3GPP TSG CN Plenary Meeting #18 **NP-020626**
4th - 6th December 2002. New Orleans, USA.

Source: TSG CN WG3

Title: CRs on Rel5 Work Item e2eQoS (CR Pack 7)

Agenda item: 8.5

Document for: APPROVAL

Introduction:

This document contains **2** CRs on **Rel-5 WI e2eQoS**.

These CRs have been agreed by TSG CN WG3 and are forwarded to TSG CN Plenary meeting #18 for approval.

WG_tdoc	Title	Spec	CR	Rev	Cat	Rel	Version_old
N3-020852	QoS mapping in the case of forking	29.208	009	1	F	Rel-5	5.1.0
N3-020866	Terminology in TS 29.208 in line with TS 29.207	29.208	010	2	F	Rel-5	5.1.0

3GPP TSG-CN WG3 Meeting #25
Miami, USA, 23rd - 27th September 2002.

Tdoc ⌘N3-020852

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **009** ⌘ **rev** **1** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	QoS mapping in the case of forking
Source:	⌘	TSG_CN WG3
Work item code:	⌘	e2eQoS
Date:	⌘	06/09/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction 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.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The QoS mapping procedure in the case of forking is referred to as a rule although is not formalized in a table as the other mapping rules.
Summary of change:	⌘	The QoS mapping in the case of forking is described by means of a procedure that uses the existing mapping rules. There is one procedure for the PCF and a similar procedure for the UE.
Consequences if not approved:	⌘	Inconsistent specification of mapping rules

Clauses affected:	⌘	7.1.1, 7.2.2, 7.3

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
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Below is a brief summary:

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of modified text.

7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PCF

The QoS authorization is to be based on the parameters Maximum Authorized DiffServ PHB and Maximum Authorized Data Rate UL/DL.

The PCF shall use the mapping rules in table 7.1.1.1 to derive the Authorized IP QoS parameters Maximum Authorized Data Rate DL/UL and the Maximum Authorized DiffServ PHB from the SDP Parameters. ~~In case of forking, the additional rule in section 7.3 shall apply.~~

In the case of forking, the various forked responses may have different QoS requirements for the same media component. Each Authorized IP QoS Parameter shall be set to the highest value requested for that media component by any of the active forked responses. These values are derived by the rules in Table 7.1.1.1

Table 7.1.1.1: Rules for derivation of the Maximum Authorized Data Rates and Maximum Authorized DiffServ PHB per media flow in the PCF

Authorized IP QoS Parameter per media flow	Derivation from SDP Parameters

Maximum Authorized Data Rate DL (Max_DR_DL) and UL (Max_DR_UL) per media flow (see note 1)	IF a=recvonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction:= downlink;
	ELSE /* mobile teminated */
	Direction:= uplink;
	ENDIF;
	ELSE
	IF a=sendonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction: = uplink;
	ELSE /* mobile teminated */
	Direction:= downlink;
	ENDIF;
	ELSE /*sendrecv or no direction attribute*/
	Direction:=both;
	ENDIF;
	ENDIF;
	
	IF b=AS:<bandwidth> is present THEN
	IF Direction=downlink THEN
	IF <transport>=”RTP/AVP” then
	Max_DR_UL:=0.025 * <bandwidth>;
	Max_DR_DL:=1.025 * <bandwidth>;
	ELSE
	Max_DR_UL:=0;
	Max_DR_DL:=<bandwidth>;
	ENDIF;
	ELSE
	IF Direction=uplink THEN
	IF <transport>=”RTP/AVP” then
	Max_DR_UL:= 1.025 * <bandwidth>;
	Max_DR_DL:=0.025 * <bandwidth>;
	ELSE
	Max_DR_UL:=<bandwidth>;
	Max_DR_DL:=0;
	ENDIF;
	ELSE /*Direction=both*/
	Max_DR_UL:= 1.025 * <bandwidth>;
	Max_DR_DL:= 1.025 * <bandwidth>;
	ENDIF;
	ENDIF;
	ELSE
	bw:= as set by the operator;
	IF Direction=downlink THEN
	Max_DR_UL:=0;
	Max_DR_DL:=bw;
	ELSE
	IF Direction=uplink THEN
	Max_DR_UL:=bw;
	Max_DR_DL:=0;
	ELSE /*Direction=both*/
	Max_DR_UL:=bw;
	Max_DR_DL:=bw;
	ENDIF;
	ENDIF;
	ENDIF;

Maximum Authorized DiffServ PHB [MaxClass] per media flow (see note 2)	CASE <media> OF “audio”: MaxClass:=EF; /*conversational*/ “video”: MaxClass:=EF; /*conversational*/ “application”: MaxClass:=EF; /*conversational*/ “data”: MaxClass:=AF1; /*interactive with priority 3*/ “control”: MaxClass:=AF3 /*interactive with priority 1*/ /*new media type*/ OTHERWISE: MaxClass:=BE; /*background*/ END;
NOTE 1: For a RTP media flow the Maximum Authorized Bandwidth DL/UL are the sum of the RTP flow DL/UL and the associated RTCP flow DL/UL. NOTE 2: The Maximum Authorized Traffic Class for a RTCP flow is the same as the corresponding RTP flow.	

Editor’s note: Further clarification is required if the SDP b=AS:<bandwidth> parameter includes the bandwidth for RTCP.

The PCF shall per ongoing session store the Authorized IP QoS parameters per media flow.

When the GGSN requests the Authorized UMTS QoS parameters for an activated/modified PDP Context carrying one or more media flows (eventually with associated RTCP signalling), the PCF shall use the rules in table 7.1.1.2 to calculate the Authorized IP QoS parameters.

Table 7.1.1.2: Rules for calculating the Maximum Authorized Data Rate and Maximum Authorized Diffserv PHB Parameters per Binding Information in the PCF

Authorized IP QoS Parameter per Binding	Calculation Rule

Maximum Authorized Data Rate DL and UL per Binding Information	Maximum Authorized Data Rate DL/UL per Binding Information is the sum of all Maximum Authorized Data Rate DL/UL per media flow for all the media flows identified by the Binding Information
	
	IF Maximum Authorized Data Rate DL/UL per Binding Information > 2047 kbps THEN
	Maximum Authorized Data Rate DL/UL per Binding Information = 2047 kbps /* See ref [8] */
	
	END;

Maximum Authorized Diffserv PHB per Binding Information	Maximum Authorized Diffserv PHB per Binding Information = MAX [Maximum Authorized Diffserv PHB per media flow among all the media flows identified by the Binding Information (The MAX function ranks the possible Maximum Authorized Diffserv PHB values as follows: "EF" > "AF4" > "AF3" > "BE")

End of modified section

….

Start of next modified section

7.2.2 SDP parameters to Authorized UMTS QoS parameters mapping in UE

If the PDP Context is activated or modified in an IMS context then it is recommended that the UE uses the mapping rules in table 7.2.2.1 to derive the Maximum Authorized Bandwidth UL/DL.

Table 7.2.2.1 also has a mapping rule for derivation of Maximum Authorized Traffic Class. In future releases this mapping rule may change. For the reason of future compatibility, the release 5 mapping rule is optional for the UE.

In the case this mapping rule is implemented then it is recommended that the UE use the mapping rule in table 7.2.2.1 to derive the Maximum Authorised Traffic Class from the SDP Parameters.

~~When the maximum authorized QoS for a media flow in forked responses is derived, the additional rule in section 7.3 shall apply.~~

In the case of forking, the various forked responses may have different QoS requirements for the same media component. When the Authorized UMTS QoS Parameters are used by the UE, they shall be set equal to the highest values requested for that media component by any of the active forked responses. The UE should use the mapping rule in table 7.2.2.1 for each forked response.

Table 7.2.2.1: Rules for derivation of the Maximum Authorized Bandwidth DL/UL and the Maximum Authorized Traffic Class per media flow in the UE

Authorized UMTS QoS Parameter per media flow	Derivation from SDP Parameters

Maximum Authorized Bandwidth DL (Max_BW_DL) and UL (Max_BW_UL) per media flow	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	IF a=recvonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction:= downlink;
	ELSE /* mobile teminated */
	Direction:= uplink;
	ENDIF;
	ELSE;
	IF a=sendonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction: = uplink;
	ELSE /* mobile teminated */
	Direction:= downlink;
	ENDIF;
	ELSE /*sendrecv or no direction attribute*/
	Direction:=both;
	ENDIF;
	ENDIF;
	
	IF b=AS:<bandwidth> is present THEN
	IF Direction=downlink THEN
	IF <transport>=”RTP/AVP” then
	Max_BW_UL:=0.025 * <bandwidth>;
	Max_BW_DL:=1.025 * <bandwidth>;
	ELSE
	Max_BW_UL:=0;
	Max_BW_DL:=<bandwidth>;
	ENDIF;
	ELSE
	IF Direction=uplink THEN
	IF <transport>=”RTP/AVP” then
	Max_BW_UL:= 1.025 * <bandwidth>;
	Max_BW_DL:=0.025 * <bandwidth>;
	ELSE
	Max_BW_UL:=<bandwidth>;
	Max_BW_DL:=0;
	ENDIF;
	ELSE /*Direction=both*/
	Max_BW_UL:= 1.025 * <bandwidth>;
	Max_BW_DL:= 1.025 * <bandwidth>;
	ENDIF;
	ENDIF;
	ELSE
	bw:= as set by the UE manufacturer;
	IF Direction=downlink THEN
	Max_BW_UL:=0;
	Max_BW_DL:= bw;
	ELSE
	IF Direction=uplink THEN
	Max_BW_UL:= bw;
	Max_BW_DL:=0;
	ELSE /*Direction=both*/
	Max_BW_UL:= bw;
	Max_BW_DL:= bw;
	ENDIF;
	ENDIF;
	ENDIF;
	
	ELSE
	No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class [MaxTrafficClass] per media flow	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	CASE <media> OF
	“audio”: MaxTrafficClass:=conversational;
	“video”: MaxTrafficClass:=conversational;
	“application”: MaxTrafficClass:=conversational;
	“data”: MaxTrafficClass:=interactive with priority 3;
	“control”: MaxTrafficClass:=interactive with priority 1;
	/*new media type*/
	OTHERWISE: MaxTrafficClass:=background;
	END;
	ELSE
	No authorization is done ;
	ENDIF ;

Editor’s note: Further clarification is required if the SDP b=AS:<bandwidth> parameter includes the bandwidth for RTCP.

It is recommended that the UE per ongoing session store the Authorized UMTS QoS parameters per media flow.

Furthermore it is recommended that the UE checks that the requested UMTS QoS parameters Traffic Class and Maximum Bitrate UL/DL not exceeds the values of the corresponding Authorized UMTS QoS parameters (calculated according to the rules in table 7.2.2.2) before activating/modifying a PDP Context. See section 7.1.3 for recommended criteria to be fulfilled.

The table 7.2.2.1 defines mapping rules to determine the Maximum Authorized Traffic Class. This table does not specify how to determine the UMTS QoS parameter traffic class.

Table 7.2.2.2: Rules for calculating the Maximum Authorized Bandwidths and Maximum Authorized Traffic Class Parameters per PDP Context in the UE

Authorized UMTS QoS Parameter per PDP Context	Calculation Rule

Maximum Authorized Bandwidth DL and UL per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	Maximum Authorized Bandwidth DL/UL per PDP Context is the sum of all Maximum Authorized Bandwidth DL/UL per media flow for all the media flows to be carried by the PDP Context ;
	
	IF Maximum Authorized Bandwidth DL/UL per PDP Context > 2047 kbps THEN
	Maximum Authorized Bandwidth DL/UL per PDP Context = 2047 kbps /* See ref [8] */
	END;
	
	ELSE
	No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	Maximum Authorised Traffic Class per PDP Context = MAX [Maximum Authorised Traffic Class per media flow among all the media flows to be carried by the PDP Context] ;
	
	ELSE
	No authorization is done ;
	ENDIF ;
	
	(The MAX function ranks the possible Maximum Authorised Traffic Class values as follows: Conversational > Streaming > Interactive > Background)

End of modified section

…

Start of added section

~~7.3 Support for forking~~

~~For an initiated session the UE and the PCF may receive several forked responses, ref. 3GPP TS 29.207 [7]. The various forked responses may have different QoS requirements for the same media flow. In the case of forked responses, the maximum authorized QoS for a media flow shall be equal to the highest QoS requested for that media flow by any of the active forked responses. This applies both to the UE and to the PCF.~~

End of added section

3GPP TSG-CN WG3 Meeting #25
Miami, USA, 23rd - 27th September 2002.

Tdoc ⌘N3-020866

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **010** ⌘ **rev** **2** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Terminology in TS 29.208 in line with TS 29.207and corrections.
Source:	⌘	TSG_CN WG3
Work item code:	⌘	E2EQoS
Date:	⌘	21/09/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
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B *(addition of feature),*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	Correction of terminology, signalling flow diagrams and a rule.
Summary of change:	⌘	1. The terminology is changed to be the same as is used in TS 29.207. 2. The description updated to consider that the media components of a session can be carried on diffrent PDP contexts. 3. The rule in table 7.2.1 is corrected to reflect what can be guided by TS 26.234 and TS 26.236 regarding mapping SDP parameters to UMTS QoS parameters.
Consequences if not approved:	⌘	TS 29.208 will contain inaccuracies and use different teminology than what is used in TS 29.207.

Clauses affected:	⌘	4.1, 4.2, 5, 6.1, 6.2.1, 6.2.2, 6.3.1, 6.4, 6.5.1, 6.5.2, 7.1, 7.1.1, 7.1.2, 7.1.3, 7.2, 7.2.1, 7.2.2, 7.3

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

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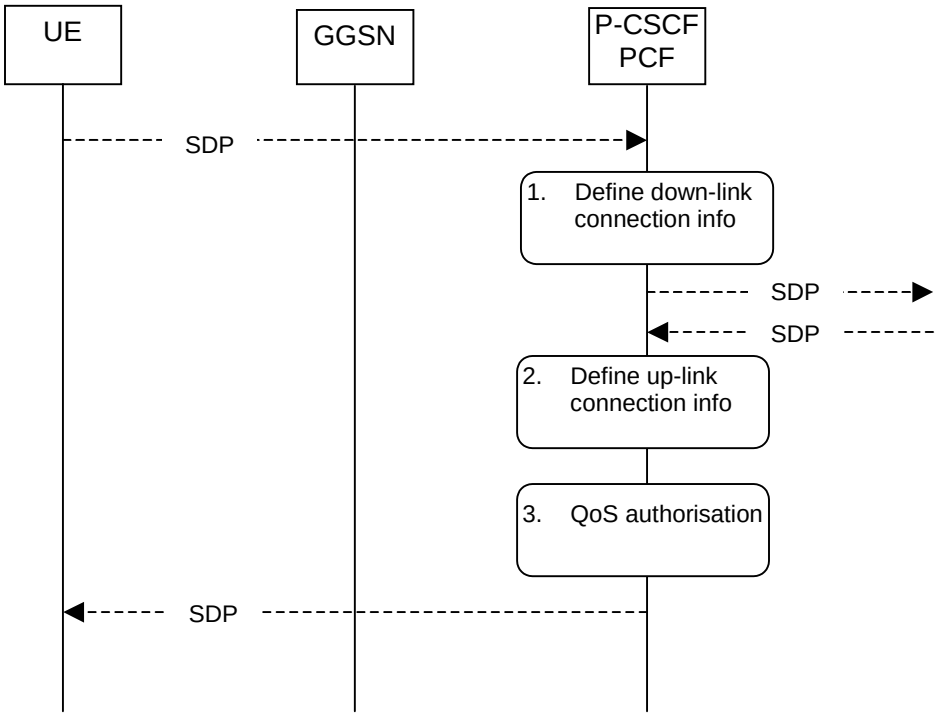
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to

First amended section

4.1 Authorize QoS resources at originating PCF

This clause covers the Authorize QoS resources procedure at the originating PCF.



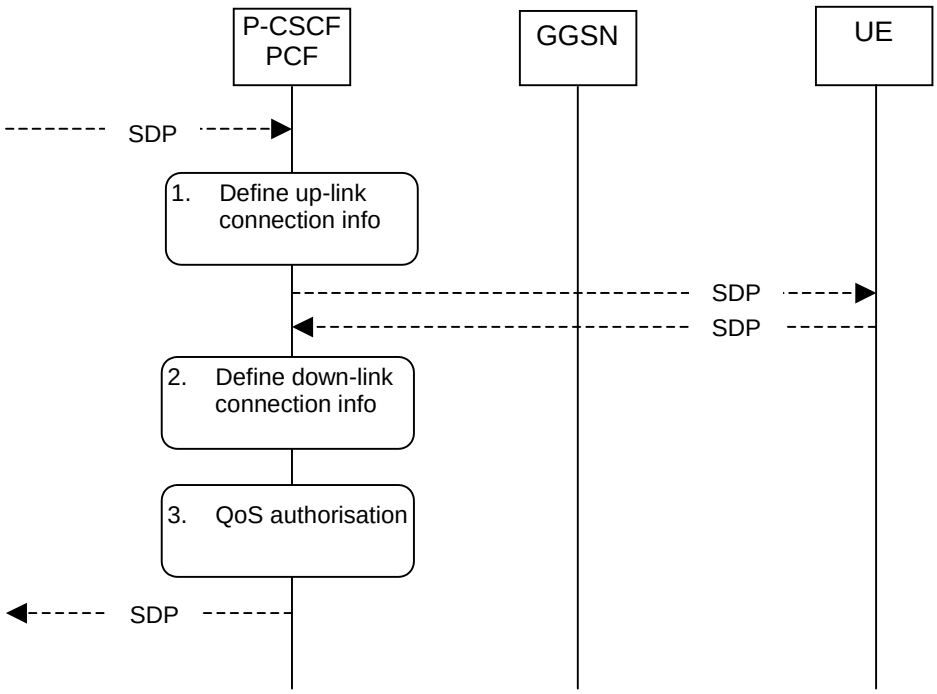
1. The P-CSCF(PCF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the down link ~~media~~ IP flow(s), ~~media~~ port~~s~~ numbers to be used etc…).
2. The P-CSCF(PCF) gets the negotiated SDP parameters from the terminating side through SIP signalling interaction. The P-CSCF(PCF) identifies the connection information needed (IP address of the up-link media IP flow(s), ~~media~~ port~~s~~ numbers to be used etc…).
3. The P-CSCF(PCF) uses the SDP parameters in order to define the QoS resource authorisation. The PCF authorises every media component negotiated for the session. The authorization shall be expressed in terms of IP QoS parameters. An authorization token is generated by the PCF and sent to the UE.

Figure 4.1: Authorize QoS resources at originating PCF

Next amended section

4.2 Authorize QoS resources at terminating PCF

This clause covers the Authorize QoS resources procedure at the terminating PCF.



1. The P-CSCF(PCF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the up-link ~~media~~ IP flow(s), ~~media~~ port~~s~~ numbers to be used etc…). An authorization token is generated by the PCF and sent to the UE.
2. The P-CSCF(PCF) receives the negotiated SDP parameters from the UE. The P-CSCF(PCF) identifies the connection information needed (IP address of the down-link ~~media~~ IP flow(s), ~~media~~ port~~s~~ numbers to be used etc…).
3. The P-CSCF(PCF) uses the SDP parameters in order to define the QoS resource authorisation. The PCF authorises every media component negotiated for the session. The authorization shall be expressed in terms of IP QoS parameters.

Figure 4.2: Authorize QoS resources at terminating PCF

Next amended section

5 Resource reservation flow with Service-based local policy

This clause describes a resource reservation flow with service based local policy. The service based local policy is done via exchange of information through the Go interface. The Go interface allows the service based local policy and QoS interworking information to be requested by the GGSN from a PCF.

The figure 5.1 presents the "Resource Reservation" procedure at PDP context activation to both the Mobile Originating (MO) side and Mobile Terminating (MT) side.

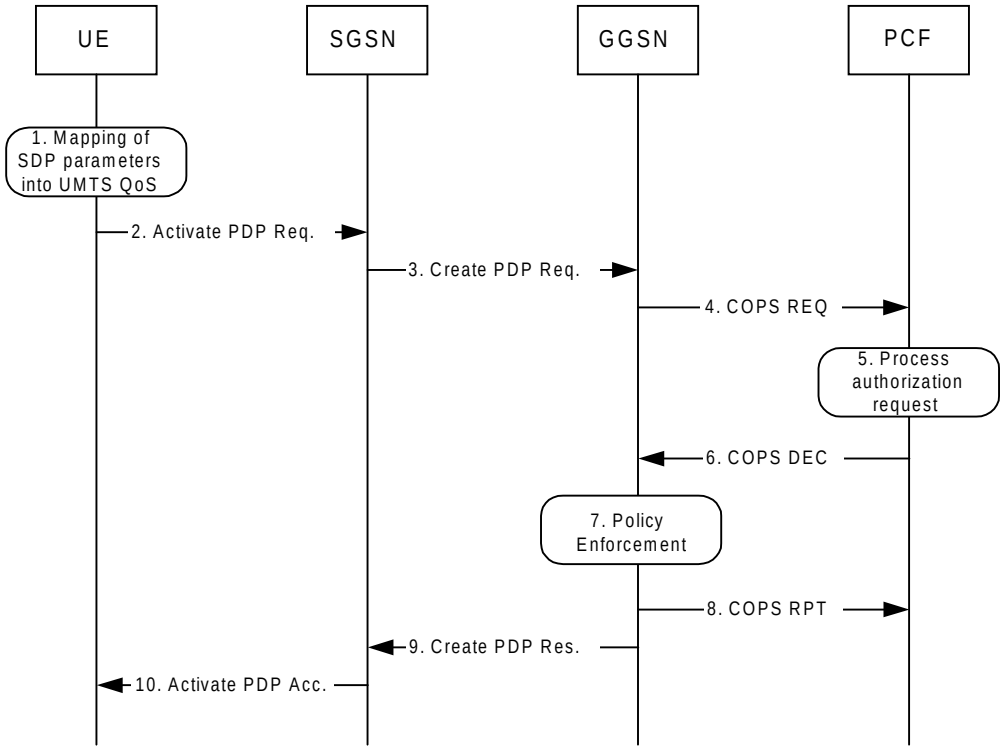


Figure 5.1: Resource reservation flow with service based local policy

1. Mapping from SDP to UMTS QoS parameters

The UE uses the SDP parameters in order to define the UMTS QoS parameter needed to request a PDP context. The QoS parameter mapping mechanism is described in clause 7.2.

2. GPRS: Activate PDP Context Request (UE to SGSN)

The UE sends an Activate PDP Context Request message to the SGSN with the UMTS QoS parameters. The UE shall include binding information in the PDP context activation messages to associate the PDP context bearer with policy information. The authorization token is sent by the P-CSCF to the UE during SIP signalling.

3. GPRS: Create PDP Context Request (SGSN to GGSN)

The SGSN carries out the procedures identified in 3GPP TS 23.060 [4] related to the PDP context activation.

4. COPS: REQ (GGSN to PCF)

The GGSN receives the PDP context activation request with the binding information. The GGSN uses the authorisation token in order to localise the PCF. The GGSN sends a COPS REQ message to the PCF and includes the binding information.

5. Process Resource Request (PCF)

The PCF receives the information sent by the GGSN. The PCF identifies the multimedia session by using the binding information. The PCF performs an authorization decision.

6. COPS: DEC (PCF to GGSN)

The decision taken by the PCF is returned via the COPS DEC message. The DEC message includes the policy information to be used by the GGSN in order to perform the policy-based admission control.

7. Policy Enforcement (GGSN)

The GGSN enforces the PCF policy decision based on the received authorization information from the PCF for the media ~~flows~~ components carried by the PDP context.

8. COPS: RPT (GGSN to PCF)

The GGSN sends COPS RPT message back to the PCF and reports its success or failure in carrying out the PCF decision.

9. GPRS: Create PDP Context Response (GGSN to SGSN)

The GGSN accepts the PDP context request based on the results of the authorisation policy decision enforcement. If the requested QoS parameters are not within the authorized QoS, the GGSN ~~either rejects the PDP context activation request or~~ downgrades the requested UMTS QoS parameters.

10. GPRS: Activate PDP Context Accept (SGSN to UE)

The SGSN sends an Activate PDP Context Accept message to the UE indicating that the PDP context has been activated and that the QoS requirements have been authorized successfully for both downlink and uplink.

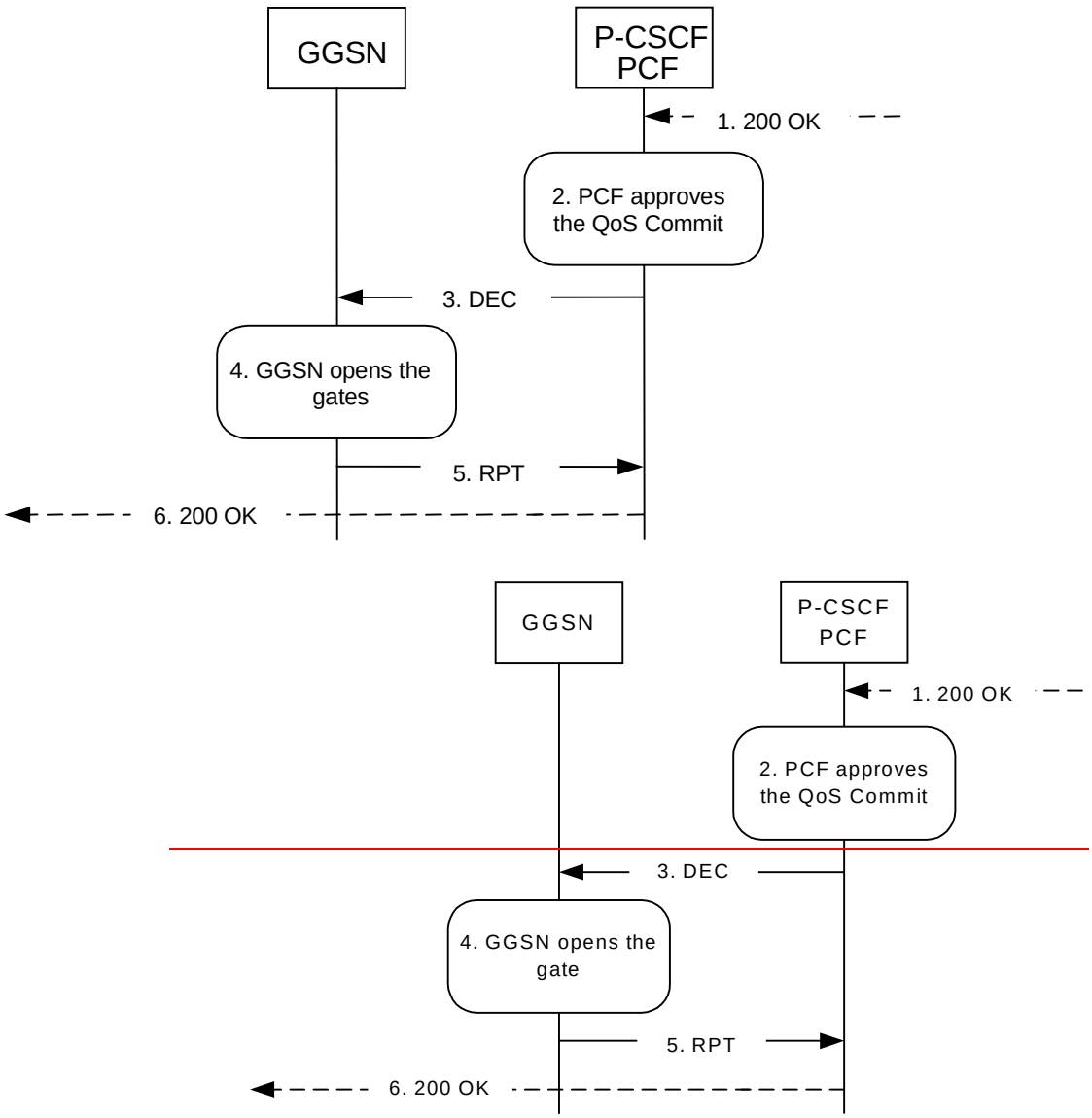
Next amended section

6.1 Approval of QoS commit

Through Approval of QoS Commit the PCF makes a final decision to enable the allocated QoS resource for the authorized media stream(s) if the QoS resources are not enable at the time they are authorized by the PCF.

The Approval of QoS Commit procedure is triggered by the P-CSCF receiving a 200 OK message.

The following figure is applicable to the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



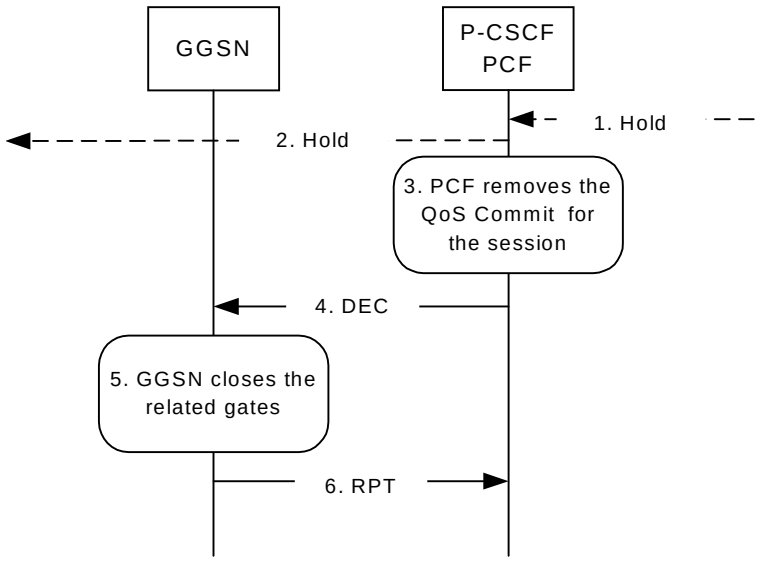
1. P-CSCF receives the 200 OK message.
2. PCF approves the QoS Commit.
3. PCF sends ~~a~~ COPS DEC message(s) to the GGSN to open the 'gates' e.g., enable the use of the authorised QoS resources.
4. GGSN receives the COPS DEC message(s) and opens the 'gates' e.g., enables the use of the authorised QoS resources.
5. GGSN sends ~~a~~ COPS RPT message(s) back to the PCF.
6. P-CSCF forwards the 200 OK message.

Figure 6.1: Approval of QoS Commit to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

6.2.1 Removal of QoS commit at Session on Hold

The following figure presents the "Removal of QoS commit" procedure at session on hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



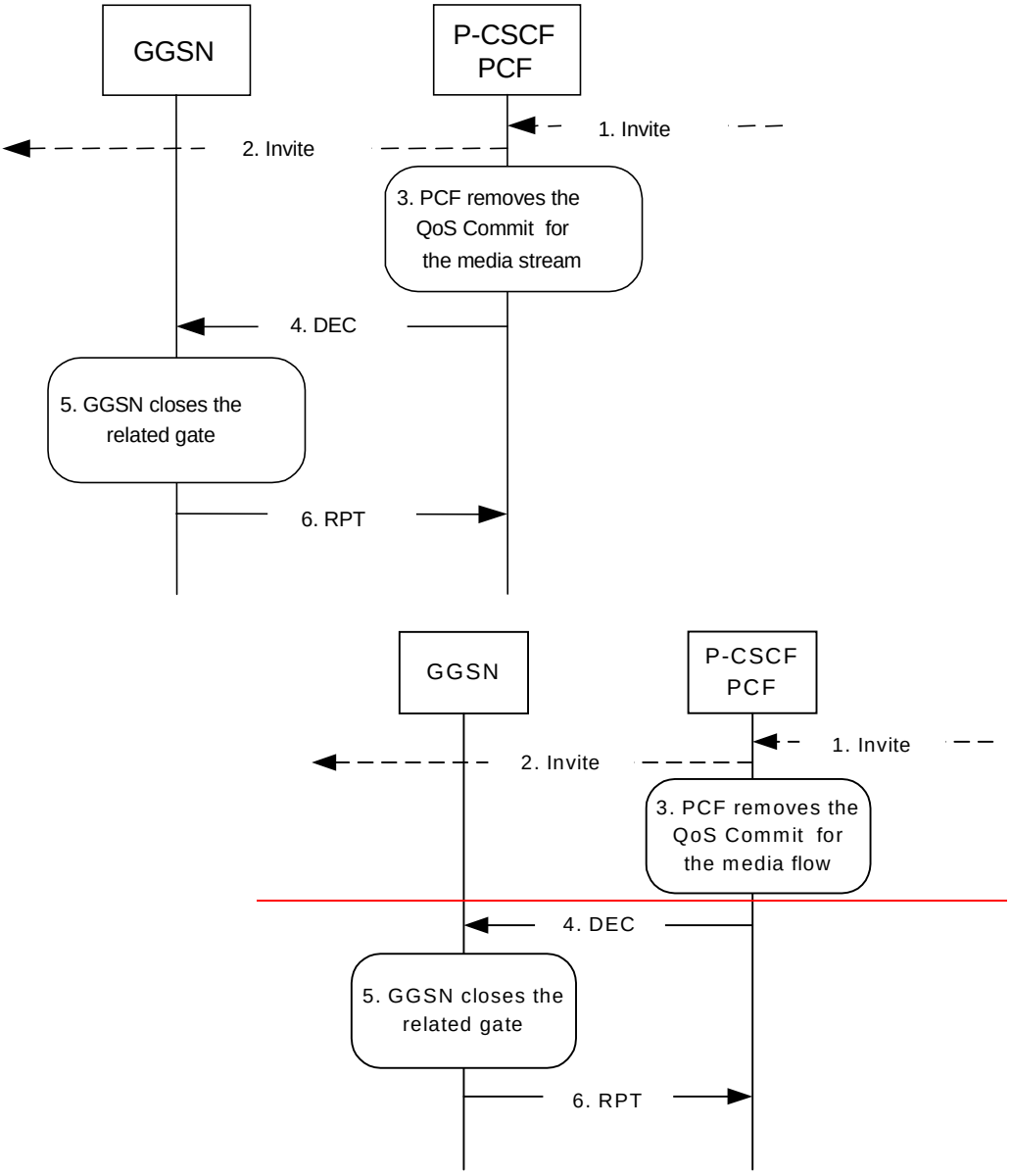
1. P-CSCF receives the Hold message.
2. P-CSCF forwards the Hold message.
3. PCF removes the QoS commit for the session.
4. PCF sends ~~a~~ COPS DEC message(s) to the GGSN to close the related 'gates'.
5. GGSN receives the COPS DEC message(s), closes the 'gates'.
6. GGSN sends ~~a~~ COPS RPT message(s) back to the PCF.

Figure 6.2.1: Removal of QoS commit at Session on Hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

6.2.2 Removal of QoS commit at ~~Codec or~~ media ~~flow~~ stream change or remove

The following figure presents the "Removal of QoS commit" procedure at ~~Codec or~~ media stream ~~flow~~ change or remove to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



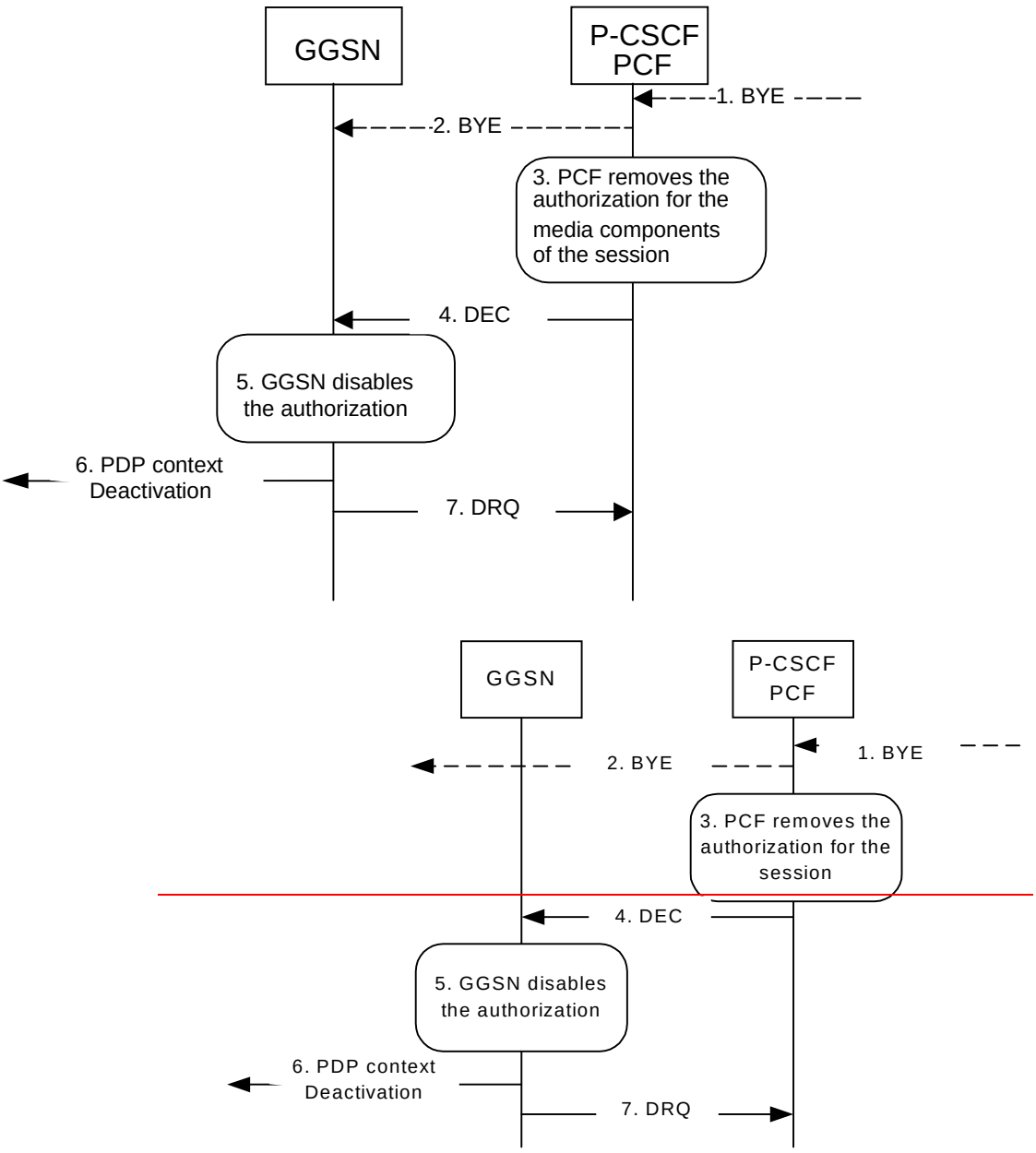
1. P-CSCF receives the INVITE message for ~~codec or~~ media change~~,~~ or remove.
2. P-CSCF forwards the INVITE message.
3. PCF removes the QoS commit for the related media ~~flow~~stream.
4. PCF sends a COPS DEC message to the GGSN to close the related 'gate'.
5. GGSN receives the COPS DEC message, closes the 'gate'.
6. GGSN sends a COPS RPT message back to the PCF.

Figure 6.2.2: Removal of QoS commit at ~~codec or~~ media ~~flow~~ stream change or remove to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

6.3.1 Mobile initiated session release / Network initiated session release

The following figure presents the "Revoke Authorization for UMTS and IP Resources" at upon Mobile initiated session release / Network initiated session release to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



1. One mobile party hangs up or the P-CSCF or S-CSCF initiates BYE message.
2. P-CSCF forwards the BYE message.
3. PCF removes the authorisation for ~~resources that had previously been issued for this endpoint~~ the media component(s) of ~~for~~ this session.
4. PCF sends ~~a~~ COPS DEC message(s) to the GGSN~~. It~~ includ~~es~~ing client handle(s) ~~binding information~~, which identifies the PDP context(s) to be deactivated.
5. GGSN receives the COPS DEC message, and disables the use of the authorized QoS resources.
6. GGSN initiates deactivation of the PDP context(s) used for the IP multimedia session, in case the UE has not done it before.
7. GGSN sends ~~a~~ COPS DRQ message(s) back to the PCF.

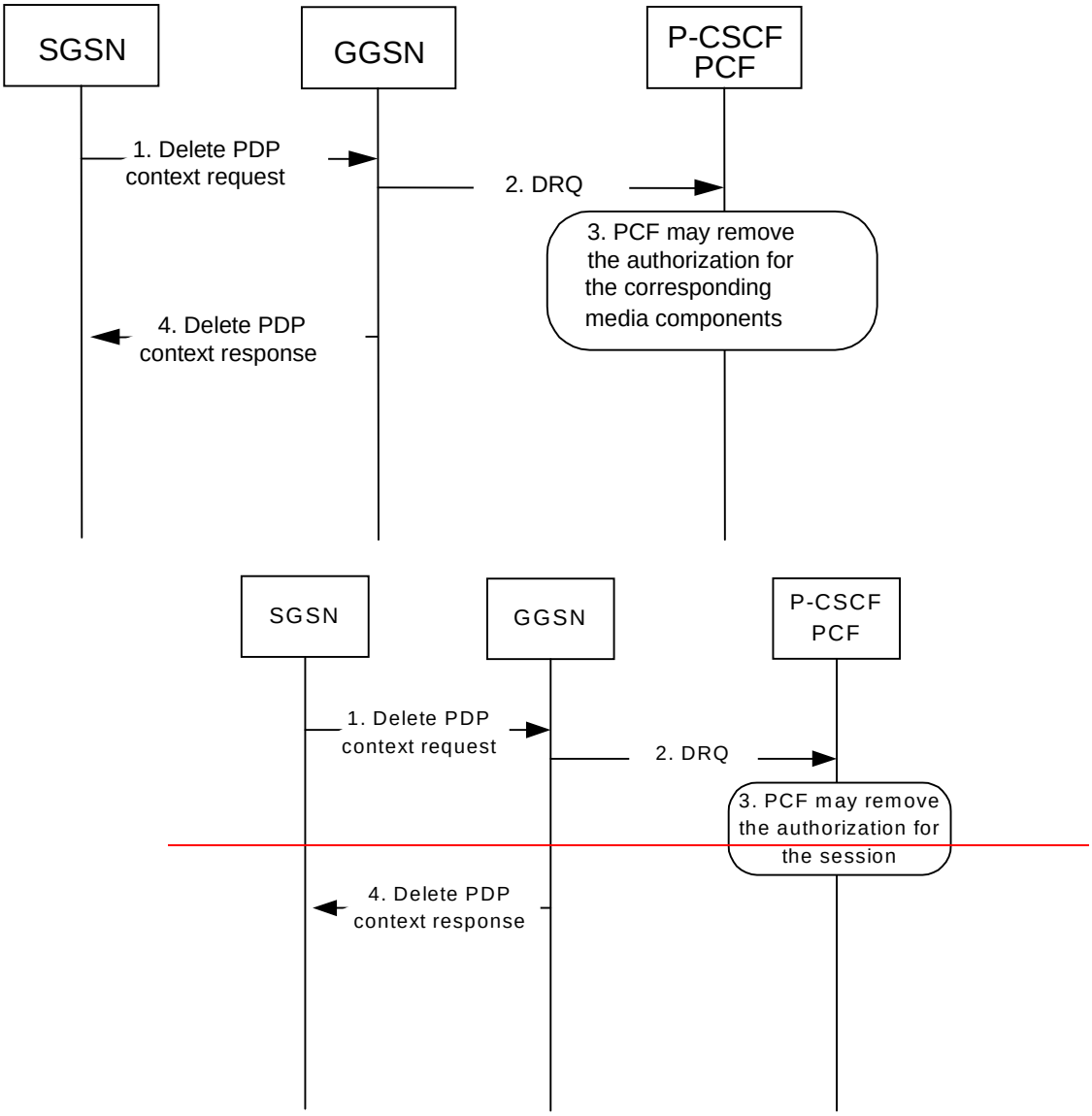
Figure 6.3.1: Revoke authorization for GPRS and IP resources - Mobile initiated session release / Network initiated session release to both Mobile Originating (MO) and Mobile termination side

Next amended section

6.4 Indication of PDP Context Release

The "Indication of PDP Context Release" procedure is used upon the release of a PDP Context that was established based on authorisation from the PCF ~~in e.g. accidental/malicious removal of a PDP Context that is related to an IMS session~~.

The following figure presents the "Indication of PDP Context Release" to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.

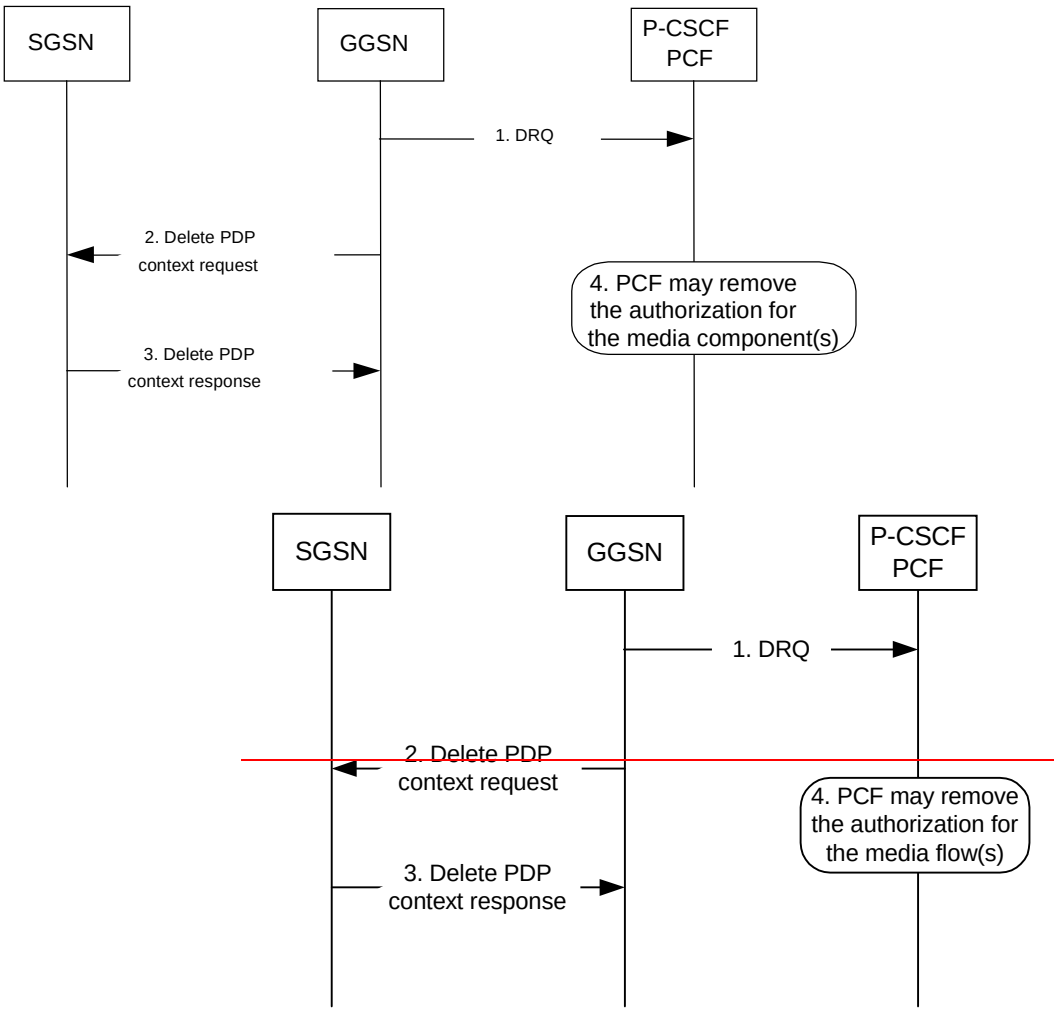


1. SGSN deactivates the PDP context ~~related to~~ carrying the media ~~flow~~ component(s) by sending the Delete PDP Context Request message to the GGSN.
2. GGSN sends a COPS DRQ message to the P-CSCF(PCF).
3. P-CSCF(PCF) receives the COPS DRQ message and PCF may remove the authorization ~~for~~ for the media component(s) with the ~~session~~ client handle corresponding to that PDP context.
4. GGSN sends the Delete PDP Context Response message to the SGSN to acknowledge the PDP context deletion.

NOTE: Step 4 may also occur at the same time or before Step 3.

Figure 6.4.1: Indication of PDP Context Release to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

The following figure presents the case when the GGSN initiates the release of a PDP context, i.e. after an error condition has been detected in GGSN.



1. GGSN sends a COPS DRQ message to the P-CSCF(PCF).
2. GGSN deactivates the PDP context related to the media ~~flow~~component(s) by sending the Delete PDP Context Request message to the SGSN.
3. SGSN sends the Delete PDP Context Response message to the GGSN to acknowledge the PDP context deletion.
4. P-CSCF(PCF) receives the COPS DRQ message and PCF may remove the authorization for the media ~~flow~~component(s) authorized for this ~~PDP context~~ client handle.

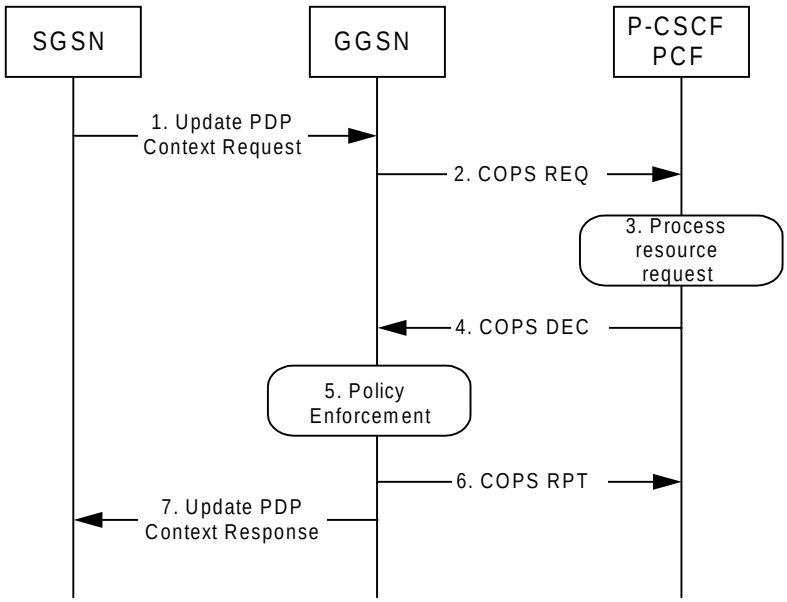
NOTE: Step 4 may also occur at the same time or before Step 2 and Step 3.

Figure 6.4.2: Indication of GGSN-initiated PDP Context Release to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

6.5.1 Authorization of PDP Context Modification

The figure 6.5.1 presents the "Modification of PDP Context" procedure to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side when the UMTS QoS which were authorized at PDP context activation (or last modification) has been changed by UE.



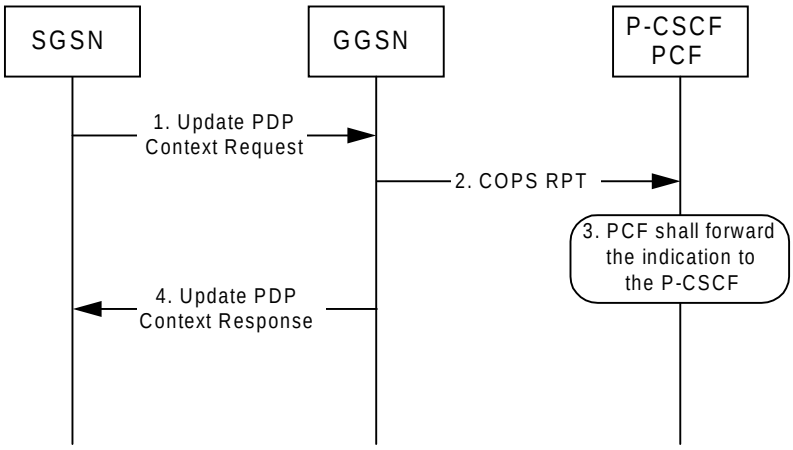
1. A request to modify the PDP context related to the media ~~flow~~ component(s), of which at least one may have been modified or removed, is indicated by sending the Update PDP Context Request message to the GGSN with the changed UMTS QoS parameters.
2. If the GGSN supports a Local Policy Decision Point(LPDP), it can consult the local policy decision stored in the LPDP before sending the COPS REQ message to the PCF. In case the requested QoS is within the already authorized QoS and the binding information is not changed, the GGSN does not need to send an authorization request to the PCF and proceeds to step 5. Otherwise, the GGSN sends a COPS REQ message to the PCF.
3. The PCF receives the COPS REQ message and performs an authorization decision according to the requested modification.
4. The decision taken by the PCF is returned via the COPS DEC message. The DEC message includes the policy information to be used by the GGSN in order to perform the policy-based admission control.
5. The GGSN enforces the policy decision based on the authorization information cached on the GGSN LPDP or received from the PCF for the media ~~flow~~component(s) carried by the PDP context.
6. The GGSN sends COPS RPT message back to the PCF and reports its success or failure in carrying out the PCF decision and notifies state changes if any.
7. The Update PDP Context Response message is sent to the SGSN to acknowledge the PDP context modification.

Figure 6.5.1: Authorization of PDP Context Modification to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

6.5.2 Indication of PDP Context Modification

The figure 6.5.2 presents the "Indication of PDP Context Modification" procedure to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side when the maximum bit rate (downlink and uplink) for the PDP context is modified to and from 0 kbit/s.



1. SGSN modifies the PDP context related to the media ~~flow~~component(s) by sending the Update PDP Context Request message to the GGSN.
2. GGSN sends a COPS RPT message to the PCF notifying the PDP context modification.
3. PCF receives the COPS RPT message and forwards the indication to the P-CSCF.
4. GGSN sends the Update PDP Context Response message to the SGSN to acknowledge the PDP context modification.

NOTE: Step 4 may also occur at the same time or before Step 3.

Figure 6.5.2: Indication of PDP Context Modification to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

Next amended section

7.1 QoS parameter mapping between IMS and GPRS

Within the IM sub-system, session establishment and modification involves an end-to-end message-exchange using SIP/SDP with negotiation of media attributes (e.g. Codecs) as defined in 3GPP TS 24.229 [3] and 3GPP TS 24.228 [2]. The P-CSCF shall forward the relevant SDP information to the PCF together with an indication of the originator. The PCF notes and authorises the chosen media components and their attributes by mapping from SDP parameters to Authorized IP QoS parameters for transfer to the GGSN via the Go interface. The GGSN will map from the Authorized IP QoS parameters to the Authorized UMTS QoS parameters. The SIP/SDP message will also have been passed on to the UE, where the UE will perform its own mapping from the SDP parameters and application demands to some UMTS QoS Parameters in order to populate the requested QoS field within the PDP context activation or modification. ~~If the SDP parameters are received in an IMS context t~~The UE should also derive the Authorized UMTS QoS parameters ~~take the mapping~~ from the SDP parameters. ~~to the Authorized UMTS QoS parameters into consideration.~~ If the UE contains an IP BS manager IP QoS parameters are also generated. Upon receiving the PDP context activation or modification, the GGSN shall compare the UMTS QoS parameters against the Authorized UMTS QoS parameters. If the request lies within the limits authorised by the PCF, the PDP context activation or modification shall be accepted.

Figure 7.1 indicates the network entities where QoS mapping functionality is required. This mapping is performed by:

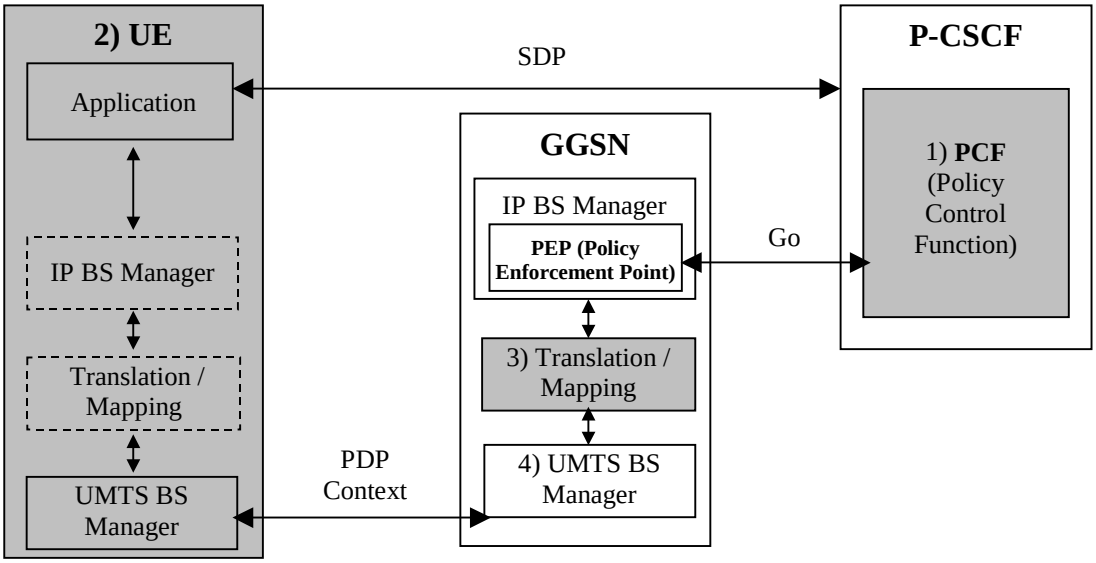
1. The PCF maps from the SDP parameters determined from the SIP signalling to the Authorized IP QoS parameters that shall be passed to the GGSN via the Go interface. The mapping is performed for each IP flow of each media component. Upon a request from the GGSN, the PCF combines per direction the individual Authorised IP QoS parameters of the IP flows that are identified by the binding information (see clause 7.1.1).

2. The UE maps from the SDP parameters to IP QoS parameters (if an IP BS manager is present) and to UMTS QoS parameters. This mapping is performed for each IP flow of each media component. The IP and UMTS QoS parameters should be generated according to application demands and recommendations for conversational [6] or streaming applications [5] (see clause 7.2.1). The mapping rules for the authorised QoS parameters should be taken into consideration because they define the maximum values for the different requested bit rates and traffic classes (see clause 7.2.2). In case the UE multiplexes several IP flows onto the same PDP context, it has to combine their IP and UMTS QoS parameters. If an IP BS manager is present, the Translation/Mapping function maps the IP QoS parameters to the corresponding UMTS QoS parameters.

3 The GGSN maps from the Authorized IP QoS parameters received from PCF to the Authorized UMTS QoS parameters (see clause 7.1.2).

4 The GGSN compares then the UMTS QoS parameters of the PDP context against the Authorized UMTS QoS parameters (see clause 7.1.3).

The mapping that takes place in the UE and the network shall be compatible in order to ensure that the GGSN will be able to correctly authorise the session.



NOTE 1: SDP parameters to Authorized IP QoS parameters mapping.
NOTE 2: SDP parameters to (IP QoS parameters and) UMTS QoS parameters mapping.
NOTE 3: Authorized IP QoS parameters to Authorized UMTS QoS parameters mapping.
NOTE 4: UMTS QoS parameters with Authorized UMTS QoS parameters comparison.

Figure 7.1: Framework for QoS mapping between IMS and GPRS

Next amended section

7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PCF

The QoS authorization is to be based on the parameters Maximum Authorized DiffServ ~~PHB~~ Class and Maximum Authorized Data Rate UL/DL.

The PCF shall use the mapping rules in table 7.1.1.1 to derive the Authorized IP QoS parameters Maximum Authorized Data Rate DL/UL and the Maximum Authorized DiffServ ~~PHB~~Class from the SDP Parameters. In case of forking, the additional rule in section 7.3 shall apply.

Table 7.1.1.1: Rules for derivation of the Maximum Authorized Data Rates and Maximum Authorized DiffServ ~~PHB~~Class per media ~~flow~~ component in the PCF

Authorized IP QoS Parameter per media ~~flow~~ component	Derivation from SDP Parameters

Maximum Authorized Data Rate DL (Max_DR_DL) and UL (Max_DR_UL) per media ~~flow~~component (see note 1)	IF a=recvonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction:= downlink;
	ELSE /* mobile teminated */
	Direction:= uplink;
	ENDIF;
	ELSE
	IF a=sendonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction: = uplink;
	ELSE /* mobile teminated */
	Direction:= downlink;
	ENDIF;
	ELSE /*sendrecv or no direction attribute*/
	Direction:=both;
	ENDIF;
	ENDIF;
	
	IF b=AS:<bandwidth> is present THEN
	IF Direction=downlink THEN
	IF <transport>=”RTP/AVP” then
	Max_DR_UL:=0.025 * <bandwidth>;
	Max_DR_DL:=1.025 * <bandwidth>;
	ELSE
	Max_DR_UL:=0;
	Max_DR_DL:=<bandwidth>;
	ENDIF;
	ELSE
	IF Direction=uplink THEN
	IF <transport>=”RTP/AVP” then
	Max_DR_UL:= 1.025 * <bandwidth>;
	Max_DR_DL:=0.025 * <bandwidth>;
	ELSE
	Max_DR_UL:=<bandwidth>;
	Max_DR_DL:=0;
	ENDIF;
	ELSE /*Direction=both*/
	Max_DR_UL:= 1.025 * <bandwidth>;
	Max_DR_DL:= 1.025 * <bandwidth>;
	ENDIF;
	ENDIF;
	ELSE
	bw:= as set by the operator;
	IF Direction=downlink THEN
	Max_DR_UL:=0;
	Max_DR_DL:=bw;
	ELSE
	IF Direction=uplink THEN
	Max_DR_UL:=bw;
	Max_DR_DL:=0;
	ELSE /*Direction=both*/
	Max_DR_UL:=bw;
	Max_DR_DL:=bw;
	ENDIF;
	ENDIF;
	ENDIF;

Maximum Authorized DiffServ ~~PHB~~Class [MaxClass] per media ~~flow~~component (see note 2)	CASE <media> OF “audio”: MaxClass:=EF; /*conversational*/ ~~–~~“video”: _MaxClass:=EF; ~~–~~/*conversational*/ “application”: _MaxClass:=EF; /*conversational*/ “data”: MaxClass:=AF1; /*interactive with priority 3*/ “control”: MaxClass:=AF3 /*interactive with priority 1*/ /*new media type*/ OTHERWISE: MaxClass:=BE; /*background*/ END;
NOTE 1: For a RTP media ~~flow~~ component the Maximum Authorized ~~Bandwidth~~ Data Rates DL/UL are the sum of the Maximum Authorized Data Rates ~~RTP flow~~ DL/UL for the RTP media streams and the associated RTCP IP flows DL/UL. NOTE 2: The Maximum Authorized ~~Traffic~~ DiffServ Class for a RTCP IP flow is the same as for the corresponding RTP ~~flow~~ media stream.	

Editor’s note: Further clarification is required if the SDP b=AS:<bandwidth> parameter includes the bandwidth for RTCP.

The PCF shall per ongoing session store the Authorized IP QoS parameters per media ~~flow~~component.

When the GGSN requests the Authorized UMTS QoS parameters for an activated/modified PDP Context carrying one or more media ~~flow~~component(s) ~~(eventually with associated RTCP signalling)~~, the PCF shall use the rules in table 7.1.1.2 to calculate the Authorized IP QoS parameters.

Table 7.1.1.2: Rules for calculating the Maximum Authorized Data Rates and Maximum Authorized Diffserv ~~PHB~~Class ~~Parameters~~ per ~~Binding Information~~ Client Handle in the PCF

Authorized IP QoS Parameter per ~~Binding~~Client Handle	Calculation Rule

Maximum Authorized Data Rate DL and UL per ~~Binding Information~~Client Handle	Maximum Authorized Data Rate DL/UL per ~~Binding Information~~ Client Handle is the sum of all Maximum Authorized Data Rate DL/UL per media ~~flow~~ component for all the media ~~flow~~components ~~identified by the Binding Information~~ associated with that Client Handle.
	
	IF Maximum Authorized Data Rate DL/UL per ~~Binding Information~~ Client Handle > 2047 kbps THEN
	Maximum Authorized Data Rate DL/UL per ~~Binding Information~~ Client Handle = 2047 kbps /* See 3GPP TS 23.107~~ref~~ [8] */
	
	END;

Maximum Authorized Diffserv ~~PHB~~Class per ~~Binding Information~~Client Handle	Maximum Authorized Diffserv ~~PHB~~Class per ~~Binding Information~~ Client Handle = MAX [Maximum Authorized Diffserv ~~PHB~~Class per ~~media flow~~ Client Handle among all the media ~~flow~~components ~~identified by the Binding Information~~ associated with that Client Handle. (The MAX function ranks the possible Maximum Authorized Diffserv ~~PHB~~Class values as follows: "EF" > "AF4" > "AF3" > “AF2” > “AF1” > "BE") /* See 3GPP TS 29.207 [7]) */

Next amended section

7.1.2 Authorized IP QoS parameters to Authorized UMTS QoS parameters mapping in GGSN

The Translation/Mapping function in the GGSN shall derive the Authorized UMTS QoS parameters from the Authorized IP QoS parameters received from the PCF according to the rules in table 7.1.2.

Table 7.1.2: Rules for derivation of the Authorized UMTS QoS Parameters per PDP context from the Authorized IP QoS Parameters per Client Handle in GGSN

Authorized UMTS QoS Parameter per PDP context	Derivation from Authorized IP QoS Parameters
Maximum Authorized Bandwidth DL and UL per PDP context	Maximum Authorized Bandwidth DL/UL per PDP context = Maximum Authorized Data Rate DL/UL per Client Handle.
Maximum Authorized Traffic Class per PDP context	IF Maximum Authorized DiffSserv PHBClass = "EF" THEN Maximum Authorized Traffic Class = "Conversational" ELSEIF Maximum Authorized DiffSserv PHBClass = "AF4" THEN Maximum Authorized Traffic Class = "Streaming" ELSEIF Maximum Authorized DiffSserv PHBClass = "AF3" THEN Maximum Authorized Traffic Class = "Interactive" ELSEIF Maximum Authorized DiffServ Class = "AF2" THEN Maximum Authorized Traffic Class = "Interactive" ELSEIF Maximum Authorized DiffServ Class = "AF1" THEN Maximum Authorized Traffic Class = "Interactive" ELSE Maximum Authorized Traffic Class = "Background" ENDIF ;

Next amended section

7.1.3 Comparing UMTS QoS Parameters against the Authorized UMTS QoS parameters in GGSN

Upon receiving a PDP context activation containing binding information, the GGSN requests the Authorized QoS information from the PCF, and ~~might~~ may request the Authorized UMTS information if a PDP context containing binding information is modified (see [7] for details). The GGSN compares the requested UMTS QoS parameters against the corresponding Authorized UMTS QoS parameters received via the translation/mapping function. If all the requested parameters lie within the limits, the PDP context activation or modification shall be accepted. I.e. the following criteria shall be fulfilled:

- the requested Guaranteed Bitrate DL/UL (if the requested Traffic Class is Conversational or Streaming) or Maximum Bitrate DL/UL (if the requested Traffic Class is Interactive or Background) is less than or equal to Maximum Authorized data rate DL/UL and
- the requested Traffic Class is less than or equal to Maximum Authorized Traffic Class.

If any of the requested parameters do not lie within their respective limit, the GGSN shall downgrade the requested UMTS QoS parameters.

Next amended section

7.2 QoS parameter mapping in the UE

Figure 7.2 indicates the entities participating in the generation of the requested QoS parameters when activate or modify a PDP Context in the UE. The steps are:

1. The Application provides the UMTS BS Manager, possibly via the IP BS Manager and the Translation/Mapping function, with relevant information to perform step 2 or step 4. (Not subject to standardization within 3GPP).

2. If needed, information from step 1 is used to access a proper set of UMTS QoS Parameters. See 3GPP TS 26.236 [6] for Conversational Codec Applications and 3GPP TS 26.234 [5] for Streaming Codec Applications.

3. If SDP is ~~present~~ available then the SDP Parameters ~~might~~ should give guidance for the UMTS BS Manager (possibly via the IP Manager and the Translation/Mapping function) ,according to the rules in clause 7.2.1, to set the Maximum Bitrate UL/DL~~,~~ and the Guaranteed Bitrate UL/DL ~~and the Maximum SDU Size~~. ~~The Application deliver extracted SDP information, possibly via the IP BS Manager, to the Translation/Mapping function. The Translation/Mapping function finally derives the UMTS QoS parameters according to the rules in clause 7.2.1.~~ Furthermore if the SDP Parameters are received in an IMS context ~~it is recommended that~~ the Maximum Authorized Bandwidth UL ~~and~~/ DL and Maximum Authorised Traffic Class ~~are~~ should be derived according to the rules in clause 7.2.2.

4. A set of UMTS QoS Parameters values from step 2 (or directly from step 1) is ~~eventually~~ possibly merged together with the Maximum Bitrate UL/DL~~,~~ and the Guaranteed Bitrate UL/DL ~~and the Maximum SDU Size~~ from step 3. The result should constitute~~s a recommendation of~~ the requested UMTS QoS Parameters. If the PDP Context is activated or modified in an IMS context ~~it is recommended that~~ the UE should check~~s~~ that the ~~actual~~ requested Guaranteed Bitrate UL/DL or requested Maximum Bitrate UL/DL (depending on the requested Traffic Class) ~~are not greater than~~ does not exceed the Maximum Authorized Bandwidth UL/DL derived in step 3. Furthermore, if the UE has implemented the mapping rule for Maximum Authorized Traffic Class, as defined in clause 7.2.2, ~~it is also recommended that~~ the UE should check that the requested Traffic Class ~~is~~ does not ~~greater than~~ exceed the Maximum Authorised Traffic Class derived in step 3.

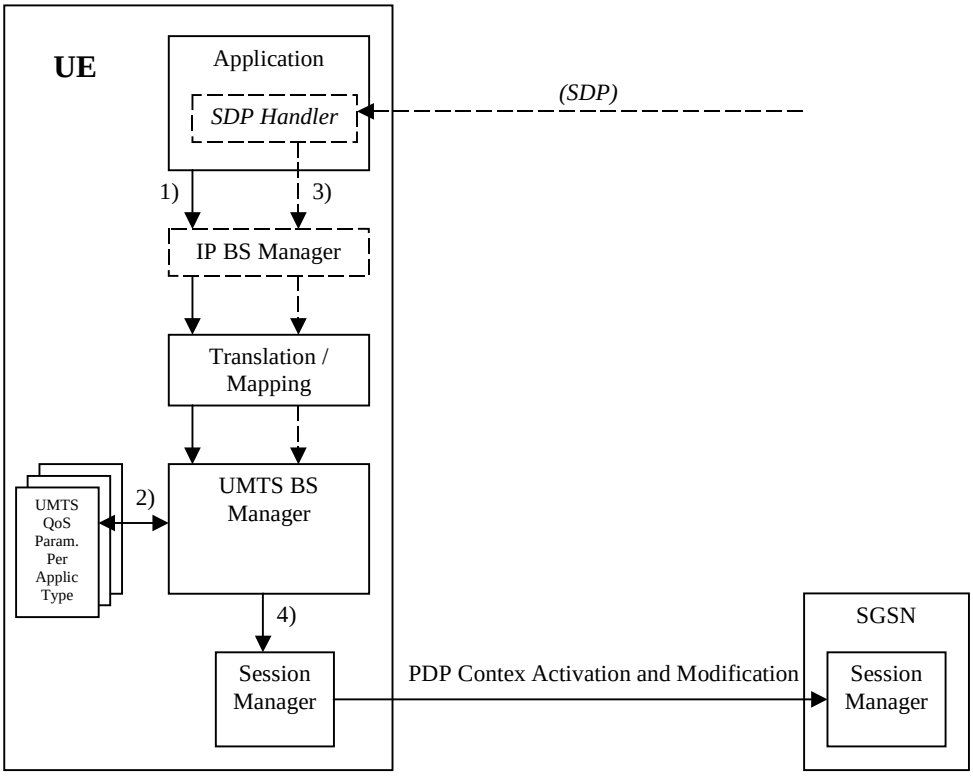


Figure 7.2: Framework for generating requested QoS parameters in the UE

Next amended section ###DAB###

7.2.1 SDP to UMTS QoS parameter mapping in UE

If SDP Parameters are available, then before activating or modifying a PDP Context the UE should check if the SDP Parameters give guidance for setting the requested UMTS QoS Parameters. The UE ~~is recommended to~~ should use the mapping rule~~s~~ in table 7.2.1 to derive the Maximum and Guaranteed Bitrate DL/UL ~~and Maximum SDU Size~~ from the SDP Parameters.

Table 7.2.1: Recommended rule for derivation of the requested Maximum and Guaranteed Bitrate DL/UL ~~and the requested Maximum SDU Size~~ per media component in the UE

UMTS QoS Parameter per media component	Derivation from SDP Parameters

Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component	/* Check if the media use codec(s) */
	IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN
	
	/* Check if Streaming */
	IF a= ("sendonly" or "recvonly") THEN
	Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified in reference [5] ;
	/* Conversational as default !*/
	ELSE
	Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified in reference [6] ;
	ENDIF ;
	
	/* Check for presence of bandwidth attribute for each media component ~~*~~/
	ELSEIF b=AS:<bandwidth~~-value~~> is present THEN
	~~Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL = "bandwidth-value" ;~~
	~~ELSE~~
	IF media stream only downlink THEN
	Maximum Bitrate DL = Guaranteed Bitrate DL =<bandwidth>;
	ELSEIF mediastream only uplink THEN
	Maximum Bitrate UL = Guaranteed Bitrate UL =<bandwidth>;
	ELSEIF mediastreams both downlink and uplink THEN
	Maximum Bitrate DL = Guaranteed Bitrate DL =<bandwidth>;
	Maximum Bitrate UL = Guaranteed Bitrate UL =<bandwidth>;
	ENDIF;
	ELSE
	
	/* SDP do not give any guidance ! */
	Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified by the UE manufacturer;
	ENDIF ;

~~**Maximum SDU size**~~	~~/* Check if the media use codec(s) */~~ ~~IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN~~ ~~/* Check if Streaming */~~ ~~IF a= ("sendonly" or "recvonly") THEN~~ ~~Maximum SDU Size as specified in reference [5] ;~~ ~~/* Conversational as default !*/~~ ~~ELSE~~ ~~Maximum SDU Size as specified in reference [6] ;~~ ~~ENDIF ;~~ ~~ELSE~~ ~~Maximum SDU Size as specified by the UE manufacturer ;~~ ~~ENDIF ;~~

Next amended section

7.2.2 SDP parameters to Authorized UMTS QoS parameters mapping in UE

If the PDP Context is activated or modified in an IMS context then ~~it is recommended that~~ the UE should use~~s~~ the mapping rules in table 7.2.2.1 to derive the Maximum Authorized Bandwidth UL/DL per media component.

Table 7.2.2.1 also has a mapping rule for derivation of Maximum Authorized Traffic Class per media component. In future releases this mapping rule may change. For ~~the reason of future compatibility, the~~ release 5 this mapping rule is optional for the UE.

~~In the case this mapping rule is implemented then it is recommended that the UE use the mapping rule in table 7.2.2.1 to derive the Maximum Authorised Traffic Class from the SDP Parameters.~~

When the maximum authorized ~~-~~QoS for a media ~~flow~~ component in forked responses is derived, the additional rule in section 7.3 shall apply.

Table 7.2.2.1: Rules for derivation of the Maximum Authorized Bandwidth DL/UL and the Maximum Authorized Traffic Class per media ~~flow~~ component in the UE

Authorized UMTS QoS Parameter per media ~~flow~~component	Derivation from SDP Parameters

Maximum Authorized Bandwidth DL (Max_BW_DL) and UL (Max_BW_UL) per media ~~flow~~component	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	IF a=recvonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction:= downlink;
	ELSE /* mobile teminated */
	Direction:= uplink;
	ENDIF;
	ELSE;
	IF a=sendonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction: = uplink;
	ELSE /* mobile teminated */
	Direction:= downlink;
	ENDIF;
	ELSE /*sendrecv or no direction attribute*/
	Direction:=both;
	ENDIF;
	ENDIF;
	
	IF b=AS:<bandwidth> is present THEN
	IF Direction=downlink THEN
	IF <transport>=”RTP/AVP” then
	Max_BW_UL:=0.025 * <bandwidth>;
	Max_BW_DL:=1.025 * <bandwidth>;
	ELSE
	Max_BW_UL:=0;
	Max_BW_DL:=<bandwidth>;
	ENDIF;
	ELSE
	IF Direction=uplink THEN
	IF <transport>=”RTP/AVP” then
	Max_BW_UL:= 1.025 * <bandwidth>;
	Max_BW_DL:=0.025 * <bandwidth>;
	ELSE
	Max_BW_UL:=<bandwidth>;
	Max_BW_DL:=0;
	ENDIF;
	ELSE /*Direction=both*/
	Max_BW_UL:= 1.025 * <bandwidth>;
	Max_BW_DL:= 1.025 * <bandwidth>;
	ENDIF;
	ENDIF;
	ELSE
	bw:= as set by the UE manufacturer;
	IF Direction=downlink THEN
	Max_BW_UL:=0;
	Max_BW_DL:= bw;
	ELSE
	IF Direction=uplink THEN
	Max_BW_UL:= bw;
	Max_BW_DL:=0;
	ELSE /*Direction=both*/
	Max_BW_UL:= bw;
	Max_BW_DL:= bw;
	ENDIF;
	ENDIF;
	ENDIF;
	
	ELSE
	No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class [MaxTrafficClass] per media ~~flow~~component	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	CASE <media> OF
	“audio”: MaxTrafficClass:=conversational;
	“video”: MaxTrafficClass:=conversational;
	“application”: MaxTrafficClass:=conversational;
	“data”: MaxTrafficClass:=interactive with priority 3;
	“control”: MaxTrafficClass:=interactive with priority 1;
	/*new media type*/
	OTHERWISE: MaxTrafficClass:=background;
	END;
	ELSE
	No authorization is done ;
	ENDIF ;

Editor’s note: Further clarification is required if the SDP b=AS:<bandwidth> parameter includes the bandwidth for RTCP.

~~It is recommended that t~~The UE should per ongoing session store the Authorized UMTS QoS parameters per media ~~flow~~component.

~~Furthermore it is recommended that the UE checks that the requested UMTS QoS parameters Traffic Class and Maximum Bitrate UL/DL not exceeds the values of the corresponding Authorized UMTS QoS parameters (calculated according to the rules in table 7.2.2.2) before activating/modifying a PDP Context. See section 7.1.3 for recommended criteria to be fulfilled.~~

Before activate or modify a PDP context the UE should check that the requested Guaranteed Bitrate UL/DL (if the Traffic Class is Conversational or Streaming) or the requested Maximum Bitrate UL/DL (if the Traffic Class is Interactive or Background) does not exceed the Maximum Authorized Bandwidth UL/DL per PDP context (calculated according to the rule in table 7.2.2.2). Furthermore, if the rule in table 7.2.2.1 for calculating Traffic Class per media component is implemented, the UE should check that the requested UMTS QoS parameter Traffic Class does not exceed the Maximum Authorized Traffic Class per PDP context (calculated according to the rule in table 7.2.2.2).

~~The table 7.2.2.1 defines mapping rules to determine the Maximum Authorized Traffic Class. This table does not specify how to determine the UMTS QoS parameter traffic class.~~

Table 7.2.2.2: Rules for calculating the Maximum Authorized Bandwidths and Maximum Authorized Traffic Class ~~Parameters~~ per PDP Context in the UE

Authorized UMTS QoS Parameter per PDP Context	Calculation Rule

Maximum Authorized Bandwidth DL and UL per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	Maximum Authorized Bandwidth DL/UL per PDP Context is the sum of all Maximum Authorized Bandwidth DL/UL per media ~~flow~~ component for all the media ~~flows~~ components to be carried by the PDP Context ;
	
	IF Maximum Authorized Bandwidth DL/UL per PDP Context > 2047 kbps THEN
	Maximum Authorized Bandwidth DL/UL per PDP Context = 2047 kbps /* See ref [8] */
	END;
	
	ELSE
	No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	Maximum Authorised Traffic Class per PDP Context = MAX [Maximum Authorised Traffic Class per media ~~flow~~ component among all the media ~~flows~~ component to be carried by the PDP Context] ;
	
	ELSE
	No authorization is done ;
	ENDIF ;
	
	(The MAX function ranks the possible Maximum Authorised Traffic Class values as follows: Conversational > Streaming > Interactive > Background)

Next amended section

7.3 Support for forking

For an initiated session the UE and the PCF may receive several forked responses, ref. 3GPP TS 29.207 [7]. The various forked responses may have different QoS requirements for the same media ~~flow~~component. In the case of forked responses, the maximum authorized QoS for a media ~~flow~~ component shall be equal to the highest QoS requested for that media ~~flow~~ component by any of the active forked responses. This applies both to the UE and to the PCF.