3GPP TSG CN Plenary Meeting #21 **NP-030332**
17th - 19th September 2003. Frankfurt, Germany.

Source: TSG CN WG3

Title: CRs on Rel-5 Work Item E2EQoS.

Agenda item: 8.5

Document for: APPROVAL

Introduction:

This document contains **3** CRs on **Rel-5 Work Item E2EQoS,** including the corresponding mirror CRs (as required).

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

WG_tdoc	Title	Spec	CR	Rev	Cat	Rel	C_Ver
N3-030619	Correcting concept description from media level to IP level	27.060	086	2	F	Rel-5	5.4.0
N3-030620	Correcting concept description from media level to IP level	29.207	101	2	F	Rel-5	5.4.0
N3-030623	Correcting concept description from media level to IP level	29.208	039	2	F	Rel-5	5.4.0

3GPP TSG-CN WG3 Meeting #29 ***N3-030619***
Sophia Antipolis, France. 25th - 29th August 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **27.060** **CR** **086** ⌘ **rev** **2** ⌘ Current version: **5.4.0** ⌘

*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:	⌘	Correcting concept description from media level to IP level
Source:	⌘	TSG_CN WG3 [Ericsson]
Work item code:	⌘	E2eQoS
Date:	⌘	24/08/2003
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:	⌘	As explained in the related CRs 101 to 29.207 and CR 039 to 29.208 the description perspective have been corrected from the 'media component'-level to the 'IP flow'-level. This means that the rules for deriving the Maximum Authorized QoS are now changed so that the parameters are derived per flow identifier instead of per media component.
Summary of change:	⌘	Correcting that the rules for deriving the Maximum Authorized QoS parameters are derived per flow identifier instead of per media component.
Consequences if not approved:	⌘	The description of the SBLP concept will be difficult to understand and in some cases even incorrect which might cause erroneous implementations.

Clauses affected:	⌘	13.7

Other specs affected: ⌘	Y	N		⌘
	X		Other core specifications	CR 101 to 29.207 and CR 039 to 29.208.
		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.
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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 containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of modification

13.7 Authorization of QoS Attributes

When the PDP context is activated or modified the MS can check that the values of some requested QoS attributes, e.g. Guaranteed or Maximum Bitrate uplink and downlink, do not exceed the values of the corresponding Maximum Authorized QoS attributes, e.g. Maximum Authorized Bandwidth uplink and downlink. The values of the Maximum Authorized QoS attributes are derived from the SDP parameters of the IMS media components identified. The rules for deriving the Maximum Authorized QoS attributes per flow identifier ~~IMS media component~~ and per PDP context are specified in 3GPP TS 29.208 [53].

End of modification

3GPP TSG-CN WG3 Meeting #29 ***N3-030620***
Sophia Antipolis, France. 25th - 29th August 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **29.207** **CR** **101** ⌘ **rev** **2** ⌘ Current version: **5.4.0** ⌘

*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:	⌘	Correcting concept description from media level to IP level	
Source:	⌘	TSG_CN WG3 [Ericsson]	
Work item code:	⌘	E2eQoS	***Date:*** ⌘ 24/08/2003
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),*
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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: ⌘ At many places in this specification functions and operations are described at the "media level", that is the level where all the IP flows as described by a media component are packed together. However, some functions and operations are better described at lower levels with other descriptors and with other subjects. Examples of such lower levels and their subjects are the 'IP flow' level where the subject is the IP flow itself and described by its definition and the 'flow identifier' level where the subject is IP flows packed together as described by its flow identifier.

At all these levels the atom is the IP flow. At the IP level the IP flow alone is the subject and the subjects at the other two levels are IP flows packed together in different ways. Therefore it is important to define the term 'IP flow'.

As a consequece of this correction, i.e. use the IP flow as the 'atom', we now have the right term to describe functions and operations of the SBLP concept at all levels of complexity. From the "IP flow"-level" where operations are performed on the IP flow itself (e.g. the gate function) via the "flow identity"-level (e.g. mapping IP flows on PDP context) up to the "media component"-level (e.g. grouping and charging). Although, for instance, authorizations are done for IP flow(s) the other two levels are needed to descibe dynamics and restriction for that function in IMS R5.

Summary of change: ⌘
1. Correction of the definition of the term 'media component'.
2. Adding the definition of the term 'IP flow'.
3. The term 'media component' has been changed to 'IP flows of a media component' in a number of places for a correct description.

Consequences if ⌘ The description of the SBLP concept will be difficult to understand and in some

not approved:	cases even incorrect which might cause erroneous implementations.

Clauses affected:	⌘	3.1, 4.1, 4.3.1.1, 4.3.1.1.1, 4.3.1.5, 4.3.2.1, 4.3.2.3, 5.1.1, 5.1.2, 5.1.4, 5.2.1.1, 5.2.1.3, 5.2.1.4 and 6.3.2.			
Other specs affected:	⌘	**Y** / **N** **X** /	Other core specifications	⌘	CR 086 to 27.060 and CR 039 to 29.208.
		/ **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 the change request.

Start of first modification

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply:

Authorization Token: consist of the IMS session identifier and the PDF identifier. It is used for authorizing the QoS for the media stream(s). The UE shall include an authorization token in order to obtain QoS authorization for the IMS session. The UE obtains this authorization token via SIP from the P-CSCF by means of an extension SIP header described in RFC 3313 [22]. The P-CSCF communicates with the PDF in order to obtain a suitable authorization token for the UE.

Client Handle: an object in the COPS messages used as a unique number to correlate all the COPS messages with the same dialogue. Over the Go interface the Client Handle is used to correlate COPS messages with respect to the same PDP Context. For the exact definition see RFC 2748 [7] and RFC 3084 [8].

Common Open Policy Service (COPS) protocol: is a simple query and response protocol that can be used to exchange policy information between a policy server (Policy Decision Point) and its clients (Policy Enforcement Points)

Flow identifier: used for the identification of an IP flow within a media component associated with a SIP session.

EXAMPLE: A single, unidirectional media component may contain one IP flow, or two IP flows in the case of an RTP media stream. In case of a bi-directional flow, the same flow identifier is used for both directions. A flow identifier consists of two parts: 1) Media component number defined in increasing order according to the sequence of the "m=" lines in the SDP (RFC 2327 [17]), session description and 2) IP flow number defined in the order of increasing port numbers within each media component, see annex C.

Go Interface: interface between PDF and GGSN (3GPP TS 23.002 [2])

GPRS Charging ID (GCID): the Charging Id generated by the GGSN as defined in 3GPP TS 29.060 [20].

IP Bearer Service Manager: uses standard IP mechanisms to manage the IP Bearer Service. It resides in the GGSN and optionally in the UE

IP flow: a unidirectional flow of IP packets with the same source IP address and port number and the same destination IP address and port number and the same transport protocol. Port numbers are only applicable if used by the transport protocol.

Media component: is a part of an SDP session description conveying information about ~~one~~ media ~~stream~~ (e.g. media type, format, IP address, port(s), transport protocol, bandwidth, direction).

The media ~~stream~~ described by a media component can be either bi- or unidirectional. ~~A m~~Media ~~stream containing an~~ using RTP ~~flow~~ for transport may also ~~contain an~~ have associated RTCP ~~flow.~~ If so, the media component also conveys information about the associated RTCP (port and possibly bandwidth). An SDP session description can consist of more than one media component. A media component shall not be deleted nor its position changed within the SDP session description. A media component line where the port number has previously been set to 0 may be reused for a new media component.

Policy Decision Function (PDF): is a logical policy decision element that uses standard IP mechanisms to implement policy in the IP media layer
The PDF makes decisions in regard to network based IP policy using policy rules, and communicates these decisions to the PEP in the GGSN.

Proxy Call Session Control Function (P-CSCF): is a network element providing session management services (e.g. telephony call control)

Policy Enforcement Point (PEP): is a logical entity that enforces policy decisions made by the PDF. It resides in the IP BS Manager of the GGSN

Policy Information Base (PIB): is a set of policy data carried by COPS-PR
The protocol assumes a named data structure, known as a Policy Information Base (PIB), to identify the type and purpose of solicited and unsolicited policy information that is sent from the Policy Decision Point to the Policy Enforcement Point for provisioning policy or sent from the Policy Enforcement Point to the Policy Decision Point as a notification.

Provisioning Instance Identifier (PRID): uniquely identifies an instance of a PRC

QoS class: identifies a bearer service (which is associated with a set of bearer service characteristics)

Translation/mapping function: provides the inter-working between the mechanisms and parameters used within the UMTS Bearer Service and those used within the IP Bearer Service

UMTS Bearer Service Manager: handles resource reservation requests from the UE. It resides in the GGSN and the UE

Next modification

4.1 Overview

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2. Media authorisation decision from PDF:

   The media authorisation information sent by the PDF to the GGSN, contains at a minimum the following information:

   - Decision on the binding information.

   The PDF shall respond with an authorisation decision for the binding information. The authorisation decision shall identify that the binding information is validated with an ongoing SIP session. Additionally, the PDF shall verify if the IP flows of the multiple media components are correctly assigned to the PDP Context. If validated, the PDF shall also communicate the following media authorisation details to the GGSN:

   - "Authorised QoS".

     This information is used by the GGSN to authorise the media resources according to the service-based local policy and the requested bearer QoS.

     The "Authorised QoS" ~~for media components~~ signalled over the Go interface is based on the SDP requirements signalled and agreed previously within SIP signalling for this session.

     The "Authorised QoS" specifies the maximum QoS that is authorised for a PDP context for that specific binding information. In case of an aggregation of multiple media components within one PDP context, the combination of the "Authorised QoS" information of the individual IP flows of the media components is provided as the "Authorised QoS" for the bearer.

     The "Authorised QoS" contains the following information:

     - QoS class:

       The QoS class information represents the highest class that can be used for the media component. It is derived from the SDP media description. The QoS class within the "Authorized QoS" information for the bearer is determined from the QoS class values of the individual IP flows of these media components identified in the binding information.

- Data rate:

  The Data rate information is derived from the SDP bandwidth parameter. The Data rate shall include all the overhead coming from the IP-layer and the layers above, e.g. UDP and RTP. If RTP is used, then overhead coming from RTCP shall be added by the PDF. If multiple codecs are agreed to be used in a session, the authorized data rate is set according to the codec requiring the highest bandwidth, meaning that terminals may under use the authorized data rate when choosing to use another agreed codec. The Data rate within the "Authorized QoS" information for the bearer is determined from the data rate values of the individual IP flows ~~media components~~ identified in the binding information.

- Packet Classifier.

  The packet classifier for media components is based on the IP-address and port number information in the SDP and shall allow for all IP flows associated with the SDP media component description.

3. Charging correlation:

   The PDF shall send the ICID (see 3GPP TS 24.229 [14]) provided by the P-CSCF as part of the authorisation decision. The GGSN shall send the GCID (see 3GPP TS 29.060 [20]) of the PDP Context and the GGSN address to the PDF as part of the authorisation report.

4. Approval of QoS Commit / Removal of QoS Commit / Revoke Authorisation for GPRS and IP resources:

   The PDF controls media components and may revoke resources at any time. Approval of QoS Commit / Removal of QoS Commit / Revoke Authorisation for GPRS and IP resources is communicated by the PDF to the GGSN.

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Next modification

4.3.1.1 Service-based local policy enforcement point

The Policy Enforcement Point (PEP) is a logical entity which resides in the GGSN and communicates with the PDF regarding Service-based local policy (SBLP) control. Hereafter in the present document, the GGSN is assumed to contain the PEP implicitly unless otherwise stated. The GGSN sends requests to and receives decisions from the PDF. The GGSN may cache the policy decision data of the PDF decisions. This cached information may be used later for a local policy decision allowing the GGSN to make policy control decision about the QoS authorization for PDP context modifications without requiring additional interaction with the PDF in case the modification request does not exceed the previously authorized QoS.

The following policy enforcement point functionalities for SBLP in the GGSN are identified:

- Policy based Authorisation:

  The GGSN requests authorisation information from the PDF for the IP flows ~~media components~~ carried by a PDP context. The GGSN enforces the PDF decisions ~~related to the media components carried by~~for this ~~a~~ PDP context.

  The GGSN shall enforce unsolicited authorisation decisions which update the QoS and packet classifiers.

  Additionally, policy-based authorisation ensures that the resources, which can be used by the PDP context ~~each particular media component,~~ are within the "Authorised QoS" specified by the PDF. This information is mapped by the Translation/mapping function in the GGSN to give the authorised resources for GPRS bearer admission control.

  The GGSN shall also report to the PDF its success or failure in carrying out the PDF decision.

- Policy based gating functionality:

  Policy based gating functionality represent the control of the GGSN over the Gate Function in the user plane, i.e. the forwarding of IP packets associated with a media component. In the user plane, a "gate" is defined for each ~~direction~~ IP flow of a media component. The PDF provides the gate description and the commands to

open or close the gate. The gate description is received from the PDF in the authorisation decision. The command to open or close the gate shall be sent either in the authorisation decision or in subsequent decisions from the PDF.

- Indication of bearer release/modification to/from 0 kb/s:

  The GGSN shall inform the PDF when the bearer changes to or from a data rate of 0 kb/s (an indication of bearer loss/recovery), and at bearer release.

- Charging Correlation

  To ensure charging correlation, the PEP shall send the GCID and the GGSN address to the PDF. The PDF shall also send the IMS charging identifier to the GGSN.

4.3.1.1.1 QoS Information processing

The GGSN is responsible for the policy based authorisation, i.e. to ensure that the requested QoS is in-line with the "Authorized QoS".

The GGSN needs the "Authorised QoS" information of the PDP context for the uplink as well as for the downlink direction. Therefore, the "Authorized QoS" information for the combination of all IP flows of each direction associated with the media component as determined by the PDF is used.

In case of an aggregation of multiple media components within one PDP context, the "Authorised QoS" for the bearer is provided by the PDF as the combination of the "Authorised QoS" information of the individual media components.

The GGSN shall perform the proper mapping between the IP QoS information and the UMTS QoS information. This mapping is performed by the Translation/mapping function which maps the "Authorised QoS" information for the PDP context into authorised UMTS QoS information.

It is recommended that the GGSN derives the highest allowed UMTS Traffic class for the PDP context from the QoS class in the "Authorized QoS" according to table 4.3.1.1.1.

Table 4.3.1.1.1

QoS class	UMTS Traffic Class	Traffic Handling Priority
A	Conversational	N/A
B	Streaming	N/A
C	Interactive	1
D		2
E		3
F	Background	N/A
NOTE: QoS class represents the highest class that can be used for the bearer.		

The QoS class values given by the PDF are equal for both the uplink and the downlink directions.

The Data rate within the "Authorized QoS" information for the bearer is the combination of the data rate values of the "Authorised QoS" of the individual IP flows of the media components.

In the case of real-time UMTS bearers (conversational and streaming traffic classes), the GGSN shall consider, the Data rate value of the "Authorized QoS" information as the maximum value of the 'Guaranteed bitrate' UMTS QoS parameter, whereas the 'Maximum bitrate' UMTS QoS parameter is limited by the subscriber and service specific setting in the HLR/HSS (SGSN) and by the capacity/capabilities/service configuration of the network (GGSN, SGSN). In the case of non-real-time bearers (interactive and background traffic classes) the GGSN shall consider, the Data rate value of the "Authorized QoS" information as the maximum value of the 'Maximum bitrate' UMTS QoS parameter.

The UMTS BS Manager receives the authorised UMTS QoS information for the PDP context from the Translation/mapping function. If the requested QoS exceeds the authorised QoS, the UMTS BS Manager shall downgrade the requested UMTS QoS information to the authorised UMTS QoS information.

The GGSN may store the authorized QoS for the binding information of an active PDP context in order to be able to make local decisions, when the UE requests for a PDP context modification.

Next modification

4.3.1.5 Binding mechanism handling

The binding information is used by the GGSN to identify the correct PDF and subsequently request service-based local policy information from the PDF. The binding information associates a PDP context with one or more media components of an IMS session. The GGSN may receive one or more sets of the binding information during an activation or modification of a secondary PDP context. Each set of binding information consists of an authorisation token and the flow identifier(s) related to the IP flow(s) ~~of the actual media component~~within the same session~~. If there is more than one media component to be transported within the PDP context the binding information includes the flow identifier(s) for the IP flows of each of the media components.~~

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Next modification

4.3.2.1 Service-based local policy decision point

The PDF functions as a Policy Decision Point for the service-based local policy control. The PDF makes policy decisions based on session and media related information obtained from the P-CSCF. The PDF shall exchange the decision information with the GGSN via the Go interface.

The following policy decision point functionalities for SBLP are identified:

- Authorisation function:

  The PDF shall be able to provide an authorisation decision upon receiving a bearer authorisation request from the GGSN. The PDF shall authorise the request according to the stored session and media related information received from the P-CSCF.

  The PDF shall use the binding information to determine the IMS session and the set of IP flows~~media components~~. Based on the IP flows~~media components~~, the PDF shall determine the authorised QoS, packet filters, and gate status to be applied. The authorised QoS specifies the maximum allowed QoS class, and the data rate for the set of IP flows ~~media components~~ identified in the binding information.

  The PDF shall be able to provide updates to the authorisation decision at session modifications which change the QoS and packet classifiers for PDP contexts which are already established.

- Revoke function:

  The PDF may revoke the authorisation of resources at any time. Revoke Authorisation for GPRS and IP resources is communicated by the PDF to the GGSN.

- Approval of QoS Commit / Removal of QoS Commit:

  The PDF may allow or deny ~~for the media component(s)~~ the usage of the PDP context for the selected IP flow(s) by controlling the correlated gate(s).

  The "Approval of QoS Commit" command may either be part of the authorisation decision, or the PDF may provide a separate decision with the "Approval of QoS Commit" command to open the gate.

  The "Removal of QoS Commit" command may either be part of the revoke authorisation decision, or the PDF may provide a separate decision with the "Removal of QoS Commit" command to close the gate.

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Next modification

4.3.2.3 Binding mechanism handling

The binding information is used by the GGSN to identify the correct PDF and subsequently request service-based local policy information from the PDF. Each set of binding information consists of an authorisation token and one or more flow identifier(s).

During the session set-up the PDF generates an Authorisation Token for the IMS session as described in RFC 3313 [22]. The Authorisation token shall be sent to the P-CSCF which forwards it to the UE in the SIP signalling. The PDF shall allocate its PDF identifier as part of the Authorization Token. This identifier shall be in the format of a fully qualified domain name.

The PDF receives the binding information and a Client Handle as part of a REQ from the GGSN. The PDF shall store the Client Handle for each flow identifier ~~each media component~~ identified by the binding information for subsequent message exchanges.

The authorisation token is applied by the PDF to identify the IMS session. If no IMS session can be found for an authorisation token, or if the authorization token for the Client Handle has been modified, or if the PDF is otherwise unable to authorise the binding information, the PDF shall send a COPS decision message carrying both an INSTALL and REMOVE decision. The INSTALL decision shall identify an authorisation failure to the GGSN, and may include further details identifying the cause. The REMOVE decision shall subsequently remove this state from the GGSN. For an initial authorisation, the PDF shall then initiate a remove for the authorisation request.

For a valid authorisation token the flow identifier(s) is used to select the available information on the IP flows ~~media component(s)~~ of this IMS session. The PDF sends the available authorisation information ~~on the media component(s)~~ back to the GGSN. If the PDF has already communicated authorisation for the same authorisation token and flow identifier(s) to this (or another) GGSN on this IMS session, then the previous authorisation shall be revoked, and this revocation shall be communicated to the appropriate GGSN.

If the binding information consists of more than one flow identifier, the PDF shall also verify that the media components identified by the flow identifiers are allowed to be transferred in the same PDP context. If any of these media components was mandated to be carried in a separate PDP Context, the PDF shall send a COPS decision message carrying both an INSTALL and REMOVE decision. The INSTALL decision shall identify an authorisation failure to the GGSN, and may include further details identifying the cause. The REMOVE decision shall subsequently remove this state from the GGSN. For an initial authorisation, the PDF shall then initiate a remove for the authorisation request.

For a valid binding information consisting of more than one flow identifier, the information sent back to the GGSN shall include the aggregated QoS for all the IP flows and suitable ~~a~~ packet filter(s) for these ~~each~~ IP flows. ~~The~~ Each flow identifier~~s~~ within the binding information can ~~span~~ identify one or more IP flows of a single media component~~s~~.

Next modification

5.1.1 Initial authorization at PDP context activation

The GGSN may receive binding information during the activation of a secondary PDP context by the UE. To perform initial authorization at the secondary PDP context activation the GGSN shall send an authorisation request to the PDF including the binding information received from the UE.

The GGSN identifies the required PDF from the authorisation token of the binding information. The authorisation token is formatted according to the structure of the policy element AUTH_SESSION defined in RFC 3520 [11]. The policy element AUTH_SESSION shall include the AUTH_ENT_ID and the SESSION_ID attributes. The GGSN checks for that Policy Element and retrieves the AUTH_ENT_ID attribute from this. If this is in the form of a Fully Qualified Domain Name, then this is used to identify the correct PDF.

The GGSN authorisation request message to the PDF shall allow the GGSN to request policy information for authorisation of the IP flows identified by the flow identifiers within the binding information ~~media components~~ carried by a PDP context ~~identified by binding information~~.

When the GGSN receives the PDF decision ~~regarding authorisation of the media components~~, the GGSN shall enforce the policy decision. To enforce the policy decision, the GGSN shall install the packet filters received from the PDF, and ignore the UE supplied TFT.

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Next modification

5.1.2 Modification of previously authorized PDP context

The GGSN is responsible for notifying the PDF when a procedure of PDP context modification of a previously authorized PDP context is performed. A modification of a previously authorized PDP Context may occur for example when a new media component is added or when the codec ~~or media flow~~ change requires new resources. To authorise the PDP context modification the GGSN shall send an authorisation request to the PDF including the binding information received from the UE in the following cases:

- Requested QoS exceeds "Authorised QoS";
- New binding information is received.

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Next modification

5.1.4 PDP context deactivation

The GGSN is responsible for notifying the PDF when a procedure of a PDP context deactivation is performed. In case of a PDP context deactivation, the GGSN shall inform the PDF of the bearer release related to the SIP session by sending a COPS Delete Request State (DRQ) message.

When a revoke authorisation procedure~~for the set of media components on that PDP context~~ is performed, the GGSN receives a decision message from the PDF for disabling the use of the "Authorised QoS" resources and deactivation of the PDP context associated with the binding information. The GGSN shall disable the use of the "Authorized QoS" resources. The GGSN shall initiate deactivation of the PDP context ~~used for carrying these media components,~~ in case that the UE has not performed it yet.

Next modification

5.2.1.1 SBLP authorisation decision

The information needed for the PDF to perform media authorization is passed by the P-CSCF upon receiving a SIP message that contains SDP. The SDP contains sufficient information about the session, such as the end-points' IP address and port numbers and bandwidth requirements.

All media components in the SDP are authorised. The media components contain one or more IP flows each represented by a flow identifier. The definition of flow identifier is in subclause 3.1. The P-CSCF shall send policy set-up information to the PDF upon every SIP message that includes an SDP payload. This ensures that the PDF passes proper information to perform media authorization for all possible IMS session set-up scenarios. The policy set-up information provided by the P-CSCF to the PDF for each media component shall contain the following:

- Destination IP address;
- Destination port number;
- Transport Protocol id;
- Media direction information;
- Direction of the source (originating or terminating side);
- Indication of the group that the media component belongs to;
- Media type information;
- Bandwidth parameter;
- Indication of forking/non-forking.

Additionally, upon the P-CSCF receiving the ICID in SIP signalling, it shall send the ICID to the PDF.

The PDF stores the authorised policy information, and generates an Authorisation Token to identify this decision. The Authorisation Token is passed back to the P-CSCF for inclusion in the SIP signalling back to the UE.

The Authorisation Token is in the form of a Session Authorisation Data Policy Element as described in RFC 3520 [11]. The PDF shall include an AUTH_ENT_ID attribute containing the Fully Qualified Domain Name of the PDF and the SESSION_ID attribute.

Upon receiving the bearer authorization request from the GGSN, the PDF shall authorize the request according to the stored service based local policy information for the session identified by the binding information in the request.

- Decision on the binding information:
  - The authorisation shall contain the decision on verifying the binding information. The PDF shall identify whether the binding information indeed corresponds to an initiated SIP session. If the corresponding SIP session cannot be found or the binding information contains invalid flow identifier(s), or the authorization token has changed in an authorization modification request, the PDF shall enforce the rejection of this PDP context request by sending an INSTALL and REMOVE decision to the GGSN. The reason for the rejection is indicated by the INSTALL decision with the "noCorrespondingSession" reason in the Authorisation Request Failure Decision. If the PDF is otherwise unable to authorise the binding information, the INSTALL decision shall identify a general authorisation failure with the "authorisationFailure" of the request reason in the Authorisation Request Failure Decision.
  - The authorization shall also contain the decision on the list of flow identifiers contained in the bearer authorisation request sent by the GGSN representing the ~~list of~~ IP flows of the media components intended to be carried in the same PDP Context. This decision shall verify that these IP flow(s)~~media components~~ are indeed allowed to be carried in the same PDP Context. The PDF shall make this decision by comparing the list of flow identifiers contained in the bearer authorization request received from the GGSN to the media component grouping indication information received from the P-CSCF.
  - In case the UE violates the IMS level indication, and attempts to set up IP flows of multiple IMS media components in a single PDP context despite of an indication that mandated separate PDP contexts, the PDF shall enforce the rejection of this PDP context request by sending an INSTALL and REMOVE decision to the GGSN. The reason for the rejection is indicated by the INSTALL decision with the "invalidBundling" reason in the Authorisation Request Failure Decision.
  - If the binding information and the list of flow identifiers are successfully authorised (verified) as per the means described above, the PDF shall also communicate the authorisation details ~~for each media component~~ to the GGSN.
  - If the PDF has already communicated authorisation for the same authorisation token and flow identifier(s) to this (or another) GGSN, then the previous authorisation shall be revoked, and this revocation shall be communicated to the GGSN.
  - The authorisation details contain the "Authorised QoS" and the packet classifier(s) of the ~~associated~~ IP flows. In case of an aggregation of multiple media components within one PDP context, the combination of the "Authorised QoS" information of the individual IP flows of the media components is provided as the "Authorised QoS".
  - Based on the media direction information and the direction of the source provided by the P-CSCF, the PDF shall define the direction (upstream or downstream) of the "Authorised QoS" and the packet classifier(s).
- Packet classifier(s):
  - The PDF shall use the destination IP address(s), destination port number(s) and transport protocol id(s) to formulate a packet classifier(s).
  - If the source IP address, which is part of the standard 5-tuple for packet classifying, is provided by the P-CSCF in the SDP, then this shall be used. Based on operator policy the source IP address for bi-directional flows may be identified from the 64 bit prefix of the destination IP address. If the source IP address is not identified by the SDP information and not identified by the 64 bit prefix of the destination IP address then the source IP address shall be wild carded by the PDF.

- If the source port number, which is part of the standard 5-tuple for packet classifying, is not provided by the P-CSCF in the SDP then the source port number shall be wild carded by the PDF in the packet classifier.

- The PDF shall send the destination address and the destination port number for each IP flow associated with the media component.

- "Authorized QoS":

  - The "Authorised QoS" information (consisting of maximum QoS Class and Data Rate) for IP flows of a media component is extracted from the media type information and bandwidth parameter of the SDP. The PDF shall map the media type information into a QoS Class which is the highest class that can be used for the media. The PDF shall use an equal QoS Class for both the uplink and the downlink directions when both directions are used. As an example, the audio media type shall be mapped into QoS class A.

  - The PDF shall derive the Data Rate value from the "b=AS" SDP parameter. The "b=AS" parameter in the SDP shall contain all the overhead coming from the IP-layer and the layers above, e.g. UDP and RTP. If RTP is used, then overhead coming from RTCP shall be added by the PDF when determining the data rate value applicable for the media component.

  - For non-real-time bearers the Data rate value shall be considered as the maximum value of the 'Maximum bitrate' parameter.

  - In case of an aggregation of multiple media components within one PDP context, the PDF shall provide the "Authorised QoS" for the bearer as the combination of the "Authorised QoS" information of the individual IP flows of the media components. The QoS Class in the "Authorised QoS" for the bearer shall contain the highest QoS class amongst the ones applied for the individual media components IP flows and indicates the highest UMTS traffic class that can be applied to the PDP context.

  - The Data Rate of the "Authorised QoS" for the bearer shall be the sum of the Data Rate values of the individual media IP flows of components~~/IP flows~~ and it is used as the maximum Data Rate value for the PDP context.

  - The detailed rules for calculating the "Authorized QoS" are specified in 3GPP TS 29.208 [18].

The PDF may include the gate enabling command as part of the authorisation decision, for instance to enable early media. Alternatively, the PDF may provide a separate decision for opening the gate.

The PDF shall send the IMS charging identifier provided by the P-CSCF as part of the authorisation decision to the GGSN.

Upon receiving the modified SDP information from the P-CSCF, the PDF shall update the media authorization information for the session. The PDF may push this updated authorisation information to the GGSN. Under certain condition e.g. revoke of authorization, the PDF shall push the updated policy decision to the GGSN.

Next modification

5.2.1.3 SBLP revoke decision

Upon SIP session release the PDF shall send a revoke authorisation decision to the GGSN after an operator specific time. The revoke authorisation decision shall be sent for each handle (PDP context) related to the session as a separate decision to the GGSN corresponding to the previous SBLP authorisation decision.

The timer for a pending session release shall be terminated if the PDF receives an indication on the termination of all PDP context(s) related to the released session.

Additionally, when a media component which is bound to a PDP context is removed from a SIP session and the UE has not performed the corresponding modification or deactivation of the PDP context within an operator specific time the PDF shall revoke the authorisation for the set of IP flows of the media components on that PDP context.

The timer for a pending media component removal shall be terminated if the PDF receives either a new authorisation request with the same handle where the IP flows of that media component has been removed, or an indication of the termination of the PDP context.

NOTE: The values of the timers for session termination and media component removal might be different, e.g. to allow for some more time for the required modification of the PDP context.

If the PDF receives a request from a GGSN for the same authorisation token and flow identifier(s) that this (or another) GGSN was already communicated authorisation, then the previous authorisation shall be revoked, and this revocation shall be communicated to the GGSN.

Next modification

5.2.1.4 SBLP gate decision

The PDF may send a gate decision during the session set-up or whenever the status of a media component changes during the session (e.g. ~~a~~ the media IP flow(s) of a media component is put on hold~~,~~ or resumed, or a media component is removed). The PDF shall not send a gate decision to the GGSN before it has sent the initial authorisation decision. If the initial authorisation decision has already been sent, the PDF may send a gate decision to the GGSN to modify the status of one or several gate(s) on the user plane. The gate decision shall only contain the gate(s) for which the status was changed compared to the last authorisation or gate decision sent to the GGSN. The gate decision contains for each gate either the "Approval of QoS Commit" command to open the gate or the "Removal of QoS Commit" command to close the gate.

Next modification

6.3.2 Message description

>>>>>>> Skipped text <<<<<<<<

A filter specification describing more than one IP flow shall be only used in case of identical Protocol IDs, IP addresses and successive port numbers (e.g. RTP and RTCP IP flow of a media component). Furthermore, the gate status of all IP flows described by this filter specification shall be identical, too.

>>>>>>> Skipped text <<<<<<<<

A filter specification describing more than one IP flow shall be only used in case of identical Protocol IDs, IP addresses and successive port numbers (e.g. RTP and RTCP IP flow of a media component). Furthermore, the gate status of all IP flows described by this filter specification shall be identical, too.

>>>>>>> Skipped text <<<<<<<<

End of modifications

3GPP TSG-CN WG3 Meeting #29 ***N3-030623***
Sophia Antipolis, France. 25th - 29th August 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **039** ⌘ **rev** **2** ⌘ Current version: **5.4.0** ⌘

*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:	⌘	Correcting concept description from media level to IP level		
Source:	⌘	TSG_CN WG3 [Ericsson]		
Work item code:	⌘	E2eQoS	***Date:*** ⌘	24/08/2003
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: ⌘

At many places in this specification functions and operations are described at the "media level", that is the level where the IP flows as described by a media component are packed together. However, some functions and operations are better described at lower levels with other descriptors and with other subjects. Examples of such lower levels and their subjects are the 'IP flow' level where the subject is the IP flow itself and described by its definition and the 'flow identifier' level where the subject is IP flows packed together as described by its flow identifier.

At all these levels the atom is the IP flow. At the IP level the IP flow alone is the subject and the subjects at the other two levels are IP flows packed together in different ways. Therefore it is important to define the term 'IP flow'.

As a consequece of this correction, i.e. use the IP flow as the 'atom', we now have the right term to describe functions and operations of the SBLP concept at all levels of complexity. From the "IP flow"-level" where operations are performed on the IP flow itself (e.g. the gate function) via the "flow identity"-level (e.g. mapping IP flows on PDP context) up to the "media component"-level (e.g. grouping and charging). Although, for instance, authorizations are done for IP flow(s) the other two levels are needed to descibe dynamics and restriction for that function in IMS R5.

Hence, the rules for deriving the Maximum Authorized QoS in the tables 7.1.1.1 and 7.2.2.1 are now changed so that the parameters in these tables are derived for each flow identifier instead of the media component.

Summary of change: ⌘

1. The term 'media component' has been corrected to 'IP flow(s)' or 'IP flows of a media component' in a number of places for a correct description.

		2. The improper term ‘media stream’ has been corrected to ‘IP flow’ or ‘media component’ in some places for a correct description. 3. The rules for deriving the Maximum Authorized QoS in the tables 7.1.1.1 and 7.2.2.1 are now changed so that the parameters in these tables are derived for each flow identifier instead of the media component.
Consequences if not approved:	⌘	The description of the SBLP concept will be difficult to understand and in some cases even incorrect which might cause erroneous implementations.

Clauses affected:	⌘	4.2, 5, 6.1, 6.2, 6.2.2, 6.3.1, 6.4, 6.5.1, 6.5.2, 7.1, 7.1.1 and 7.2.2.			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ CR 086 to 27.060 and CR 101 to 29.207.
			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.

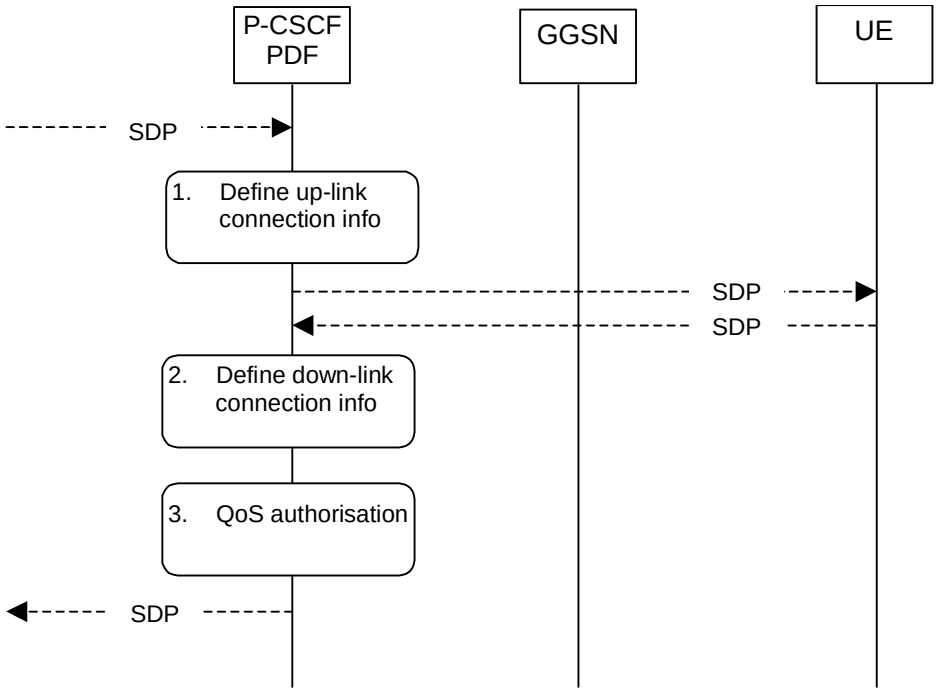
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest 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 containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of first modification

4.2 Authorize QoS resources at terminating PDF

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



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…). An 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

next modification

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 PDF.

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

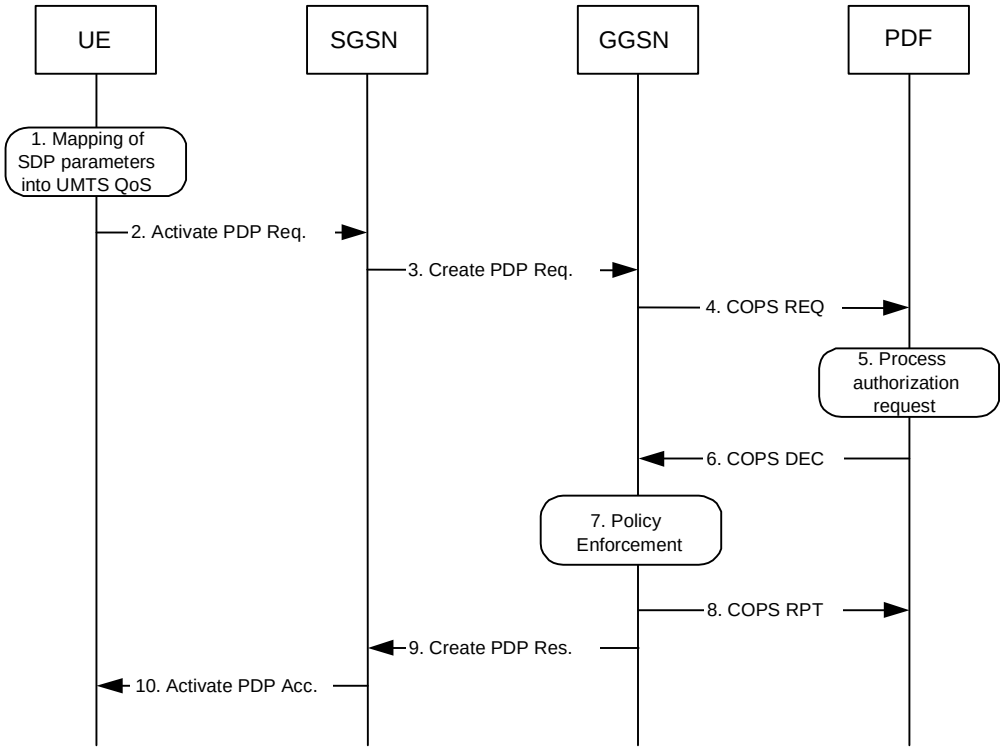


Figure 5.1: Resource reservation flow with service based local policy

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 PDF)

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

5. Process Resource Request (PDF)

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

6. COPS: DEC (PDF to GGSN)

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. Policy Enforcement (GGSN)

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

8. COPS: RPT (GGSN to PDF)

The GGSN sends COPS RPT message back to the PDF and reports its success or failure in carrying out the PDF 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 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 modification

6.1 Approval of QoS commit

Through Approval of QoS Commit the PDF makes a final decision to enable the allocated QoS resource for the authorized IP flows of the media ~~stream~~component(s) if the QoS resources are not enable at the time they are authorized by the PDF or if the ~~authorized~~ media IP flow(s) ~~stream~~ previously placed on hold ~~is~~ are resumed i.e. the media IP flow(s) of the media component~~stream~~ that was previously inactive is reactivated (with SDP direction sendrecv, sendonly, recvonly or none direction).

>>>>>>>>>> Skipped text <<<<<<<<<<<<<<

next modification

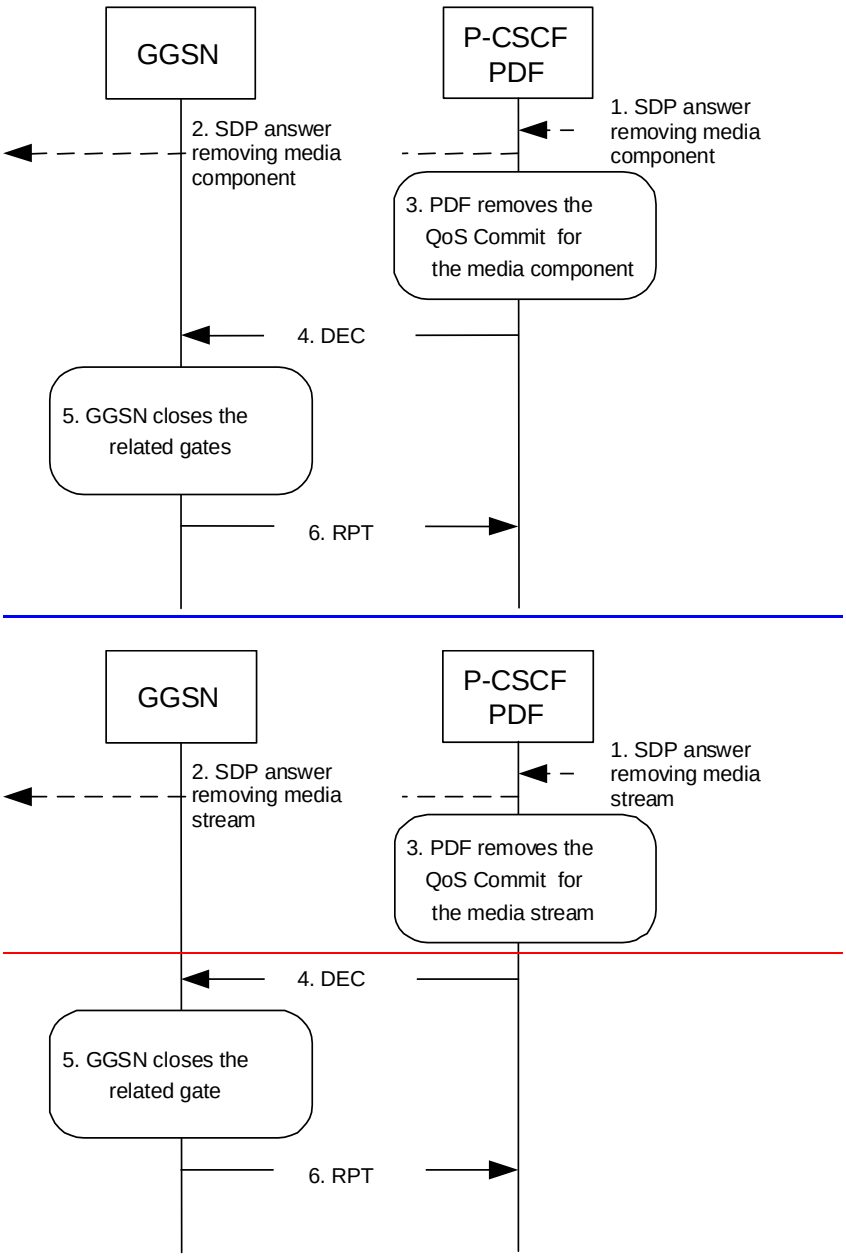
6.2 Removal of QoS commit

The "Removal of QoS commit" procedure is used e.g. when ~~a~~ media IP flow(s) ~~media component~~ 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.

next modification

6.2.2 Removal of QoS commit at media ~~stream~~ component remove

Figure 6.2.2 presents the "Removal of QoS commit" procedure at media ~~stream~~ component remove to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.



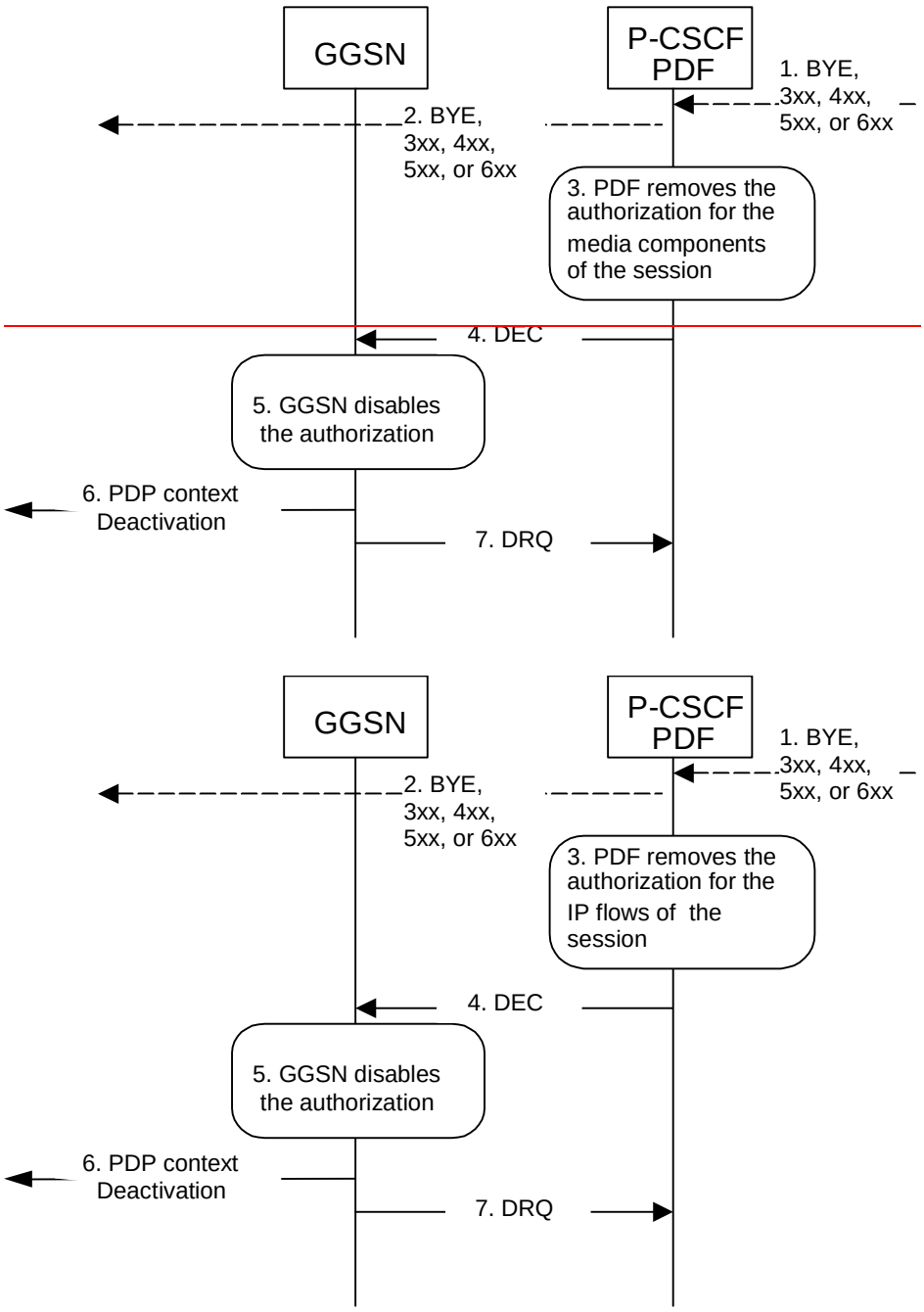
1. P-CSCF receives an SDP answer removing media ~~stream~~component.
2. P-CSCF forwards the SDP answer removing media ~~stream~~component.
3. PDF removes the QoS commit for the related IP flow(s) of the media component~~stream~~.
4. PDF sends a COPS DEC message to the GGSN to close the related 'gate(s)'.
5. GGSN receives the COPS DEC message, closes the 'gate(s)'.
6. GGSN sends a COPS RPT message back to the PDF.

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

next modification

6.3.1 Mobile initiated session release / Network initiated session release

Figure 6.3.1 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. The session release may be signalled by a SIP BYE message or any SIP 3xx redirect response, or any 4xx, 5xx, or 6xx SIP final error response.



1. A SIP BYE message, a SIP 3xx redirect response, or any 4xx, 5xx, or 6xx SIP final error response is received by the P-CSCF.
2. P-CSCF forwards the BYE message, or the SIP 3xx redirect response, or any 4xx, 5xx, or 6xx SIP final error response.
3. PDF removes the authorisation for the IP flow(s) ~~the media component(s)~~ of this session, which it authorized previously.
4. PDF sends COPS DEC message(s) to the GGSN including client handle(s), 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 COPS DRQ message(s) back to the PDF.

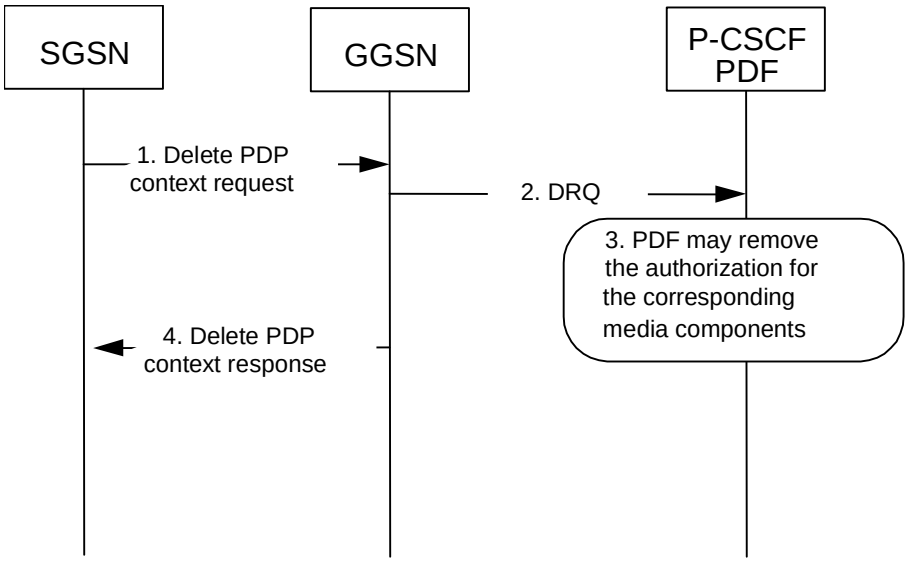
Figure 6.3.1: Revoke authorization for GPRS and IP resources - Mobile initiated session release / Network initiated session release to both Mobile Originating (MO) and Mobile termination side

next modification

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 PDF.

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

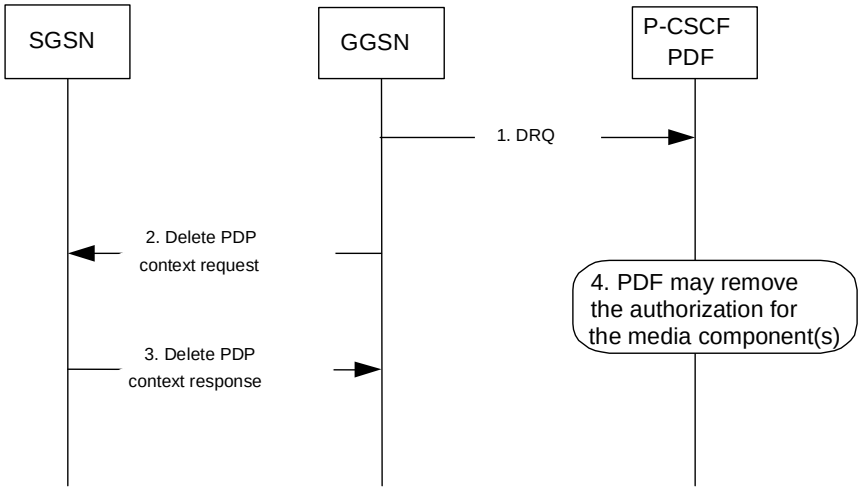


1. SGSN deactivates the PDP context carrying ~~the~~ IP flow(s) of media component(s) by sending the Delete PDP Context Request message to the GGSN.
2. GGSN sends a COPS DRQ message to the P-CSCF(PDF).
3. P-CSCF(PDF) receives the COPS DRQ message and PDF may remove the authorization for the media component(s) with the 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

Figure 6.4.2 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(PDF).
2. GGSN deactivates the PDP context ~~related to~~ carrying IP flow(s) of ~~the~~ media 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(PDF) receives the COPS DRQ message and PDF may remove the authorization for the media component(s) authorized for this client handle.

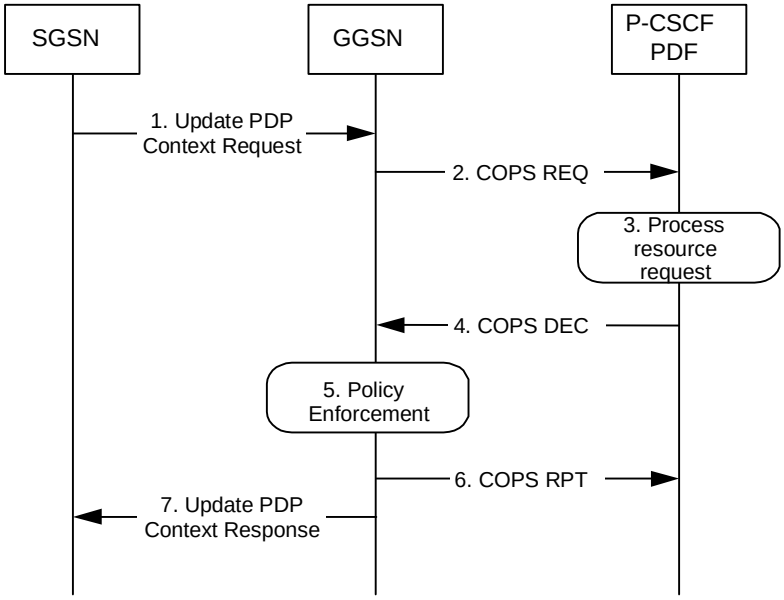
NOTE: Step 4 may also occur at the same time or before Step 2 and Step 3.

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 modification

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.



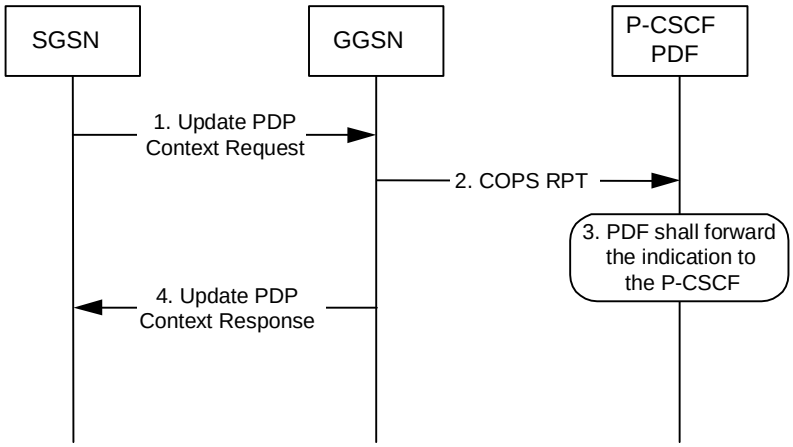
1. A request to modify the PDP context ~~related to~~ carrying the IP flows of ~~the~~ media component(s), of which at least one may have been modified or removed, is indicated by sending the Update PDP Context Request message to the GGSN with the changed UMTS QoS parameters.
2. If the GGSN supports 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

next 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. SGSN modifies the PDP context ~~related to~~ carrying the IP flows of ~~the~~ media component(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

next modification

7.1 QoS parameter mapping between IMS and GPRS

Within the IMS, 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]. If the IMS applies Service Based Local Policy (SBLP), as specified in 3GPP TS 29.207 [7], then the P-CSCF shall forward the relevant SDP information to the PDF together with an indication of the originator. The PDF notes and authorises the IP flows of 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 SBLP is applied, i.e. the UE has received an authorization token, then the UE should also derive the Authorized UMTS QoS parameters from the SDP parameters. 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 PDF, 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. If SBLP is applied then the PDF 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 flow identifier ~~IP flow of each media component~~. Upon a request from the GGSN, the PDF combines per direction the individual Authorised IP QoS parameters per flow identifier ~~of the IP flows~~ that are identified by the binding information (see clause 7.1.1).

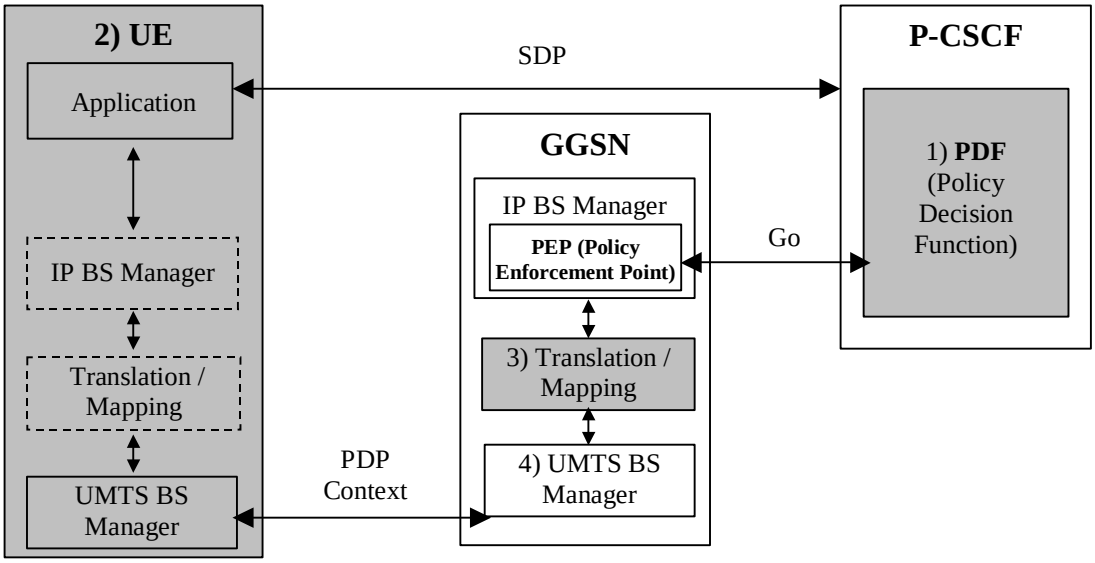
2. The UE maps from the SDP parameters to IP QoS parameters (if an IP BS manager is present) and to UMTS QoS parameters. This mapping is performed for each flow identifier ~~IP flow of each media component~~. The IP and UMTS QoS parameters should be generated according to application demands and recommendations for conversational (3GPP TS 26.236 [6]) or streaming applications (3GPP TS 26.234 [5]) (see clause 7.2.1). If SBLP is applied, i.e. the UE has received an authorization token, then 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 PDF 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: If SBLP is applied then SDP parameters to Authorized IP QoS parameters mapping.
NOTE 2: SDP parameters to (IP QoS parameters and) requested UMTS QoS parameters mapping and, if SBLP is applied, also SDP parameters to Authorized 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

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7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PDF

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

When a session is initiated or modified the PDF 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 QoS Class from the SDP Parameters. In the case of forking, the various forked responses may have different QoS requirements for the IP flows of the same media component. Each Authorized IP QoS Parameter shall be set to the highest value requested for the IP flow(s) of 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 QoS Class per ~~media component~~ flow identifier in the PDF

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

Maximum Authorized Data Rate DL (Max_DR_DL) and UL (Max_DR_UL) per ~~media component (see note 1)~~flow identifier	/* Direction of the IP flow(s) identified by the flow identifier */
	
	IF a=recvonly THEN
	  IF <SDP direction> = mobile originated THEN
	  Direction:= downlink;
	  ELSE /* mobile terminated */
	  Direction:= uplink;
	  ENDIF;
	ELSE
	  IF a=sendonly THEN
	  IF <SDP direction> = mobile originated THEN
	  Direction: = uplink;
	  ELSE /* mobile terminated */
	  Direction:= downlink;
	  ENDIF;
	  ELSE /*sendrecv, inactive or no direction attribute*/
	  Direction:=both;
	  ENDIF;
	ENDIF;
	
	/* Derivation of Max_DR_UL and Max_DR_DL */
	
	IF media IP flow(s) THEN
	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;
	ELSE /* RTCP IP flow(s) */
	  IF b=AS:<bandwidth> is present THEN
	  Max_DR_UL:= 0.025 * <bandwidth>;
	  Max_DR_DL:= 0.025 * <bandwidth>;
	  ELSE
	  Max_DR_UL:= as set by the operator;
	  Max_DR_DL:= as set by the operator;
	  ENDIF;
	ENDIF;

Maximum Authorized QoS Class [MaxClass] per ~~media component~~ flow identifier (see notes 1~~2~~, 2~~3~~ and 3~~4~~)	IF (all media IP flows ~~media components~~ of media type "audio" or "video" for the session ~~are unidirectional and~~ have the same direction) THEN
	MaxClassDerivation:=B; /*streaming*/
	ELSE
	MaxClassDerivation:=A; /*conversational*/
	ENDIF;
	
	CASE <media> OF
	"audio": MaxClass:= MaxClassDerivation
	"video": MaxClass:= MaxClassDerivation
	"application": MaxClass:=A; /*conversational*/
	"data": MaxClass:=E; /*interactive with priority 3*/
	"control": MaxClass:=C; /*interactive with priority 1*/
	/*new media type*/
	OTHERWISE: MaxClass:=F; /*background*/
	END;

~~NOTE 1: For a RTP media component the Maximum Authorized Data Rates DL/UL are the sum of the Maximum Authorized Data Rates DL/UL for the RTP media streams and the associated RTCP IP flows DL/UL.~~ NOTE ~~2~~1: The Maximum Authorized QoS Class for a RTCP IP flow is the same as for the corresponding RTP media ~~stream~~ IP flow. NOTE ~~3~~2: When ~~an~~ audio or video IP flow(s) ~~stream is~~ are removed from a session, the maximum Authorized QoS class~~remaining media streams in the session~~ shall keep the originally assigned value~~maximum Authorized QoS classes~~. NOTE ~~4~~3: When ~~an~~ audio or video IP flow(s)~~stream~~ ~~is~~ are added to a session, the PDF shall derive the maximum Authorized QoS Class taking into account the already existing media IP flow(s) ~~streams~~ within the session.	

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

When the GGSN requests the Authorized UMTS QoS parameters for an activated/modified PDP Context carrying ~~one or more~~ IP flows of media component(s), the PDF shall use the rules in table 7.1.1.2 to calculate the Authorized IP QoS parameters per Client Handle.

Table 7.1.1.2: Rules for calculating the Maximum Authorized Data Rates and Maximum Authorized QoS Class per Client Handle in the PDF

Authorized IP QoS Parameter per Client Handle	Calculation Rule

Maximum Authorized Data Rate DL and UL per Client Handle	Maximum Authorized Data Rate DL/UL per Client Handle is the sum of all Maximum Authorized Data Rate DL/UL ~~per media component~~ for all the flow identifiers ~~media component s~~ associated with that Client Handle.
	
	IF Maximum Authorized Data Rate DL/UL per Client Handle > 2 047 kbps THEN
	Maximum Authorized Data Rate DL/UL per Client Handle = 2 047 kbps /* See 3GPP TS 23.107 [8] */
	
	END;

Maximum Authorized QoS Class per Client Handle	Maximum Authorized QoS Class per Client Handle = MAX [Maximum Authorized QoS Class per ~~Client Handle~~ flow identifier among all the ~~media components~~ flow identifiers associated with that Client Handle. (The MAX function ranks the possible Maximum Authorized QoS Class values as follows: "A" > "B" > "C" > "D" > "E" > "F") /* See 3GPP TS 29.207 [7]) */

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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 in which SBLP is applied, i.e. an authorization token has been received, then the UE should use the mapping rules in table 7.2.2.1 to derive the Maximum Authorized Bandwidth UL/DL per flow identifier~~media component~~.

Table 7.2.2.1 also has a mapping rule for derivation of Maximum Authorized Traffic Class per flow identifier~~media component~~ which applies for session initiation and modification.

In future releases this mapping rule may change. For release 5 this mapping rule is optional for the Rein the case of forking, the various forked responses may have different QoS requirements for the same IP flows of a media component. When the Authorized UMTS QoS Parameters are used by the UE, they shall be set equal to the highest values requested for the IP flows of 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 component~~ flow identifier in the UE

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

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

Maximum Authorized Bandwidth DL (Max_BW_DL) and UL (Max_BW_UL) per ~~media component (see note 3)~~ flow identifier	IF SBLP is applied THEN
	
	/* Direction of the IP flow(s) identified by the flow identifier */
	
	IF a=recvonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction:= downlink;
	ELSE /* mobile terminated */
	Direction:= uplink;
	ENDIF;
	ELSE;
	IF a=sendonly THEN
	IF <SDP direction> = mobile originated THEN
	Direction: = uplink;
	ELSE /* mobile terminated */
	Direction:= downlink;
	ENDIF;
	ELSE /*sendrecv, inactive or no direction attribute*/
	Direction:=both;
	ENDIF;
	ENDIF;
	
	/* Derivation of Max_BW_UL and Max_BW_DL */
	
	IF media IP flow(s) THEN
	
	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 /* RTCP IP flow(s) */
	IF b=AS:<bandwidth> is present THEN
	Max_BW_UL:= 0.025 * <bandwidth>;
	Max_BW_DL:= 0.025 * <bandwidth>;
	ELSE
	Max_BW_UL:= as set by the UE manufacturer;
	Max_BW_DL:= as set by the UE manufacturer;
	ENDIF;
	ENDIF;
	
	ELSE
	No authorization is done ;
	ENDIF ;

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

Maximum Authorized Traffic Class [MaxTrafficClass] per ~~media component~~flow identifier(see NOTE 1, 2 and ~~4~~3)	IF SBLP is applied THEN
	IF (all media IP flows ~~media components~~ of media type "audio" or "video" for the session ~~are unidirectional and~~ have the same direction) THEN
	MaxService:= streaming;
	ELSE
	MaxService:= conversational;
	ENDIF;
	
	CASE <media> OF
	"audio": MaxTrafficClass:= MaxService;
	"video": MaxTrafficClass:= MaxService;
	"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 ;

~~NOTE 1: When an audio or video stream is removed from a session, the remaining media streams shall keep the originally assigned maximum Authorized Traffic Classes.~~

~~NOTE 2: When an audio or video stream is added to a session, the UE shall derive the maximum Authorized TrafficClass taking into account the already existing media streams within the session.~~

~~NOTE 3: For a RTP media component the Maximum Authorized Bandwidth DL/UL are the sum of the Maximum Authorized Bandwidths DL/UL for the RTP media streams and the associated RTCP IP flows DL/UL.~~

~~NOTE 4: The Maximum Authorized Traffic Class for a RTCP IP flow is the same as for the corresponding RTP media stream.~~

NOTE 1: The Maximum Authorized Traffic Class for a RTCP IP flow is the same as for the corresponding RTP media IP flow.

NOTE 2: When audio or video IP flow(s) are removed from a session, the maximum Authorized Traffic Class shall keep the originally assigned value.

NOTE 3: When audio or video IP flow(s) are added to a session, the UE shall derive the maximum Authorized Traffic Class taking into account the already existing media IP flows within the session

The UE should per ongoing session store the Authorized UMTS QoS parameters per flow identifier ~~media component~~.

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 flow identifier ~~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).

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

Authorized UMTS QoS Parameter per PDP Context	Calculation Rule

Maximum Authorized Bandwidth DL and UL per PDP Context	IF SBLP is applied THEN
	
	Maximum Authorized Bandwidth DL/UL per PDP Context is the sum of all Maximum Authorized Bandwidth DL/UL ~~per media component~~ for all the flow identifiers ~~media component s to be carried by~~ associated with that~~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	IF SBLP is applied THEN
	
	Maximum Authorised Traffic Class per PDP Context = MAX [Maximum Authorised Traffic Class per ~~media component~~ flow identifier among all the flow identifiers ~~media component s to be carried by the~~ associated with that 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 modifications