3GPP TSG-CN Meeting #26 **Tdoc ⌘ NP-040616**

Athens, Greece. 8th to 10th December 2004.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.061** **CR** **140** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*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:	⌘	Gmb interface. Corrections, addition of missing AVPs and code values assignation.
Source:	⌘	CN3
Work item code:	⌘	MBMS
Date:	⌘	09/12/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	The Gmb interface needs to be completed with missing functionality based in the stage 2 requirements. Also AVP codes needs to be defined as indicated by CN4. New table needed to define the reused AVPs in Gmb. Incorrect use of Result-Code when Experimental-Result-Code should be used. A clarification is needed to indicate that after a RAR-RAA exchange, no AAR is needed, to avoid confusion with the Nasreq specification. A new AVP is needed in AAR to include the serving network identity associated with the MSISDN (for a subscriber using MBMS) in signalling from the GGSN to the BM-SC for charging purposes.
Summary of change:	⌘	This contribution is merging some previous contributions: - New AVP to indicate Multicast or Broadcast service. (N3-040634) - Table with reused AVPs added (N3-040685) - Correction to the Result-Code AVP (N3-040686) - General corrections and clarification on the use of RAR (N3-040687) - Update of AVPs codes and permanent failures codes as indicated by CN4. (N3-040731) - The place holder for the new application-id of the Gmb interface is created. The final value will be assignated by IANA (N3-040731) - New AVP indicating the ìserving network identityî is added to AAR (3GPP-SGSN-MCC-MNC) (N3-040732)
Consequences if not approved:	⌘	Incomplete Gmb functionalities. RAN will be unable to know whether one MBMS Bearer Service is for the Multicast mode or for the Broadcast mode service. Incorrect use of Result-Code AVP

	Round Trip behaviour of the commands unclear, as the RAR behaviour definition is different in the RFC. Missing code values. MBMS charging requirements in 22.146, 22.246, and SA2 proposed application level charging mechanisms, will not be met.

Clauses affected:	⌘	17, 17.2, 17.5.2, 17.5.3, 17.6.1, 17.6.2, 17.6.4, 17.6.5, 17.6.6, 17.7 and its subclauses, 17.8 and its subclauses.			
Other specs affected:	⌘	**Y**	**N**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

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

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.

********** FIRST MODIFIED SECTION **********

17 Usage of Diameter on Gmb interface

Signalling between GGSN and BM-SC is exchanged at Gmb reference point. BM-SC functions for different MBMS bearer services may be provided by different physical network elements. To allow this distribution of BM-SC functions, the Gmb protocol must support the use of proxies to correctly route the different signalling interactions in a manner which is transparent to the GGSN.

The GGSN uses the Gmb interface

- to request authorisation/deactivation of a user for an MBMS service,
- to register/de-register the GGSN for receiving the MBMS service.
- to receive indication of session start and session stop messages, which shall cause the GGSN, SGSN and RAN to set up/tear down the appropriate resources for the service. For further details, see 3GPP TS 23.246 [65].

The support of Gmb within the GGSN is optional, and needed for MBMS.

The Gmb application is defined as an IETF vendor specific Diameter application, where the vendor is 3GPP. The vendor identifier assigned by IANA to 3GPP (http://www.iana.org/assignments/enterprise-numbers) is 10415. The Gmb application identifier value assigned by IANA is xxx.

The BM-SC and the GGSN shall advertise the support of the Gmb application by including the value of the application identifier in the Auth-Application-Id AVP and the value of the 3GPP (10415) in the Vendor-Id AVP of the Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands. The Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands are specified in the Diameter Base Protocol.

********** NEXT MODIFIED SECTION **********

17.2 MBMS service registration / de-registration

The MBMS service registration of the GGSN at the BM-SC shall be performed after authorisation of the first user on a particular GGSN, for a particular MBMS Bearer service. The MBMS service de-registration of the GGSN shall be performed when the last user leaves a particular GGSN, for a particular MBMS bearer service.

The MBMS de-registration procedure shall be initiated by BM-SC when the specific MBMS service is terminated.

The GGSN shall support pre-configuration of a BM-SC or Gmb proxy server for registration/de-registration purposes. The GGSN may support a list of pre-configured BM-SC servers based on the MBMS bearer service requested for bearer registration purposes.

********** NEXT MODIFIED SECTION **********

17.5.2 Session start procedure

The BM-SC initiates the MBMS session start procedure when it is ready to send data. This informs the GGSN of the imminent start of the transmission and MBMS session attributes are provided to the GGSNs that have previously registered for the corresponding MBMS bearer service. The bearer plane is allocated.

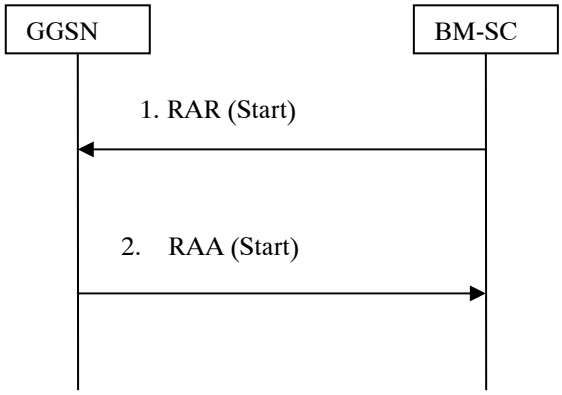

Figure 27: MBMS Session Start procedure

1. The BM-SC sends a ~~MBMS-SSR~~RAR ~~(Start)~~ message to indicate the impending start of the transmission and to provide the session attributes (QoS, MBMS service Area, estimated session durationÖ) to the GGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The BM-SC sets the state attribute of its MBMS Bearer Context to ëActiveí.
2. The GGSN stores the session attributes in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and sends a ~~MBMS-SSA~~RAA ~~(Start)~~ message to the BM-SC. An AAR message is not mandated for the Gmb application in response to a RAR- RAA command exchange.

17.5.3 Session stop procedure

The BM-SC initiates the MBMS session stop procedure when it considers the MBMS session terminated. Typically this will happen when there is no more MBMS data expected to be transmitted for a sufficiently long period of time to justify the release of bearer plane resources in the network.

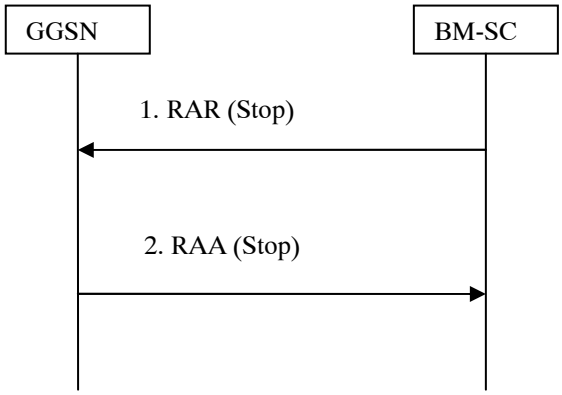

Figure 28: MBMS Session Stop procedure

1. The BM-SC sends a ~~MBMS-SSR~~RAR ~~(Stop)~~ message to all GGSNs listed in the ì list of downstream nodesî parameter of the affected MBMS Bearer Context to indicate that the MBMS session is terminated and the bearer plane resources can be released.

2. The GGSN sets the state attribute of its MBMS Bearer Context to ëStandbyí and sends a ~~MBMS SSA~~RAA ~~(Stop)~~ message to the BM-SC. An AAR message is not mandated for the Gmb application in response to a RAR-RAA command exchange.

********** NEXT MODIFIED SECTION **********

17.6 Gmb Messages

This clause defines the Gmb interface Diameter messages.

The relevant AVPs that are of use for the Gmb interface are detailed in this clause. Other Diameter NASREQ AVPs, even if their AVP flag rules is marked with ì Mî , are not required for being compliant with the current specification.

17.6.1 AAR Command

The AAR command, defined in Diameter NASREQ[67], is indicated by the Command-Code field set to 265 and the ëRí bit set in the Command Flags field. It, is sent by the GGSN to the BM-SC to request user authorization (authorize the activating UE to receive Data) or to register the GGSN for a particular MBMS bearer service.

The relevant AVPs that are of use for the Gmb interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for Gmb purposes and should be ignored by the receiver or processed according to the relevant specifications.

The bold marked AVPs in the message format indicate new optional AVPs for Gmb, or modified existing AVPs.

Message Format:

```
<AA-Request> ::= < Diameter Header: 265, REQ, PXY >
                       < Session-Id >
                       { Auth-Application-Id }
                       { Origin-Host }
                       { Origin-Realm }
                       { Destination-Realm }
                       { Auth-Request-Type }
                       [ Destination-Host ]
                       [ Called-Station-Id ]
                       [ Calling-Station-Id ]
                       [ Framed-IP-Address]
                       [ Framed-IPv6-Prefix ]
                       [ Framed-Interface-Id ]
                     * [ Proxy-Info ]
                     * [ Route-Record ]
                       [ 3GPP-GPRS-Negotiated-QoS-Profile ]
                       [ 3GPP-IMSI]
                       [ 3GPP-SGSN-MCC-MNC ]
```

The GGSN shall allocate a new Session-Id for each time an AAR command is sent.

A request for user authorisation for an MBMS bearer service is indicated by the presence of the MSISDN within the Calling-Station-Id AVP and the 3GPP-IMSI. Otherwise the request is for the GGSN to be authorised (i.e. registered) to receive the MBMS bearer service.

The Framed-IPv6-Prefix AVP contains the IPv6 prefix of the multicast address identifying the MBMS bearer service.

The Framed-Interface-Id AVP contains the IPv6 interface identifier of the multicast address identifying the MBMS bearer service.

The Framed-IP-Address AVP contains the IPv4 multicast address identifying the MBMS bearer service.

The Called-Station-Id AVP contains the Access Point Name (APN) on which the MBMS bearer service authorisation request was received.

17.6.2 AAA Command

The AAA command, defined in Diameter NASREQ [67], is indicated by the Command-Code field set to 265 and the ëRí bit cleared in the Command Flags field., It is sent by the BM-SC to the GGSN in response to the AAR command.

The relevant AVPs that are of use for the Gmb interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for Gmb purposes and should be ignored by the receiver or processed according to the relevant specifications.

Message Format:

```
<AA-Answer> ::= < Diameter Header: 265, PXY >
                      < Session-Id >
                      { Auth-Application-Id }
                      { Result-Code }
                      { Origin-Host }
                      { Origin-Realm }
                      [ Result-Code ]
                      [ Experimental-Result ]
                      [ Error-Message ]
                      [ Error-Reporting-Host ]
                    * [ Failed-AVP ]
                    * [ Proxy-Info ]
                      [ Alternative-APN ]
                      [ 3GPP-GPRS-Negotiated-QoS-Profile ]
                      [ 3GPP-IMSI]
                      [ TMGI ]
                      [ Required-MBMS-Bearer-Capabilities ]
```

********** NEXT MODIFIED SECTION **********

17.6.4 STA Command

The STA command, defined in IETF RFC3588 (DIAMETER BASE) [66], is indicated by the Command-Code field set to 275 and the ëRí bit cleared in the Command Flags field, is sent in response to an STR command (De-registration procedure).

The relevant AVPs that are of use for the Gmb interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for Gmb purposes and should be ignored by the receiver or processed according to the relevant specifications.

The bold marked AVPs n the message format indicates: new optional specific AVPs for Gmb, or modified existing

Message Format:

```
<ST-Answer>  ::= < Diameter Header: 275, PXY >
                       < Session-Id >
                       { Result-Code }
                       { Origin-Host }
```

```
                  { Origin-Realm }
                * [ Class ]
                  [ Error-Message ]
                  [ Error-Reporting-Host ]
                * [ Failed-AVP ]
                  [ Origin-State-Id ]
                * [ Redirect-Host ]
                  [ Redirect-Host-Usage ]
                  [ Redirect-Max-Cache-Time ]
                * [ Proxy-Info ]
```

Editorís note: The same way that in 17.6.1, some text describing how this AVPís are use for Gmb purposes is needed. This is FFS if those clarifications are needed.

17.6.5 Re-Auth-Request Command

The Re-Auth-Request (RAR) command, defined in IETF RFC3588 (DIAMETER BASE) [66], is indicated by the Command-Code set to 258 and the message flags' 'R' bit set.

The relevant AVPs that are of use for the Gmb interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for Gmb purposes and should be ignored by the receiver or processed according to the relevant specifications.

The bold marked AVPs in the message format indicate new optional AVPs for Gmb, or modified existing AVPs.

Message Format:

```
<RAR>  ::= < Diameter Header: 258, REQ, PXY >
           < Session-Id >
           { Origin-Host }
           { Origin-Realm }
           { Destination-Realm }
           { Destination-Host }
           { Auth-Application-Id }
           { Re-Auth-Request-Type }
           [ MBMS-StartStop-Indication ]
           [ MBMS-Service-Area ]
           [ 3GPP-GPRS-Negotiated-QoS-Profile ]
           [ 3GPP-IMSI]
           [ MBMS-Session-Duration ]
           [ MBMS-Service-Type ]
           [ Origin-State-Id ]
         * [ Proxy-Info ]
         * [ Route-Record ]
```

The MBMS-StartStop-Indication AVP will indicate if the command is indicating a MBMS Start procedure or a MBMS Stop procedure.

For the MBMS Start procedure, RAR is sent by the BM-SC to the GGSN(s) that have previously registered for the corresponding MBMS bearer service, when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data and to notify interested UEs of the imminent start of the transmission.

For MBMS Stop procedure, RAR is sent by the BM-SC to the GGSN(s) when it considers the MBMS session to be terminated. The session is typically terminated when there is no more MBMS data expected to be transmitted for a sufficiently long period of time to justify a release of bearer plane resources in the network.

The MBMS service to be started/stopped is identified by the session-id.

17.6.6 RE-Auth-Answer Command

The Re-Auth-Answer (RAA) command, defined in IETF RFC3588 (DIAMETER BASE) [66], is indicated by the Command-Code set to 258 and the message flags' 'R' bit clear, is sent in response to the RAR.

The relevant AVPs that are of use for the Gmb interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for Gmb purposes and should be ignored by the receiver or processed according to the relevant specifications.

Message Format:

```
      <RAA>  ::= < Diameter Header: 258, PXY >
                 < Session-Id >
                 { Result-Code }
                 { Origin-Host }
                 { Origin-Realm }
                 [ Result-Code ]
                 [ Experimental-Result ]
                 [ MBMS-StartStop-Indication ]
                 [ Origin-State-Id ]
                 [ Error-Message ]
                 [ Error-Reporting-Host ]
               * [ Failed-AVP ]
               * [ Redirected-Host ]
                 [ Redirected-Host-Usage ]
                 [ Redirected-Host-Cache-Time ]
               * [ Proxy-Info ]
```

********** NEXT MODIFIED SECTION **********

17.7 Gmb specific AVPs

Table 10 describes the Gmb specific Diameter AVPs. The Vendor-Id header of all Gmb specific AVPs defined in the present specification shall be set to 3GPP (10415).

The Gmb specific AVPs require to be supported to be compliant to the present specification. All AVPs in table 10 are mandatory within Gmb interface unless otherwise stated.

Table 10: Gmb specific AVPs

				AVP Flag rules				
Attribute Name	**AVP Code**	**Section defined**	**Value Type**	**Must**	**May**	**Should not**	**Must not**	**May Encr.**
TMGI	900~~TBD~~	17.7.2~~1~~	OctectString	M,V	P			Y
Required-MBMS-Bearer-Capabilities	901~~TBD~~	17.7.3~~2~~	UTF8String	M,V	P			Y
MBMS-StartStop-Indication	902~~TBD~~	17.7.5~~3~~	Enumerated	M,V	P			Y
MBMS-Service-Area	903~~TBD~~	17.7.6~~4~~	OctectString	M,V	P			Y
MBMS-Session-Duration	904~~TBD~~	17.7.7~~5~~	Unsigned32	M,V	P			Y
3GPP-GPRS-Negotiated-QoS-	5	16.4.7	UTF8String	M,V	P			Y

Profile		(see Note)						
3GPP-IMSI	1	16.4.7 (see Note)	UTF8String	M.V	P			Y
Alternative-APN	905~~TBD~~	17.7.8~~6~~	UTF8String	M,V	P			Y
MBMS-Service-Type	906	17.7.9	Enumerated	M,V	P			Y
3GPP-SGSN-MCC-MNC	18	16.4.7 (see Note)	UTF8String	M.V	P			Y
NOTE: The use of Radius VSA as a Diameter vendor AVP is described in Diameter NASREQ [67] and the P flag may be set.								

~~Editorís note: Thereís also another set of AVPs used in the Gmb interface, but are not Gmb specific. They are part of the IETF NASREQ application. The list with those AVPs can also be created for extra clarity.~~

Table 11 lists the set of Diameter AVPs that are not Gmb specific, but are reused from other Diameter applications by the Gmb interface. A reference is done to the specifications where the AVPs are specified. This set of AVPs requires to be supported to be compliant to the present specification.

Table 11: Gmb reused AVPs from other Diameter applications.

AVP Name	Reference
Called-Station-Id	draft-ietf-aaa-diameter-nasreq-17.txt [67]
Calling-Station-Id	draft-ietf-aaa-diameter-nasreq-17.txt [67]
Framed-Interface-Id	draft-ietf-aaa-diameter-nasreq-17.txt [67]
Framed-IP-Address	draft-ietf-aaa-diameter-nasreq-17.txt [67]
Framed-IPv6-Prefix	draft-ietf-aaa-diameter-nasreq-17.txt [67]

NOTE: Diameter Base AVPs are not listed as support of them is mandated by IETF RFC 3588 [66].

17.7.1 3GPP-Vendor-Specific AVP

Void.

17.7.2 TMGI AVP

The TMGI AVP (AVP code 900~~TBD~~) is of type OctectString, and contains the Temporary Mobile Group Identity allocated to a particular MBMS bearer service. TMGI use and structure is specified in 3GPP TS 23.003 [40].

17.7.3 Required-MBMS-Bearer-Capabilities AVP

The Required-MBMS-Bearer-Capabilities AVP (AVP code 901~~TBD~~) is of type UTF8String, and contains the minimum bearer capabilities the UE needs to support. The information contained in this AVP is UTF-8 encoded QoS profile as defined in 3GPP TS 24.008 [54].

17.7.4 MBMS-Service-Area AVP

Void.

17.7.5 MBMS-StartStop-Indication AVP

The MBMS-StartStop-Indication AVP (AVP code 902~~TBD~~) is of type Enumerated. The following values are supported:

START (0)

The message containing this AVP is indicating a MBMS session start procedure.

STOP (1)

The message containing this AVP is indicating a MBMS session stop procedure.

17.7.6 MBMS-Service-Area AVP

The MBMS-Service-Area AVP (AVP code 903~~TBD~~) is of type OctetString, and indicates the area over which the MBMS bearer service has to be distributed.

17.7.7 MBMS-Session-Duration AVP

The MBMS-Session-Duration AVP (AVP code 904~~TBD~~) is of type Unsigned32, and indicates the estimated session duration (MBMS Service data transmission) if available. This AVP is optional within the Gmb interface. The time is indicated in seconds.

17.7.8 Alternative-APN AVP

The Alternative-APN AVP (AVP code 905~~TBD~~) is of type UTF8String, and contains the value of a new APN. This AVP is optional within the Gmb interface. BM-SC only includes it if the UE must use a different APN for the MBMS PDP Context from the one used in the Join message.

17.7.9 MBMS-Service-Type AVP

The MBMS-Service-Type AVP (AVP code 906) is of type Enumerated, and contains explicit information about the type of service that the BM-SC Start Procedure is about to start.

MULTICAST (0)

The Start Procedure signalled by the BM-SC is for a Multicast Service.

BROADCAST (1)

The Start Procedure signalled by the BM-SC is for a Broadcast Service.

17.8 Gmb specific Experimental-Result-Code AVP values

There are two different types of errors in Diameter; protocol and application errors. A protocol error is one that occurs at the base protocol level, those are covered in the Diameter Base RFC 3588 [66] specific procedures. Application errors, on the other hand, generally occur due to a problem with a function specified in a Diameter application.

Diameter Base RFC 3588 [66] defines a number of Result-Code AVP values that are used to report protocol errors and how those are used. Those procedures and values apply for the present specification.

Due to the Gmb specific AVPs, new applications errors can occur. The Gmb specific errors ~~that can be~~are described by the Experimental- ~~-~~Result-Code AVP ~~are described~~ in this clause, below. Note that according to RFC 3588 [66], the Diameter node ~~must~~ reports only the first error encountered and only one Result-Code AVP or one Experimental-Result AVP is included in the Diameter answer.~~-~~

17.8.1 Success

Result codes~~Errors~~ that fall within the Success category are used to inform a peer that a request has been successfully completed.

The Result-Code AVP values defined in Diameter Base RFC 3588 [66] are applicable.

17.8.2 Permanent Failures

Errors that fall within the Permanent Failures category are used to inform the peer that the request failed, and should not be attempted again.

The Result-Code AVP values defined in Diameter Base RFC 3588 [66] are applicable. Also the following specific Gmb Experimental-Result-Code values are defined:

DIAMETER_ERROR_START_INDICATION (5120~~xx1~~)

This error covers the case when a MBMS Session Start procedure could not be performed due to some of the required session attributes that are necessary to activate the bearer resources are missing (QoS, MBMS Service AreaÖ). The Failed-AVP AVP must contain the missing AVP.

DIAMETER_ERROR_STOP_INDICATION (5121~~xx2~~)

An indication of session stop has been received with no session start procedure running.

DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVICE (5122~~xx3~~)

The requested MBMS service is unknown at the BM-SC.

DIAMETER_ERROR_SERVICE_AREA (5123~~xx4~~)

The MBMS service area indicated for a specific MBMS Bearer Service is unknown or not available.

********** **END OF MODIFIED SECTIONS** **********