6, 4.15.6.6a with the service name agreed in S2-2105082 ("Ntsctsf\_QoSand TSCAssistance" service);  - corrects the term "TSC QoS" parameters to individual "QoS parameters" as those QoS parameters are not TSC-specific;  - keeps the original step numbers in the procedure in clause 4.15.6.6 to avoid references to those procedures become obsolete and to avoid conficts with other CRs;  - adds Editor's Note " Whether and how the PCF uses a Priority value provided by an AF other than the TSN AF is FFS"  - corrects a few typos |

*FIRST CHANGE*

#### 4.15.6.6 Setting up an AF session with required QoS procedure



Figure 4.15.6.6-1: Setting up an AF session with required QoS procedure

1. The AF sends a request to reserve resources for an AF session using Nnef\_AFsessionWithQoS\_Create request message (UE address, AF Identifier, Flow description(s), QoS reference, (optional) Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order)) to the NEF. Optionally, a period of time or a traffic volume for the requested QoS can be included in the AF request. The NEF assigns a Transaction Reference ID to the Nnef\_AFsessionWithQoS\_Create request. The AF may in addition provide the following individual QoS parameters: Requested 5GS delay, (optional), priority (optional), Requested GFBR, Requested MFBR, flow direction, Burst Size (optional), Burst Arrival Time (optional) at UE (uplink) or UPF (downlink), Periodicity (optional), Time domain (optional) , Survival Time (optional).

2. The NEF authorizes the AF request and may apply policies to control the overall amount of pre-defined QoS authorized for the AF. If the authorisation is not granted, all steps (except step 5) are skipped and the NEF replies to the AF with a Result value indicating that the authorisation failed.

- If the NEF does not receive any of the individual QoS parameters as described in clause 6.1.3.22 in TS 23.503 [20] from the AF, the steps 3, 4, 5, 6, 7, 8 are executed, otherwise, the steps 3a, 3b, 4a, 4b, 5, 6a, 7a, 7b, 8 are executed.

3. If the NEF does not receive any of the individual QoS parameters from the AF as described in clause 6.1.3.22 in TS 23.503 [20], the NEF interacts with the PCF by triggering a Npcf\_PolicyAuthorization\_Create request and provides UE address, AF Identifier, Flow description(s), the QoS reference and the optional Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order). Any optionally received period of time or traffic volume is also included and mapped to sponsored data connectivity information (as defined in TS 23.203 [24]).

NOTE 1: The Npcf\_PolicyAuthorization\_Create request message is also used by AFs considered to be trusted by the operator to interact directly with PCF to request reserving resources for an AF session without individual QoS parameters.

3a. If the NEF receives any of the individual QoS parameters as described in clause 6.1.3.22 in TS 23.503 [20] from the AF, the NEF forwards these received individual QoS parameters in the Ntsctsf\_QoSandTSCAssistance\_Create request message to the TSCTSF.

NOTE 2: The Ntsctsf\_QoSandTSCAssistance\_Create request message is also used by AFs considered to be trusted by the operator to interact directly with TSCTSF to request reserving resources for an AF session.

3b. The TSCTSF interacts with the PCF by triggering a Npcf\_PolicyAuthorization\_Create request and provides UE address, AF Identifier, Flow description(s), the QoS reference and the optional Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order). Any optionally received period of time or traffic volume is also included and mapped to sponsored data connectivity information (as defined in TS 23.203 [24]).

If the TSCTSF receives the Requested 5GS delay, the TSCTSF calculates a Requested PDB by subtracting the UE-DS-TT residence time from the Requested 5GS delay. If the TSCTSF receives any of the flow direction, Burst Arrival Time, Periodicity, Time domain, Survival Time from the NEF, the TSCTSF forwards these parameters in the TSC Assistance Container in the Npcf\_PolicyAuthorization\_Create request to the PCF. The TSCTSF sends the Requested PDB, the TSC Assistance Container, and other received individual QoS parameters in the Npcf\_PolicyAuthorization\_Create request to the PCF.

4. For requests received from the NEF in step 3,the PCF determines whether the request is authorized and notifies the NEF if the request is not authorized.

If the request is authorized, the PCF derives the required QoS parameters based on the information provided by the NEF and determines whether this QoS is allowed (according to the PCF configuration), and notifies the result to the NEF. In addition, if the Alternative Service Requirements are provided, the PCF derives the Alternative QoS parameter set(s) from the one or more QoS reference parameters contained in the Alternative Service Requirements in the same prioritized order (as defined in TS 23.503 [20]).

If the PCF determines that the SMF needs updated policy information, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with updated policy information about the PDU Session as described in the PCF initiated SM Policy Association Modification procedure in clause 4.16.5.2.

If the request is not authorized, or the required QoS is not allowed, NEF responds to the AF in step 5 with a Result value indicating the failure cause.

4a. For requests received from the TSCTSF in step 3b, the PCF determines whether the request is authorized and notifies the TSCTSF if the request is not authorized.

If the request is authorized, the PCF derives the required QoS parameters based on the information provided by the TSCTSF and determines whether this QoS is allowed (according to the PCF configuration), and notifies the result to the TSCTSF. In addition, if the Alternative Service Requirements are provided, the PCF derives the Alternative QoS parameter set(s) from the one or more QoS reference parameters contained in the Alternative Service Requirements in the same prioritized order (as defined in TS 23.503 [20]).

The PCF sets the PDB and MDBV according to the received Requested PDB and Burst Size received from the TSCTSF. If the Requested PDB is not provided, the PCF determines the PDB that matches the QoS Reference. It also sets the GFBR and MFBR according to requested values sent by the TSCTSF. TSCTSF specified parameter values are used to over-ride default values for the 5QI corresponding to the TSCTSF provided QoS Reference.

Editor's note: Whether and how the PCF uses a Priority value provided by an AF other than the TSN AF is FFS.

If the PCF determines that the SMF needs updated policy information, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with updated policy information about the PDU Session as described in the PCF initiated SM Policy Association Modification procedure in clause 4.16.5.2.

If the request is not authorized, or the required QoS is not allowed, TSCTSF responds to the NEF in step 4b with a Result value indicating the failure cause.

4b. The TSCTSF sends a Ntsctsf\_QoSandTSCAssistance\_Create response message (Transaction Reference ID, Result) to the NEF. Result indicates whether the request is granted or not.

5. The NEF sends a Nnef\_AFsessionWithQoS\_Create response message (Transaction Reference ID, Result) to the AF. Result indicates whether the request is granted or not.

6. The NEF shall send a Npcf\_PolicyAuthorization\_Subscribe message to the PCF to subscribe to notifications of Resource allocation status and may subscribe to other events described in clause 6.1.3.18 of TS 23.503 [20].

6a. The TSCTSF shall send a Npcf\_PolicyAuthorization\_Subscribe message to the PCF to subscribe to notifications of Resource allocation status and may subscribe to other events described in clause 6.1.3.18 of TS 23.503 [20].

7. When the event condition is met, e.g. that the establishment of the transmission resources corresponding to the QoS update succeeded or failed, the PCF sends Npcf\_PolicyAuthorization\_Notify message to the NEF notifying about the event.

7a. When the event condition is met, e.g. that the establishment of the transmission resources corresponding to the QoS update succeeded or failed, the PCF sends Npcf\_PolicyAuthorization\_Notify message to the TSCTSF notifying about the event.

7b. The TSCTSF sends Ntsctsf\_QoSandTSCAssistance\_Notify message with the event reported by the PCF to the NEF.

8. The NEF sends Nnef\_AFsessionWithQoS\_Notify message with the event reported by the PCF to the AF.

The AF may send Nnef\_AFsessionWithQoS\_Revoke request to NEF in order to revoke the AF request. The NEF authorizes the revoke request and triggers the Ntsctsf\_QoSandTSCAssistance\_Delete/Unsubscribe and/or Npcf\_PolicyAuthorization\_Delete and the Npcf\_PolicyAuthorization\_Unsubscribe operations for the AF request.

*Second CHANGE*

#### 4.15.6.6a AF session with required QoS update procedure



Figure 4.15.6.6a-1: AF session with required QoS update procedure

1. For an established AF session with required QoS, the AF may send a Nnef\_AFsessionWithQoS\_Update request message (AF Identifier, Transaction Reference ID, [Flow description(s)], [QoS reference], [Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order)]) to NEF for updating the reserved resources. Optionally, a period of time or a traffic volume for the requested QoS can be included in the AF request. The Transaction Reference ID provided in the AF session with required QoS update request message is set to the Transaction Reference ID that was assigned, by the NEF, to the Nnef\_AFsessionWithQoS\_Create request message. The AF may in addition provide the following individual QoS parameters: Requested 5GS delay, (optional), priority (optional), Requested GFBR, Requested MFBR, flow direction, Burst Size (optional), Burst Arrival Time (optional) at UE (uplink) or UPF (downlink), Periodicity (optional), Time domain (optional), Survival Time (optional).

2. The NEF authorizes the AF request of updating AF session with required QoS and may apply policies to control the overall amount of pre-defined QoS authorized for the AF. If the authorisation is not granted, all steps (except step 5) are skipped and the NEF replies to the AF with a Result value indicating that the authorisation failed.

If the NEF does not receive any of the individual QoS parameters as described in clause 6.1.3.22 in TS 23.503 [20] from the AF, then the steps 3, 4, 5, 6, 7 are executed, otherwise, the steps 3a, 3b, 4a, 4b, 5, 6a, 6b, 7 are executed.

3. If the NEF does not receive any of the individual QoS parameters from the AF as described in clause 6.1.3.22 in TS 23.503 [20], the NEF interacts with the PCF by triggering a Npcf\_PolicyAuthorization\_Update request and provides UE address, AF Identifier, Flow description(s), the QoS reference and the optional Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order). Any optionally received period of time or traffic volume is also included and mapped to sponsored data connectivity information (as defined in TS 23.203 [24]).

NOTE 1: The Npcf\_PolicyAuthorization\_Update request message is also used by AFs considered to be trusted by the operator to interact directly with PCF to update the reserving resources for an AF session.

3a. If the NEF receives one or more of the individual QoS parameters as described in clause 6.1.3.22 in TS 23.503 [20] from the AF, the NEF forwards these received individual QoS parameters in the Ntsctsf\_QoSandTSCAssistance\_Update request message to the TSCTSF.

NOTE 2: The Ntsctsf\_QoSandTSCAssistance\_Update request message is also used by AFs considered to be trusted by the operator to interact directly with TSCTSF to update the reserving resources for an AF session with individual QoS parameters.

3b. The TSCTSF interacts with the PCF by triggering a Npcf\_PolicyAuthorization\_Update request and provides UE address, AF Identifier, Flow description(s), the QoS reference and the optional Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order). Any optionally received period of time or traffic volume is also included and mapped to sponsored data connectivity information (as defined in TS 23.203 [24]).

If the TSCTSF receives the Requested 5GS delay, the TSCTSF calculates a Requested PDB by subtracting the UE-DS-TT residence time from the Requested 5GS delay. If the Requested PDB is not provided, the PCF determines the PDB that matches the QoS Reference.

Editor's note: Whether and how the PCF uses a Priority value provided by an AF other than the TSN AF is FFS.

If the TSCTSF receives any of the flow direction, Burst Arrival Time, Periodicity, Time domain, Survival Time from the NEF, the TSCTSF forwards these parameters in the TSC Assistance Container in the Npcf\_PolicyAuthorization\_Update request to the PCF. The TSCTSF sends the Requested PDB, the TSC Assistance Container, and other received individual QoS parameters in the Npcf\_PolicyAuthorization\_Update request to the PCF.

4. If the PCF received request from the NEF in step 3, the PCF determines whether the request is authorized.

If the request is authorized, the PCF derives the required QoS parameters based on the information provided by the NEF and determines whether this QoS is allowed (according to the PCF configuration), and notifies the result to the NEF. In addition, if the Alternative Service Requirements are provided, the PCF derives the Alternative QoS parameter set(s) from the one or more QoS reference parameters contained in the Alternative Service Requirements in the same prioritized order (as defined in TS 23.503 [20]).

If the request is not authorized or the required QoS is not allowed, NEF responds to the AF in step 5 with a Result value indicating the failure cause.

4a. If the PCF received request from the TSCTSF in step 3b, the PCF determines whether the request is authorized.

If the request is authorized, the PCF derives the required QoS parameters based on the information provided by the TSCTSF and determines whether this QoS is allowed (according to the PCF configuration for this AF), and notifies the result to the TSCTSF. In addition, if the Alternative Service Requirements are provided, the PCF derives the Alternative QoS parameter set(s) from the one or more QoS reference parameters contained in the Alternative Service Requirements in the same prioritized order (as defined in TS 23.503 [20]).

If the TSCTSF provides Requested PDB, priority, Requested GFBR, Requested MFBR or Burst Size, then the PCF sets the PDB and/or MDBV according to the received Requested PDB and Burst Size received from the TSCTSF. If the Requested PDB is not provided from TSCTSF, the PCF determines the PDB that matches the QoS Reference. It also sets the GFBR and MFBR according to the requested values provided by the TSCTSF. TSCTSF specified parameter values are used to over-ride default values for the 5QI corresponding to the TSCTSF provided QoS Reference.

If the PCF determines that the SMF needs updated policy information, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with updated policy information about the PDU Session as described in the PCF initiated SM Policy Association Modification procedure in clause 4.16.5.2.

If the request is not authorized or the required QoS is not allowed, TSCTSF responds to the NEF in step 4b with a Result value indicating the failure cause.

If the PCF determines that the SMF needs updated policy information, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with updated policy information about the PDU Session as described in the PCF initiated SM Policy Association Modification procedure in clause 4.16.5.2.

4b. The TSCTSF sends a Ntsctsf\_QoSandTSCAssistance\_Update response message (Transaction Reference ID, Result) to the NEF. Result indicates whether the request is granted or not.

5. The NEF sends a Nnef\_AFsessionWithQoS\_Update response message (Transaction Reference ID, Result) to the AF. Result indicates whether the request is granted or not.

6. The PCF sends Npcf\_PolicyAuthorization\_Notify message to the NEF when the modification of the transmission resources corresponding to the QoS update succeeded or failed.

6a. The PCF sends Npcf\_PolicyAuthorization\_Notify message to the TSCTSF when the modification of the transmission resources corresponding to the QoS update succeeded or failed.

6b. The TSCTSF sends Ntsctsf\_QoSandTSCAssistance\_Notify message with the event reported by the PCF to the NEF.

7. The NEF sends Nnef\_AFsessionWithQoS\_Notify message with the event reported by the PCF to the AF.

*Third CHANGE*

##### 5.2.5.3.2 Npcf\_PolicyAuthorization\_Create service operation

**Service operation name:** Npcf\_PolicyAuthorization\_Create

**Description:** Authorize the request, and optionally determines and installs SM Policy Control Data according to the information provided by the NF Consumer or provides Port Management Information Container for ports on DS-TT or NW-TT.

**Inputs, Required:** UE (IP or MAC) address, identification of the application session context.

**Inputs, Optional:** UE identity if available, DNN if available, S-NSSAI if available, Media type, Media format, bandwidth requirements, sponsored data connectivity if applicable, flow description, Application Identifier, AF Communication Service Identifier, AF Record Identifier, Flow status, Priority indicator, emergency indicator, Application service provider, resource allocation outcome, AF Application Event Identifier, a list of DNAI(s) and corresponding routing profile ID(s) or N6 traffic routing information, AF Transaction Id, Early and/or late notifications about UP path management events, temporal validity condition and spatial validity condition as described in clause 5.6.7 in 23.501 [2], Background Data Transfer Reference ID, priority sharing indicator as described in clause 6.1.3.15 in TS 23.503 [20], pre-emption control information as described in clause 6.1.3.15 in TS 23.503 [20], Port Management Information Container and related port number, TSN AF parameters provided by the TSN AF to the PCF as described in clause 6.1.3.23 of TS 23.503 [20], individual QoS parameters as described in clause 6.1.3.22 of TS 23.503 [20],QoS parameter(s) to be measured, Reporting frequency, Target of reporting as described in clause 6.1.3.21 of TS 23.503 [20], Alternative Service Requirements (containing one or more QoS reference parameters in a prioritized order), MPS for Data Transport Service indicator as described in clause 6.1.3.11 of TS 23.503 [20].

**Outputs, Required:** Success or Failure (reason for failure, e.g. as defined in TS 23.503 [20] clause 6.1.3.16, clause 6.1.3.10).

**Outputs, Optional:** The service information that can be accepted by the PCF.

*Fourth CHANGE*

##### 5.2.5.3.3 Npcf\_PolicyAuthorization\_Update service operation

**Service operation name:** Npcf\_PolicyAuthorization\_Update

**Description:** Provides updated information to the PCF.

**Inputs, Required:** Identification of the application session context.

**Inputs, Optional:** Media type, Media format, bandwidth requirements, sponsored data connectivity if applicable, flow description, Application Identifier, AF Communication Service Identifier, AF Record Identifier, Flow status, Priority indicator, Application service provider, resource allocation outcome, AF Application Event Identifier, a list of DNAI(s) and corresponding routing profile ID(s) or N6 traffic routing information, AF Transaction Id, Early and/or late notifications about UP path management events, temporal validity condition and spatial validity condition as described in clause 5.6.7 in 23.501 [2], Background Data Transfer Reference ID, priority sharing indicator as described in clause 6.1.3.15 in TS 23.503 [20], pre-emption control information as described in clause 6.1.3.15 in TS 23.503 [20], Port Management Information Container and related port number, TSN AF parameters provided by the TSN AF to the PCF as described in clause 6.1.3.23 of TS 23.503 [20], individual QoS parameters as described in clause 6.1.3.22 of TS 23.503 [20], QoS parameter(s) to be measured, Reporting frequency, Target of reporting as described in clause 6.1.3.21 of TS 23.503 [20], MPS for Data Transport Service indicator as described in clause 6.1.3.11 of TS 23.503 [20].

**Outputs, Required:** Success or Failure (reason for failure, e.g. as defined in TS 23.503 [20] clause 6.1.3.16).

**Outputs, Optional:** The service information that can be accepted by the PCF.

Provides updated application level information and communicates with Npcf\_SMPolicyControl service to determine and install the policy according to the information provided by the NF Consumer. Updates an application context in the PCF.