3GPP TSG-CN Meeting #26 **NP-040555**
8th – 10th December 2004. Athens, Greece.

Source: **TSG CN WG3**

Title: **CRs to Rel-5 on Work Item "End-to-End QoS"**

Agenda item: **8.5**

Document for: **APPROVAL**

Introduction:

This document contains 5 CRs to Rel-6 on Work Item "QoS1" that have been agreed by TSG CN WG3, and are forwarded to TSG CN Plenary for approval.

WG_tdoc	Spec	CR	R	Cat	Title	Rel	C_Ver	Work Item
N3-040814	29.208	077	1	F	Authorize QoS resources with no generation of authorization token at session modification	Rel-5	5.8.0	E2EQoS
N3-040815	29.208	081	1	F	Removal of QoS commit for session modification	Rel-5	5.8.0	E2EQoS
N3-040893	29.208	082	3	A	Removal of QoS commit for session modification	Rel-6	6.1.0	E2EQoS
N3-040864	29.208	089	1	F	Modification of PDP contexts	Rel-5	5.8.0	E2EQoS
N3-040865	29.208	090	1	A	Modification of PDP contexts	Rel-6	6.1.0	E2EQoS

3GPP TSG–CN3 Meeting #34
Seoul, Korea, 15th to 19th November 2004

***Tdoc* ⌘N3-040814**

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **077** ⌘**rev** **1** ⌘ Current version: **5.8.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Authorize QoS resources with no generation of authorization token at session modification
Source:	⌘	Orange
Work item code:	⌘	E2EQOS
Date:	⌘	19/11/2004
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: ⌘ **It is an essential correction.**

Currently, the "Authorize QoS resources" procedure applies at session establishment or session modification. In case the session is modified, there is no need to send an authorization token to the UE because one is already affected for the session.

As stated in TS 29.207

Section 4.3.2.1: Generation of authorisation token:

"During the session set-up the PDF generates an authorisation token for the IMS session."

Section 4.3.2.3:

"The authorisation token is applied by the PDF to identify the IMS session."

Summary of change: ⌘ In section 4 detailing the 'Authorize QoS resources" procedure, the authorization token is generated only in case the 'Authorize QoS resources' procedure is performed at session establishment.

Consequences if not approved: ⌘ Inconsistency with TS 29.207

Several authorization tokens coexist for a same session, breaking the rule that one token is used for one session.

Clauses affected:	⌘	4			
Other specs affected:	⌘	Y / N		⌘	
			X Other core specifications		
			X Test specifications		
			X O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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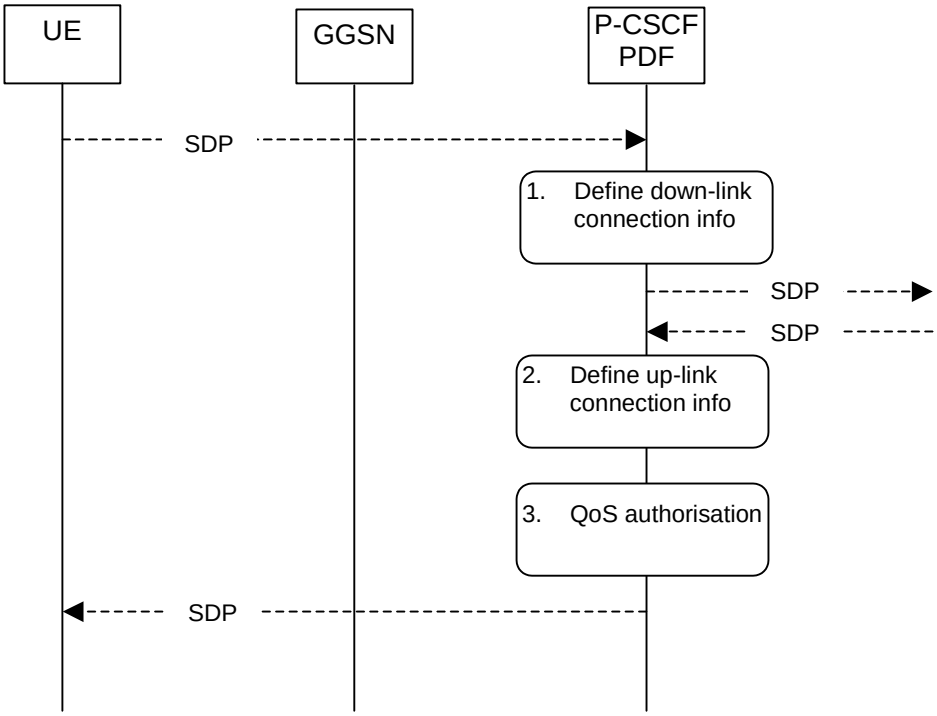
3)With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause co

*** FIRST MODIFICATION ***

4 Authorize QoS resources

4.1 Authorize QoS resources at originating PDF

This clause covers the Authorize QoS resources procedure at the originating PDF at IMS session establishement and modification.

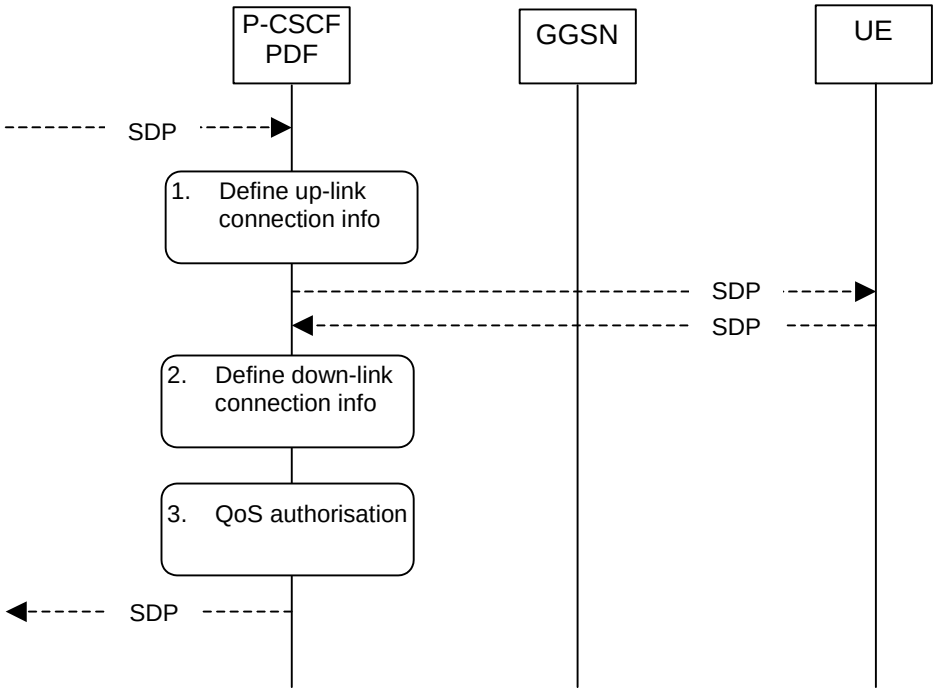


1. The P-CSCF(PDF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the down link IP flow(s), port numbers to be used etc…).
2. The P-CSCF(PDF) gets the negotiated SDP parameters from the terminating side through SIP signalling interaction.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

Figure 4.1: Authorize QoS resources at originating PDF

4.2 Authorize QoS resources at terminating PDF

This clause covers the Authorize QoS resources procedure at the terminating PDF at IMS session establishement and modification.



1. The P-CSCF(PDF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the up-link IP flow(s), port numbers to be used etc…). ~~In case~~If the 'Authorize QoS resources' procedure is performed at session establishment, a~~A~~n authorization token is generated by the PDF and sent to the UE.
2. The P-CSCF(PDF) receives the negotiated SDP parameters from the UE. The P-CSCF(PDF) identifies the connection information needed (IP address of the down-link IP flow(s), port numbers to be used etc…).
3. The P-CSCF(PDF) uses the SDP parameters in order to define the QoS resource authorisation. The PDF authorises every IP flow of a 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 PDF

*** END OF MODIFICATION ***

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CHANGE REQUEST

⌘ **29.208** **CR** **090** ⌘**rev** **1** ⌘ Current version: **6.1.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Modification of PDP contexts
Source:	⌘	Orange
Work item code:	⌘	E2EQOS
Date:	⌘	19/11/2004
Category:	⌘	**A**
Release:	⌘	REL-6

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)*
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R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change: ⌘ **It is an essential correction.**

The GGSN may receive a "Update PDP context request" from the SGSN whatever the modification is requested by the UE or the network (SGSN, RAN…). The GGSN is not able to detect whether the request is initiated by the UE.

In particular, the RNC can request the modification of PDP context e.g. due to a break of the radio connection or due to user inactivity. In that case, if the PDP context is using streaming or conversational traffic class, the PDP context is preserved, but the maximum bit rate is downgraded to 0 kbit/s (for both uplink and downlink) when the associated RAB is released. The SGSN sends an Update PDP Context Request message to the GGSN to set the maximum bit rate to 0 kbit/s in the GGSN.

The treatment between the GGSN and PDF in the 'Modification of PDP context release' procedure should cover all cases.

Summary of change: ⌘ In 'Modification of PDP context' QoS procedures,

- "Indication of PDP context modification" is requested by the SGSN for a streaming or conversational PDP context modified to or from 0 kbit/s.
- "Authorization of PDP context modification" applies in all other cases, i.e. not only on UE request.

Consequences if ⌘ Conditions for triggering of "Authorization of PDP context modification" and

not approved:	"Indication of PDP context modification" are not completely specified.

Clauses affected:	⌘	6.5			
Other specs affected:	⌘	Y / N	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 co

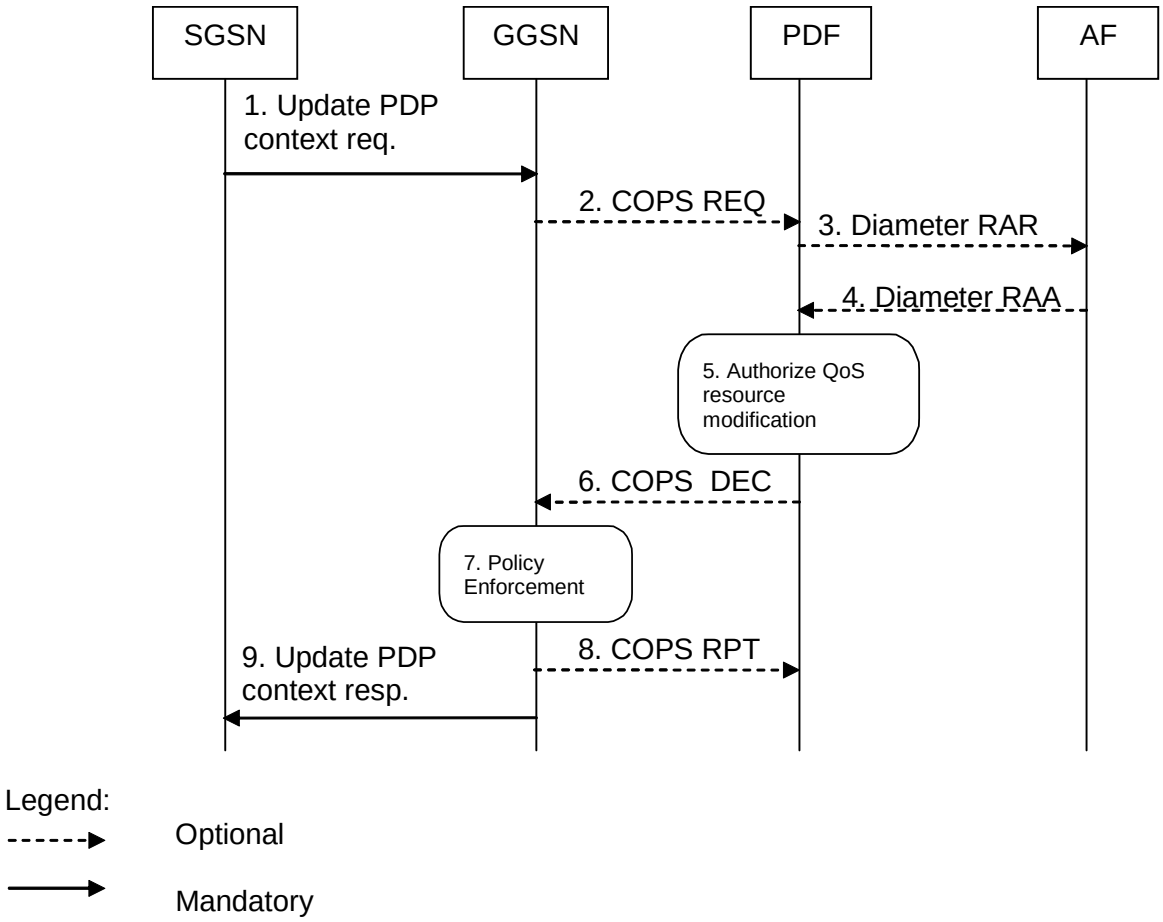
*** FIRST MODIFICATION ***

6.5 Modification of PDP Context

The "Modification of PDP Context" procedure is used when a PDP Context is modified such that the requested QoS falls outside of the limits that were authorized at PDP context activation (or last modification) or such that the maximum bit rate (downlink and uplink) is downgraded to 0 kbit/s. In these cases, the GGSN communicates with the PDF as described below.

6.5.1 Authorization of PDP Context Modification

Figure 6.5.1 presents the "Modification of PDP Context" when the UMTS QoS which were authorized at PDP context activation (or last modification) has been changed ~~by UE~~.

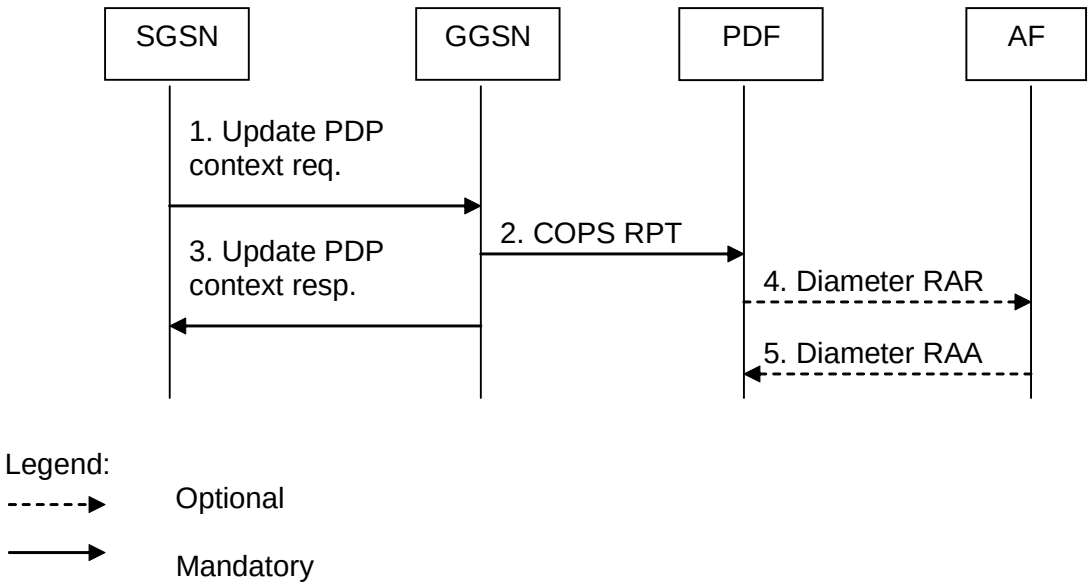


1. A request to modify the PDP context carrying the IP flows of media component(s), of which at least one may have been modified or removed, is indicated by sending the Update PDP Context Request message to the GGSN with the changed UMTS QoS parameters.
2. If the GGSN supports a Local Policy Decision Point(LPDP), it can consult the local policy decision stored in the LPDP before sending the COPS REQ message to the PDF. 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 PDF and proceeds to step 7. Otherwise, the GGSN sends a COPS REQ message to the PDF.
3. If the PDF receives the COPS REQ message, it performs an authorization decision according to the requested modification. If the AF has instructed earlier that the PDF needs to contact the AF in bearer modification, the PDF sends a re-authorization request to the AF.
4. If step 3 happens, the AF responds to the re-authorisation request.
5. If the PDF has received a COPS REQ message in step 2, the PDF performs the authorization decision.
6. If the PDF has received a COPS REQ message in step 2, the decision taken by the PDF 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. The GGSN enforces the policy decision based on the authorization information cached on the GGSN LPDP or received from the PDF for the IP flows of media component(s) carried by the PDP context.
8. If step 6 has happened, the GGSN sends COPS RPT message back to the PDF and reports its success or failure in carrying out the PDF decision and notifies state changes if any.
9. 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

6.5.2 Indication of PDP Context Modification

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. The SGSN modifies the streaming or conversational PDP context carrying the IP flows of media component(s) to or from 0 kbits/s by sending the Update PDP Context Request message to the GGSN.
2. The GGSN sends a COPS RPT message to the PDF notifying the PDP context modification.
3. The GGSN sends the Update PDP Context Response message to the SGSN to acknowledge the PDP context modification.
4. If the AF has instructed the PDF earlier that the PDF needs to contact the AF when the bandwidth of the PDP context is modified to 0 kbit/s, the PDF sends a re-authorization request to the AF.
5. If step 4 happens, the AF sends a re-authorisation answer back to the PDF. If the PDP context is modified to 0 kbit/s, the authorization may be kept or removed depending on operator's policies.

Figure 6.5.2: Indication of PDP Context Modification

*** END OF MODIFICATION ***

3GPP TSG–CN3 Meeting #34
Seoul, Korea, 15th to 19th November 2004

***Tdoc* ⌘N3-040864**

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CHANGE REQUEST

⌘ **29.208** **CR** **089** ⌘**rev** **1** ⌘ Current version: **5.8.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Modification of PDP contexts
Source:	⌘	Orange
Work item code:	⌘	E2EQOS
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
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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: ⌘ **It is an essential correction.**

The GGSN may receive an "Update PDP context request" from the SGSN whatever the modification is requested by the UE or the network (SGSN, RAN…). The GGSN is not able to detect whether the request is initiated by the UE.

In particular, the RNC can request the modification of PDP context e.g. due to a break of the radio connection or due to user inactivity. In that case, if the PDP context is using streaming or conversational traffic class, the PDP context is preserved, but the maximum bit rate is downgraded to 0 kbit/s (for both uplink and downlink) when the associated RAB is released. The SGSN sends an Update PDP Context Request message to the GGSN to set the maximum bit rate to 0 kbit/s in the GGSN.

The treatment between the GGSN and PDF in the 'Modification of PDP context release' procedure should cover all cases (and not only when coming from the UE).

Summary of change: ⌘ In 'Modification of PDP context' QoS procedures,

- "Indication of PDP context modification" is requested by the SGSN for a streaming or conversational PDP context modified to or from 0 kbit/s.
- "Authorization of PDP context modification" applies in all other cases, i.e. not only on UE request.

Consequences if not approved:	⌘	Conditions for triggering of "Authorization of PDP context modification" and "Indication of PDP context modification" are not completely specified.

Clauses affected:	⌘	6.5			
Other specs affected:	⌘	Y / N		⌘	
		N: X	Other core specifications		
		N: X	Test specifications		
		N: X	O&M Specifications		
Other comments:	⌘	Mirror CR in R6			

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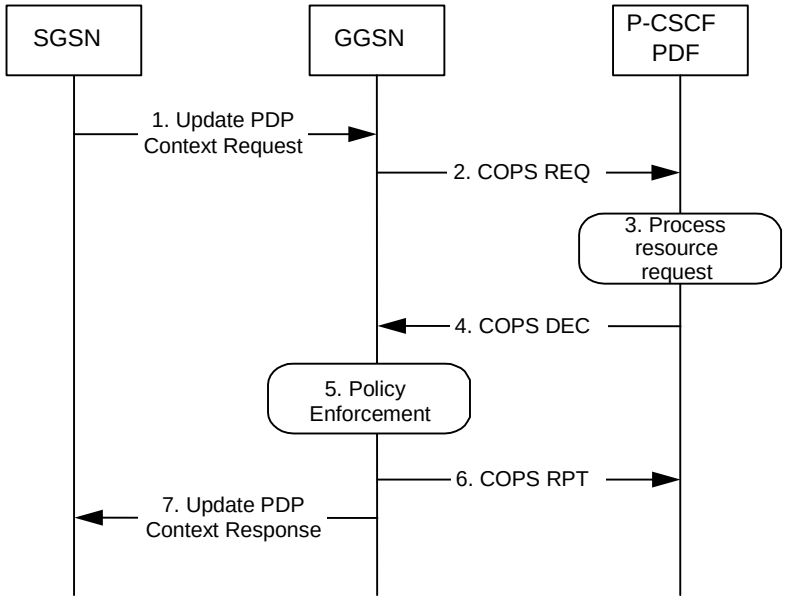
*** FIRST MODIFICATION ***

6.5 Modification of PDP Context

The "Modification of PDP Context" procedure is used when a PDP Context is modified such that the requested QoS falls outside of the limits that were authorized at PDP context activation (or last modification) or such that the maximum bit rate (downlink and uplink) is downgraded to 0 kbit/s. In these cases, the GGSN communicates with the PDF as described below.

6.5.1 Authorization of PDP Context Modification

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~~.

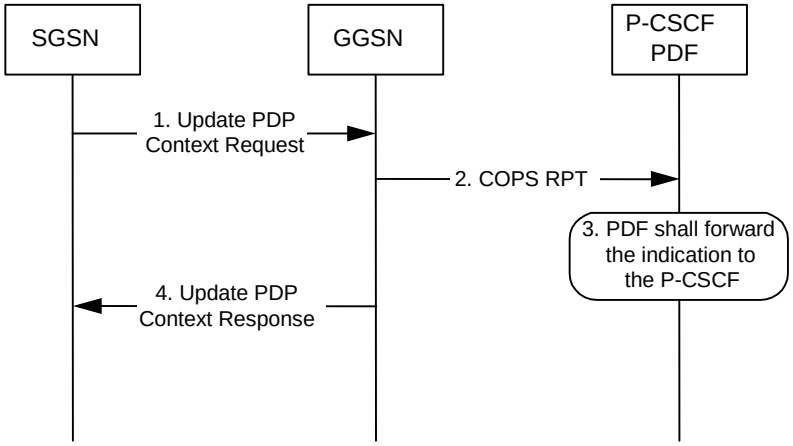


1. A request to modify the PDP context carrying the IP flows of media component(s), of which at least one may have been modified or removed, is indicated by sending the Update PDP Context Request message to the GGSN with the changed UMTS QoS parameters.
2. If the GGSN supports a Local Policy Decision Point(LPDP), it can consult the local policy decision stored in the LPDP before sending the COPS REQ message to the PDF. 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 PDF and proceeds to step 5. Otherwise, the GGSN sends a COPS REQ message to the PDF.
3. The PDF receives the COPS REQ message and performs an authorization decision according to the requested modification.
4. The decision taken by the PDF 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 PDF for the IP flows of media component(s) carried by the PDP context.
6. The GGSN sends COPS RPT message back to the PDF and reports its success or failure in carrying out the PDF 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

6.5.2 Indication of PDP Context Modification

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 streaming or conversational PDP context carrying the IP flows of media component(s) to or from 0 kbit/s by sending the Update PDP Context Request message to the GGSN.
2. GGSN sends a COPS RPT message to the PDF notifying the PDP context modification.
3. PDF receives the COPS RPT message and forwards the indication to the P-CSCF.
   At this point the authorization may be kept or removed depending on operators policies.
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

*** END OF MODIFICATION ***

3GPP TSG–CN3 Meeting #34
Seoul, Korea, 15th to 19th November 2004

***Tdoc* ⌘N3-040815**

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **081** ⌘**rev** **1** ⌘ Current version: **5.8.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Removal of QoS commit for session modification
Source:	⌘	Orange
Work item code:	⌘	E2EQOS
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
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R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change: ⌘ **It is an essential correction.**

Currently, the "Removal of QoS commit" applies for session modification at media on hold (section 6.2.1) or media removal (section 6.2.2). The role of the procedure is to command the closing of the gate at the GGSN.

For media put on hold, the procedure "occurs whenever a bidirectional media is made unidirectional" and "media is placed on hold as specified in RFC 3264".

As stated in RFC 3264 about offer/answer model for SDP (section 8.4)

If a party in a call wants to put the other party "on hold", i.e., request that it temporarily stops sending one or more unicast media streams, a party offers the other an updated SDP.
If the stream to be placed on hold was previously a **sendrecv** media stream, it is placed on hold by marking it as **sendonly**. If the stream to be placed on hold was previously a **recvonly** media stream, it is placed on hold by marking it **inactive**.
This means that **a stream is placed "on hold" separately in each direction**. Each stream is placed "on hold" independently. The recipient of an offer for a stream on-hold SHOULD NOT automatically return an answer with the corresponding stream on hold.

"Removal of QoS commit" should apply when a media is changed to inactive or to unidirectional, including the case when a media is put in hold as specified in RFC 3264.

Summary of change:	⌘	In 'Removal of QoS commit' procedure, conditions for triggering are given.
Consequences if not approved:	⌘	Conditions for triggering are not completely specified for session modification.

Clauses affected:	⌘	6.2			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	Mirror CR in R6			

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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 co

*** FIRST MODIFICATION ***

6.2 Removal of QoS commit

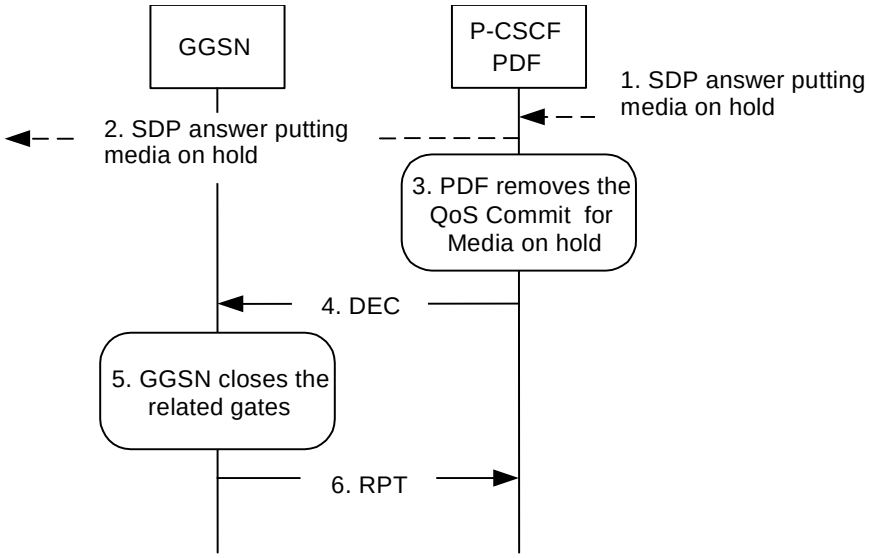
The "Removal of QoS commit" procedure is used e.g. when media IP flow(s) of a session is put on hold. (e.g. in case of a media re-negotiation or call hold). The PDF decision of "Removal of QoS commit" shall be sent as a separate decision to the GGSN corresponding to the previous "Authorize QoS Resources" request.

6.2.1 Removal of QoS commit at Media on Hold

Media is placed on hold as specified in RFC 3264 [11]. Media modified to become inactive (SDP direction attribute) shall also be considered to be put on hold.

If a bidirectional media component is placed on hold by making it unidirectional, the QoS Commit shall only be removed in the deactivated direction. If a media component is placed on hold by making it inactive, the QoS Commit shall be removed in both directions.

Figure 6.2.1 presents the "Removal of QoS commit" procedure at media on hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



1. P-CSCF receives an SDP answer putting media on hold within a SIP message. (NOTE 1)
2. P-CSCF forwards an SDP answer putting media on hold within a SIP message.
3. PDF removes the QoS commit for the media on hold.
4. PDF sends COPS DEC message(s) to the GGSN to close the relevant media IP flow gate(s),leaving the possible related RTCP gate(s) open to keep the connection alive.
5. GGSN receives the COPS DEC message(s) and closes the requested gate(s).
6. GGSN sends COPS RPT message(s) back to the PDF.

NOTE 1: This procedure occurs whenever a bidirectional media is made unidirectional or when a media is changed to inactive.

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

*** END OF MODIFICATION ***

3GPP TSG–CN3 Meeting #34
Seoul, Korea, 15th to 19th November 2004

***Tdoc* ⌘N3-040893**

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **082** ⌘**rev** **3** ⌘ Current version: **6.1.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Removal of QoS commit for session modification
Source:	⌘	Orange
Work item code:	⌘	E2EQOS
Date:	⌘	19/11/2004
Category:	⌘	**A**
Release:	⌘	REL-6

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: ⌘ **It is an essential correction.**

Currently, the "Removal of QoS commit" applies for session modification at media hold on (section B.4.1) or media removal (section B.4.2). The role of the procedure is to command the closing of the gate at the GGSN.

As stated in RFC 3264 about offer/answer model for SDP (section 8.4)

If a party in a call wants to put the other party "on hold", i.e., request that it temporarily stops sending one or more unicast media streams, a party offers the other an updated SDP.
If the stream to be placed on hold was previously a **sendrecv** media stream, it is placed on hold by marking it as **sendonly**. If the stream to be placed on hold was previously a **recvonly** media stream, it is placed on hold by marking it **inactive**.
This means that **a stream is placed "on hold" separately in each direction**. Each stream is placed "on hold" independently. The recipient of an offer for a stream on-hold SHOULD NOT automatically return an answer with the corresponding stream on hold.

"Removal of QoS commit" should apply when a media is changed to inactive and should also include the case the case when a media is put in hold as specified in RFC 3264.

Summary of change: ⌘ In 'Removal of QoS commit' procedure in sections B.4 and 6.2, conditions for

	triggering are given.
Consequences if not approved: ⌘	Conditions for triggering are not completely specified for session modification.

Clauses affected:	⌘	B4			
Other specs affected:	⌘	Y / N		⌘	
		N: X	Other core specifications		
		N: X	Test specifications		
		N: X	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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 co

*** FIRST MODIFICATION ***

B.4 Removal of QoS commit

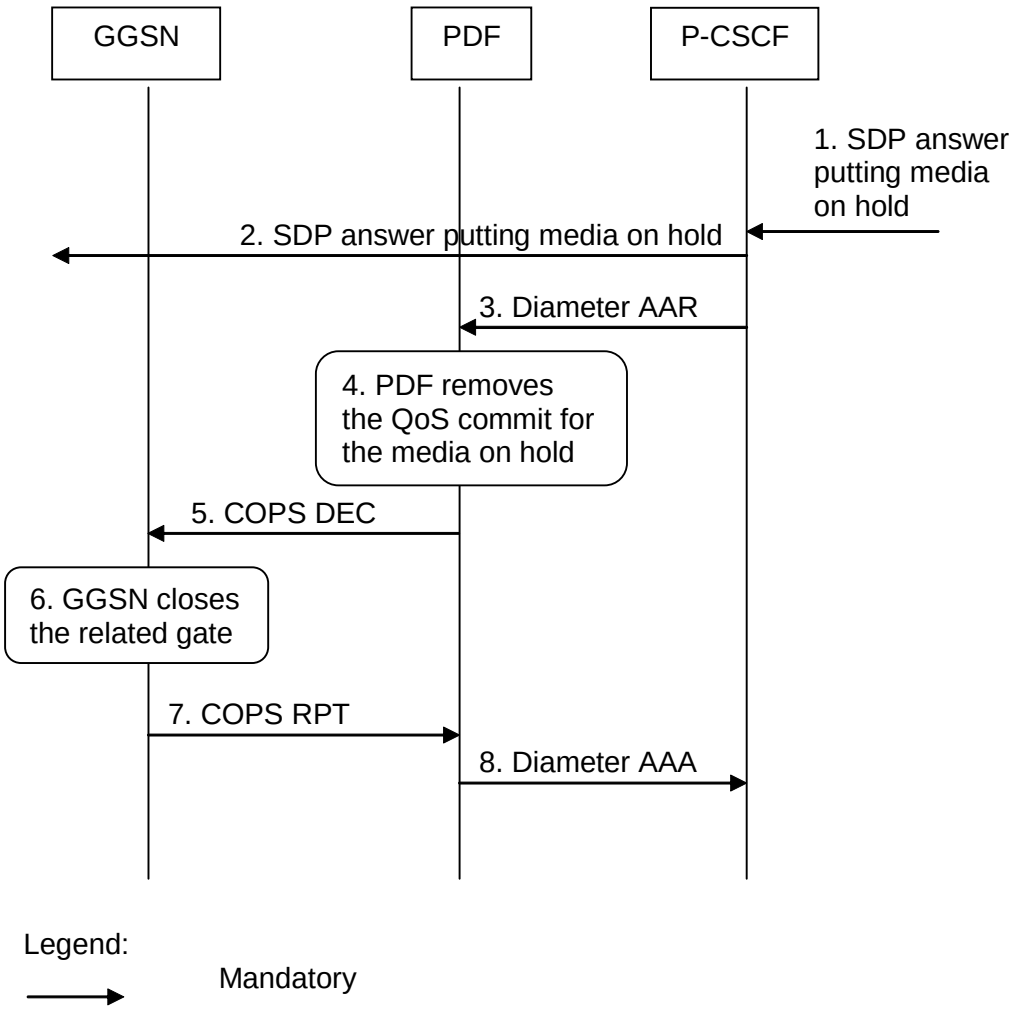
The "Removal of QoS commit" procedure is used e.g. when a session is released and the related IP flows are removed from a PDP context that multiplexes IP flows from several sessions, or when media IP flow(s) of a session are put on hold (e.g. in case of a media re-negotiation or call hold). The PDF decision of "Removal of QoS commit" shall be sent as a separate decision to the GGSN corresponding to the previous "Authorize QoS Resources" request.

B.4.1 Removal of QoS commit at Media on Hold

Media is placed on hold as specified in RFC 3264 [11]. Media modified to become inactive (SDP direction attribute) shall also be considered to be put on hold.

If a bidirectional media component is placed on hold by making it unidirectional, the QoS Commit shall only be removed in the deactivated direction. If a media component is placed on hold by making it inactive, the QoS Commit shall be removed in both directions.

Figure B.4.1.1 presents the "Removal of QoS commit" procedure at media on hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



1. The P-CSCF receives an SDP answer putting media on hold within a SIP message. (NOTE 1)
2. The P-CSCF forwards the SDP answer putting media on hold within a SIP message.
3. The P-CSCF sends a Diameter AAR request to the PDF, requesting that gates shall be closed.
4. The PDF removes the QoS commit for the media on hold.
5. The PDF sends the COPS DEC message(s) to the GGSN to close the relevant media IP flow gate(s),leaving the possible related RTCP gate(s) open to keep the connection alive.
6. The GGSN receives the COPS DEC message(s) and closes the requested gate(s).
7. The GGSN sends the COPS RPT message(s) back to the PDF.
8. The PDF sends a Diameter AAA message back to the P-CSCF.

NOTE 1: This procedure occurs whenever a bidirectional media is made unidirectional or when a media is changed to inactive.

Figure B.4.1.1: Removal of QoS commit at Media on Hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

*** END OF MODIFICATION ***