3GPP TSG CN Plenary Meeting #18 **NP-020622**
4th - 6th December 2002. New Orleans, USA.

Source: TSG CN WG3

Title: CRs on Rel5 Work Item e2eQoS (CR Pack3)

Agenda item: 8.5

Document for: APPROVAL

Introduction:

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

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

WG_tdoc	Title	Spec	CR	Rev	Cat	Rel	Version_old
N3-021026	Replacement of DIFFSERV class by QoS Class	29.207	064	3	F	Rel-5	5.1.0
N3-021014	Replacement of DIFFSERV class by QoS Class	29.208	018		F	Rel-5	5.1.0

3GPP TSG-CN WG3 Meeting #26 ***Tdoc ⌘N3-021014***
Bangkok, Thailand, 11th - 15th November 2002.

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **018** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Replacement of DiffServ class with QoS class
Source:	⌘	TSG_CN WG3
Work item code:	⌘	E2EQoS
Date:	⌘	14/11/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

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

Reason for change:	⌘	Since the term “DiffServ class” is replaced with “QoS class” in TS 29.207, the corresponding term used in TS 29.208 shall also be replaced in the same manner to avoid inconsistent representation of Authorized QoS class.
Summary of change:	⌘	Replacement of “DiffServ PHB” with “QoS class” and related changes to definitions and abbreviations sections.
Consequences if not approved:	⌘	Possible confusion and misunderstanding of the specification.

Clauses affected:	⌘	3.1, 3.2, 7.1, 7.1.1, 7.1.2

	Y	N			
Other specs affected:	X		Other core specifications	⌘	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 amended section

3 Definitions and abbreviations

3.1 Definitions

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

QoS class: Class of QoS used in Authorized IP QoS parameters as specified in 3GPP TS 29.207 [7].

3.2 Abbreviations

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

COPS	Common Open Policy Service protocol
DEC	COPS D~~ec~~EC~~i~~sion message
DRQ	COPS Delete Re~~q~~Quest ~~S~~state message
IMS	IP Multimedia CN Subsystem
PCF	Policy Control Function
REQ	COPS R~~eq~~EQuest message
RPT	COPS Re~~p~~Por~~t~~T ~~S~~state message

Next amended section

7 QoS parameter mapping

7.1 QoS parameter mapping between IMS and GPRS

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

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

1. The PCF maps from the SDP parameters determined from the SIP signalling to the Authorized IP QoS parameters that shall be passed to the GGSN via the Go interface. The mapping is performed for each IP flow of

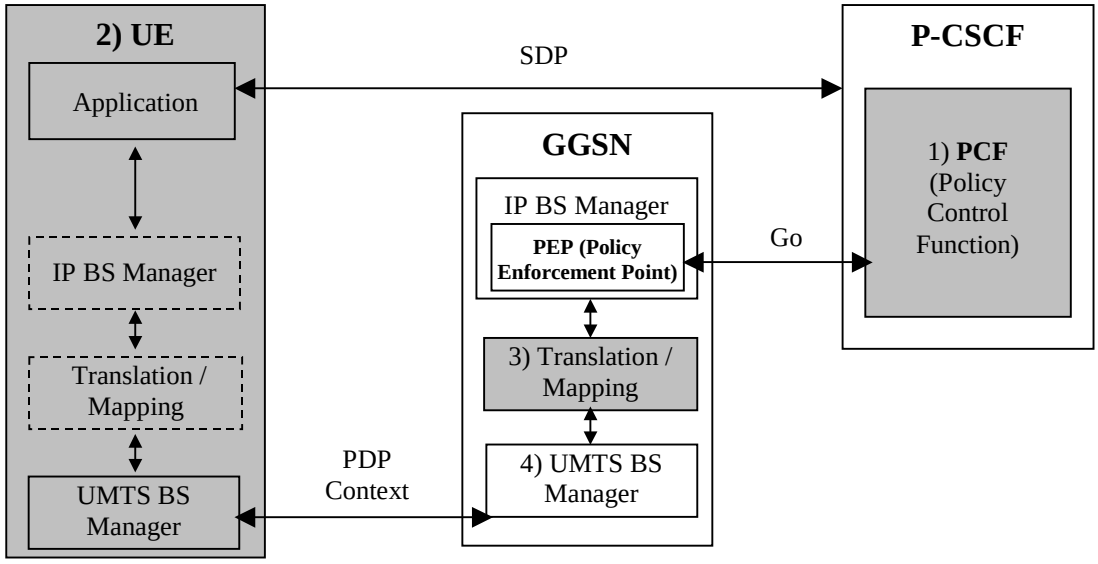
each media component. Upon a request from the GGSN, the PCF combines per direction the individual Authorised IP QoS parameters of the IP flows that are identified by the binding information (see clause 7.1.1).

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

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

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

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



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

Figure 7.1: Framework for QoS mapping between IMS and GPRS

7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PCF

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

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

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

Authorized IP QoS Parameter per media flow	Derivation from SDP Parameters

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

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

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

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

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

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

Authorized IP QoS Parameter per Binding	Calculation Rule

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

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

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

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

Table 7.1.2: Rules for derivation of the Authorized UMTS QoS Parameters from the Authorized IP QoS Parameters

Authorized UMTS QoS Parameter	Derivation from Authorized IP QoS Parameters
Maximum Authorized Bandwidth DL and UL	Maximum Authorized Bandwidth DL/UL = Maximum Authorized Data Rate DL/UL
Maximum Authorized Traffic Class	IF Maximum Authorized ~~Diffserv PHB~~QoS class = "~~EF~~A" THEN Maximum Authorized Traffic Class = "Conversational" ELSEIF Maximum Authorized ~~Diffserv PHB~~QoS class = "~~AF4~~B" THEN Maximum Authorized Traffic Class = "Streaming" ELSEIF Maximum Authorized ~~Diffserv PHB~~QoS class = "~~AF3~~C" THEN Maximum Authorized Traffic Class = "Interactive" ELSE Maximum Authorized Traffic Class = "Background" ENDIF ;

End of amended section

3GPP TSG-CN WG3 Meeting #26 ***Tdoc ⌘N3-021026***
Bangkok, Thailand, 11th – 15th November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.207** **CR** **064** ⌘ **rev** **3** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Replacement of DiffServ class with QoS class
Source:	⌘	TSG_CN WG3
Work item code:	⌘	E2EQoS
Date:	⌘	15/11/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

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

Reason for change:	⌘	During the authorization process the PCF sends the maximum authorized QoS information to the GGSN. This information consists of a data rate parameter and a parameter identifying a specific bearer characteristics (namely the UMTS traffic class). Currently, this parameter is called DiffServ class. The purpose of this parameter is simply to identify a specific bearer and not to give any specific information (like PHBs to be used) for a DiffServ function in the GGSN. Consequentely, the term "DiffServ class" could lead to misunderstandings and does not fit to a general IP level QoS information which should be somehow transport network independent. Since the information transferred by this parameter is not related to the DiffServ functionality of the GGSN we propose to rename this parameter and to replace the PHBs in the QoS information processing table with letters. An editor's note is removed.
Summary of change:	⌘	A QoS class definition is added to the definitions section. In several sections the term DiffServ class is replaced by QoS class. The table 4.3.1.1.1 is aligned and the DiffServ specific PHBs are replaced by letters. The Go PIB is also updated and an encoding with integer values is proposed. DiffServ and RSVP are deleted from the reference, abbreviations and definitions section because these terms are not used in 29.207 anymore.
Consequences if not approved:	⌘	The usage of DiffServ class for the information transfer on the Go interface is missleading and could be mixed up with the DiffServ functionality of the GGSN.

Clauses affected:	⌘	2, 3, 4.1, 4.3.1.1.1, 5.2.1.1, Annex B

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	TS 29.208
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘	CR 034 is also impacting section 5.2.1.1 but the CRs are not contradicting and are affecting different parts of the section. This CR 064 superseeds CR 048.				

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 reques

Start of modified section

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.002: "Network architecture".

[3] 3GPP TS 23.207: "End to end quality of service concept and architecture".

[4] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[5] ~~IETF RFC 2475: "An Architecture for Differentiated Services".~~void.

[6] IETF RFC 2753: "A Framework for Policy-based Admission Control".

[7] IETF RFC 2748: "The COPS (Common Open Policy Service) Protocol".

[8] IETF RFC 3084: "COPS Usage for Policy Provisioning (COPS-PR)".

[9] IETF RFC 3159: "Structure of Policy Provisioning Information (SPPI)".

[10] ~~IETF RFC 2205: "Resource ReSerVation Protocol (RSVP) – Version 1 Functional Specification".~~void.

[11] IETF RFC tbd: "Session Authorisation for RSVP" (draft-ietf-rap-rsvp-authsession-03.txt).

[12] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core network protocols; Stage 3".

[13] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".

[14] 3GPP TS 24.229: ” IP Multimedia Call Control Protocol based on SIP and SDP”

[15] IETF RFC 3318: "Framework Policy Information Base".

[16] IETF RFC 3289: "Management Information Base for the Differentiated Services Architecture"

[17] IETF RFC 2327: "SDP: Session Description Protocol".

3 Definitions and abbreviations

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:

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)

~~**Differentiated Services (DiffServ):** Diffserv networks classify packets into one of a small number of aggregated flows or "classes", based on the DiffServ codepoint (DSCP) in the packet's IP header~~
~~This is known as behaviour aggregate (BA) classification. At each DiffServ router, packets are subjected to a "per-hop behaviour" (PHB) (see RFC 2475 [5]), which is invoked by the DSCP.~~

Flow identifier: used for the identification of an IP flow within a media component associated with a SIP session
For 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 bidirectional 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 [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 PCF and GGSN [2]

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

Media component: is a part of an SDP session description conveying information about one media stream (e.g. type, format, IP address, port, transport protocol, bandwidth, direction)
The media stream described by a media component can be either bi- or unidirectional. A media stream containing an RTP flow may also contain an associated RTCP flow. 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 Control Function (PCF): is a logical policy decision element that uses standard IP mechanisms to implement policy in the IP media layer
The PCF 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 PCF. It resides in the IP BS Manager of the GGSN

Policy Information Base (PIB): data carried by COPS-PR is a set of policy data
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).

~~**Resource ReSerVation Protocol (RSVP):** is used by a host to request specific qualities of service from the network for particular application data streams or flows~~
~~The network responds by explicitly admitting or rejecting RSVP requests.~~

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

3.2 Abbreviations

For the purposes of the present document, the abbreviations as specified in 3GPP TR 21.905 [1] and the following abbreviations apply:

COPS	Common Open Policy Service protocol
COPS-PR	COPS for policy PRovisioning
DEC	COPS DECision message
~~DiffServ~~	~~Differentiated Services~~
DRQ	COPS Delete ReQuest state message
~~DSCP~~	~~DiffServ Code Point~~
GCID	GPRS Charging IDentifier
ICID	IMS Charging IDentifier
IMS	IP Multimedia core network Subsystem
MIB	Management Information Base
PCF	Policy Control Function
P-CSCF	Proxy Call Session Control Function
PEP	Policy Enforcement Point
~~PHB~~	~~Per Hop Behaviour~~
PIB	Policy Information Base
PRC	PRovisioning Class (a type of policy data)
PRI	PRovisioning Instance (an instance of a PRC)
PRID	PRovisioning Instance iDentifier
QoS	Quality of Service
REQ	COPS REQuest message
RPT	COPS RePorT state message
~~RSVP~~	~~resource ReSerVation Protocol~~
RTCP	RTP Control Protocol
SBLP	Service Based Local Policy
SDP	Session Description Protocol

End of modified section

Start of modified section

4.1 Overview

The Go interface allows service-based local policy information to be "pushed" to or requested by the Policy Enforcement Point (PEP) in the GGSN from a Policy Control Function (PCF). As defined in the stage 2 specifications [3], this information is used by the GGSN for:

- GPRS bearer authorisation;
- Charging correlation;
- Policy based "gating" function in GGSN;

The Go interface uses IP flow based policies.

The Common Open Policy Service (COPS) protocol has been developed as a protocol for use between a policy server and a network device, as described in [7].

In addition, COPS for Provisioning extensions have been developed as described in [8] with [9] describing a structure for specifying policy information that can then be transmitted to a network device for the purpose of configuring policy at that device. The model underlying this structure is one of well-defined provisioning classes and instances of these classes residing in a virtual information store called the Policy Information Base (PIB).

The Go interface shall conform to the IETF COPS [7] and the extensions of COPS-PR [8]. For the purpose of exchanging the required specific Go information, a 3GPP Go COPS-PR Policy Information Base (PIB) is defined in the present document.

COPS Usage for Policy Provisioning (COPS-PR) is independent of the type of policy being provisioned (QoS, Security, etc.). In the present document, COPS-PR is used to communicate service-based local policy information between PCF and GGSN. COPS-PR can be extended to provide per-flow policy control along with a 3GPP Go Policy Information Base (PIB). The 3GPP Go PIB may inherit part of the data object definitions from other PIBs and MIBs defined in the IETF.

The minimum functionalities that the Go interface shall cover are introduced below.

1. Media Authorisation request from GGSN:

   The GGSN receives the binding information during the activation of a (Secondary) PDP context or during the modification of an existing PDP context that has been previously authorized by the PCF. To authorise the PDP context activation, the GGSN shall send a media authorisation request to the PCF. To authorise the PDP context modification, the GGSN shall send a media authorisation request to the PCF when the requested QoS exceeds the authorised QoS or new binding information is received.

   This authorisation request shall include the following information:

   - Binding information:

     The binding information is used by the GGSN to identify the correct PCF and subsequently request service-based local policy information from the PCF. The GGSN may receive one or more sets of the binding information during an activation or modification of a PDP context. Each binding information consists of:

     - One Authorisation token;
     - One or more Flow id(s) within the session.

   It is assumed that only one set of binding information is carried within a PDP context in this Release.

2. Media authorisation decision from PCF:

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

   - Decision on the binding information.

   The PCF 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 PCF shall verify if the multiple media components are correctly assigned to the PDP Context. If validated, the PCF 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 media components is provided as the "Authorised QoS" for the bearer.

The "Authorised QoS" contains the following information:

- ~~DiffServ~~ QoS class:

  The ~~DiffServ~~ QoS class information represents ~~determines~~ the highest ~~QoS~~ class that can be used for the media component. It is derived from the ~~media type information of 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 media components identified in the binding information.

- Data rate:

  The Data rate information is extracted from the SDP bandwidth parameter, more specifically the bandwidth value indicated by the "b=AS:" parameter. The Data rate shall include all the overhead coming from the IP-layer and the layers above, e.g. UDP, RTP. The Data rate shall also include the overhead coming from the possible usage of RTCP. The Data rate within the "Authorized QoS" information for the bearer is determined from the data rate values of the individual 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 PCF shall send the ICID provided by the P-CSCF as part of the authorisation decision. The GGSN shall send the GCID of the PDP Context and the GGSN address to the PCF as part of the authorisation report.

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

   The PCF 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 PCF to the GGSN.

5. Indication of PDP Context Release / Modification to/from 0 kbit/s:

   The GGSN informs the PCF of bearer changes related to the authorised resources for the IMS session in the following cases:

   - Loss of radio contact (modification to/from 0 kbit/s for conversational and streaming class);

   - Deactivation of PDP context.

End of modified section

Start of modified section

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 PCF 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 PCF 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 ~~Diffserv~~ QoS class~~PHB~~ in the "Authorized QoS" according to table 4.3.1.1.1.

Table 4.3.1.1.1

~~Diffserv~~ QoS class~~PHB~~	UMTS Traffic Class	Traffic Handling Priority
~~EF~~A	Conversational	N/A
~~AF4~~$_1$B	Streaming	N/A
~~AF3~~$_1$C	Interactive	1
~~AF2~~$_1$D		2
~~AF1~~$_1$E		3
~~BE~~F	Background	N/A

NOTE: QoS class represents the highest class that can be used for the bearer.

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 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.

End of modified section

Start of modified section

5.2.1.1 SBLP authorisation decision

The information needed for the PCF 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. Cf. the definition of flow identifier in clause 3.1. The P-CSCF shall send policy setup information to the PCF upon every SIP message that includes an SDP payload. This ensures that the PCF passes proper information to perform media authorization for all possible IMS session setup scenarios. The policy setup information provided by the P-CSCF to the PCF 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;

Editor's note: The format of this group indication in SIP/SDP is subject to CN1's decision.

- Media type information;
- Bandwidth parameter;
- Indication of forking/non-forking.

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

The PCF 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 [11]. The PCF shall include an AUTH_ENT_ID attribute containing the Fully Qualified Domain Name of the PCF and the SESSION_ID attribute.

Upon receiving the bearer authorization request from the GGSN, the PCF 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 PCF shall identify whether the binding information indeed corresponds to an initiated SIP session.

  The authorization shall also contain decision on the list of flow_IDs contained in the bearer authorisation request sent by the GGSN representing the list of media components intended to be carried in the same PDP Context. This decision shall verify that these media components are indeed allowed to be carried in the same PDP Context. The PCF shall make this decision by comparing the list of flow_IDs 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 multiple IMS media components in a single PDP context despite of an indication that mandated separate PDP contexts, the PCF shall enforce the rejection of this PDP context request by sending an INSTALL and REMOVE decision to the GGSN.

  If the binding information and the list of flow_IDs are successfully authorised (verified) as per the means described above, the PCF shall also communicate the authorisation details for each media component 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 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 PCF shall define the direction (upstream or downstream) of the "Authorised QoS" and the packet classifier(s).

- Packet classifier(s):

  The PCF 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 wildcarded by the PCF.

- 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 wildcarded by the PCF in the packet classifier.

- The PCF 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 ~~DiffServ~~ QoS Class and Data Rate) for a media component is extracted from the media type information and bandwidth parameter of the SDP. The PCF shall map the media type information into a ~~DiffServ~~ QoS Class which is the highest class that can be used for the media. As an example, the audio media type shall be mapped into ~~Expedited Forwarding PHB~~QoS class A.

  The PCF shall extract 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, RTP. The Data Rate includes the overhead coming from the possible usage of RTCP. The PCF shall use this value 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 PCF shall provide the "Authorised QoS" for the bearer as the combination of the "Authorised QoS" information of the individual media components. The ~~DiffServ~~ QoS Class in the "Authorised QoS" for the bearer shall contain the highest ~~PHB~~ QoS class amongst the ones applied for the individual media components and indicates the highest UMTS traffic class that can be applied to the PDP context.

~~Editor's note: It shall be possible the group identifiers to restrict the individual media components carried by the same PDP context to have the same PHBs.~~

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

The PCF may include the gate enabling command as part of the authorisation decision. Alternatively, the PCF may provide a separate decision for opening the gate.

The PCF 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 PCF shall update the media authorization information for the session. The PCF may push this updated authorisation information to the GGSN. Under certain condition e.g. revoke of authorization, the PCF shall push the updated policy decision to the GGSN.

End of modified section

Start of modified section

Annex B (normative): 3GPP Go PIB

```
GO3GPP-PIB  PIB-DEFINITIONS ::= BEGIN

IMPORTS
    Unsigned32, Integer32, MODULE-IDENTITY,
    MODULE-COMPLIANCE, OBJECT-TYPE, OBJECT-GROUP, pib
            FROM COPS-PR-SPPI
    InstanceId, Prid
            FROM COPS-PR-SPPI-TC

    InetAddress, InetAddressType,
    InetAddressPrefixLength, InetPortNumber
```

```
            FROM INET-ADDRESS-MIB

    DscpOrAny
            FROM DIFFSERV-DSCP-TC
        ;

   go3gppPib  MODULE-IDENTITY
       SUBJECT-CATEGORIES   { go3gpp (xx) } -- Go 3GPP COPS Client Type
                                            -- xx to be assigned by IANA
       LAST-UPDATED "200208012200Z"
       ORGANIZATION "3GPP TSG CN WG3"
       CONTACT-INFO
                   "Kwok Ho Chan
                    Nortel Networks
                    600 Technology Park Drive
                    Billerica, MA 01821 USA
                    Phone: +1 978 288 8175
                    Email: khchan@nortelnetworks.com

                    Louis-Nicolas Hamer
                    Nortel Networks
                    PO Box 3511 Station C
                    Ottawa, Ontario
                    Canada, K1Y 4H7
                    Phone: +1 613 768 3409
                    Email: nhamer@nortelnetworks.com"
       DESCRIPTION
               "A PIB module containing the set of provisioning
               classes that are required for support of policies for
               3GPP's GO interface, Release 5."
       REVISION "Release 5, v.1 "
       DESCRIPTION
               "This is version 1 of the 3GPP Go PIB for release 5."

       ::= { pib xxx } -- xxx to be assigned by IANA
```

< skipped text >

```
--
-- 3GPP Go QoS Table
--
   go3gppQosTable OBJECT-TYPE
       SYNTAX         SEQUENCE OF Go3gppQosEntry
       PIB-ACCESS     install
       STATUS         current
       DESCRIPTION
           "This table represents the Authorised QoS. It is referenced by the go3gppAuthReqDirDecQos
entry of the go3gppAuthReqDirDecEntry  class."
       ::= { go3gppDecInfoClasses 5 }


   go3gppQosEntry OBJECT-TYPE
       SYNTAX         Go3gppQosEntry
       STATUS         current
       DESCRIPTION
           "There should be one of these per direction per AuthReqDec."
       PIB-INDEX { go3gppQosPrid }
       UNIQUENESS { }
       ::= { go3gppQosTable 1 }


   Go3gppQosEntry ::= SEQUENCE {
           go3gppQosPrid               InstanceId,
           go3gppQosServiceClass       DscpOrAnyINTEGER,
           go3gppQosDataRateUnit       INTEGER,
           go3gppQosDataRate           Unsigned32
   }


   go3gppQosPrid OBJECT-TYPE
       SYNTAX         InstanceId
       STATUS         current
       DESCRIPTION
```

```
            "An arbitrary integer index that uniquely identifies an
            instance of the go3gppQos class."
        ::= { go3gppQosEntry 1 }


    go3gppQosServiceClass OBJECT-TYPE
        SYNTAX          DscpOrAny INTEGER {
                          QoSclassA    (1),
                          QoSclassB    (2),
                          QoSclassC    (3),
                          QoSclassD    (4),
                          QoSclassE    (5),
                          QoSclassF    (6)
                        }
        STATUS          current
        DESCRIPTION
            "A The QoS Service Class Iindicatesion the highest authorized QoS class using DSCP
Encoding."
        ::= { go3gppQosEntry 2 }


    go3gppQosDataRateUnit OBJECT-TYPE
        SYNTAX          INTEGER {
                          bps     (1),
                          kbps    (2),
                          Mbps    (3)
                        }
        STATUS          current
        DESCRIPTION
            "Indication of the unit of measure for go3gppQosDataRate."
        ::= { go3gppQosEntry 3 }


    go3gppQosDataRate OBJECT-TYPE
        SYNTAX          Unsigned32
        STATUS          current
        DESCRIPTION
            "The Data Rate with unit of measure indicated by
            go3gppQosDataRateUnit."
        ::= { go3gppQosEntry 4 }
```

< skipped text >

```
END
```

End of modified section