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TECHNICAL SPECIFICATION

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Contents

Foreword

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1 Scope

The present document defines a transport protocol for use in the IP multimedia (IM) Core Network (CN) subsystem based on the Diameter base protocol as specified in IETF RFC 6733 [15].

The present document is applicable to:

- The Sh interface between an AS and the HSS.
- The Sh interface between an SCS and the HSS.

Whenever it is possible this document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of Diameter base protocol as specified in IETF RFC 6733 [15]. Where this is not possible, extensions to the Diameter base protocol as specified in IETF RFC 6733 [15] are defined within this document.

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, edition number, version number, etc.) 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 TS 29.328 "IP Multimedia (IM) Subsystem Sh interface; signalling flows and message contents".

[2] 3GPP TS 33.210 "3G Security; Network Domain Security; IP Network Layer Security".

[3] IETF RFC 2960 "Stream Control Transmission Protocol".

[4] Void.

[5] IETF RFC 2234 "Augmented BNF for syntax specifications".

[6] 3GPP TS 29.229 "Cx and Dx Interfaces based on the Diameter protocol; protocol details".

[7] IETF RFC 3589 "Diameter Command Codes for Third Generation Partnership Project (3GPP) Release 5".

[8] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[9] 3GPP TR 33.978 "Security aspects of early IP Multimedia Subsystem (IMS) (Release 6)".

[10] 3GPP TS 29.364 "IMS Application Server Service Data Descriptions for AS interoperability".

[11] 3GPP TS 29.002 "Mobile Application Part (MAP) specification".

[12] IETF RFC 7683: "Diameter Overload Indication Conveyance".

[13] IETF RFC 7944: "Diameter Routing Message Priority".

[14] IETF RFC 8583: "Diameter Load Information Conveyance".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[15] IETF RFC 6733: "Diameter Base Protocol".

[16]] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".

3 Definitions, symbols and abbreviations

3.1 Definitions

Refer to IETF RFC 6733 [15] for the definitions of some terms used in this document.

For the purposes of the present document, the following terms and definitions apply.

Attribute-Value Pair: see IETF RFC 6733 [15], it corresponds to an Information Element in a Diameter message.

Server: SIP-server.

User data: user profile data.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAA	Authentication, Authorization and Accounting
AS	Application Server
ABNF	Augmented Backus-Naur Form
AVP	Attribute-Value Pair
CN	Core Network
DRMP	Diameter Routing Message Priority
DSCP	Differentiated Services Code Point
HSS	Home Subscriber Server
IANA	Internet Assigned Numbers Authority
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
NDS	Network Domain Security
RFC	Request For Comment
SCTP	Stream Control Transport Protocol
UCS	Universal Character Set
URL	Uniform Resource Locator
UTF	UCS Transformation Formats

4 General

he Diameter base protocol as specified in IETF RFC 6733 [15] shall apply except as modified by the defined support of the methods and the defined support of the commands and AVPs, result and event codes specified in clause 6 of this specification. Unless otherwise specified, the procedures (including error handling and unrecognised information handling) are unmodified.

5 Use of the Diameter base protocol

The same clarifications of clause 5 of 3GPP TS 29.229 [6] shall apply to the Sh interface. An exception is that the application identifier for this application is defined in chapter 6.

6 Diameter application for Sh interface

This clause specifies a Diameter application that allows a Diameter server and a Diameter client:

- to download and update transparent and non-transparent user data
- to request and send notifications on changes on user data

The Sh interface protocol 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 Diameter application identifier assigned to the Sh interface application is 16777217 (allocated by IANA).

6.1 Command-Code values

This clause defines Command-Code values for this Diameter application.

Every command is defined by means of the ABNF syntax (as defined in RFC 2234 [5]), according to the Command Code Format (CCF) specification defined in IETF RFC 6733 [15]. Whenever the definition and use of an AVP is not specified in this document, what is stated in 3GPP TS 29.229 [6] shall apply.

NOTE: As the Diameter commands described in this specification have been defined based on the former specification of the Diameter base protocol, the Vendor-Specific-Application-Id AVP is still listed as a required AVP (an AVP indicated as {AVP}) in the command code format specifications defined in this specification to avoid backward compatibility issues, even if the use of this AVP has been deprecated in the new specification of the Diameter base protocol (IETF RFC 6733 [15]).

The command codes for the Sh interface application are taken from the range allocated by IANA in IETF RFC 3589 [7] as assigned in this specification. For these commands, the Application-ID field shall be set to 16777217 (application identifier of the Sh interface application, allocated by IANA).

The following Command Codes are defined in this specification:

Table 6.1.1: Command-Code values

Command-Name	Abbreviation	Code	Clause
User-Data-Request	UDR	306	6.1.1
User-Data-Answer	UDA	306	6.1.2
Profile-Update-Request	PUR	307	6.1.3
Profile-Update-Answer	PUA	307	6.1.4
Subscribe-Notifications-Request	SNR	308	6.1.5
Subscribe-Notifications-Answer	SNA	308	6.1.6
Push-Notification-Request	PNR	309	6.1.7
Push-Notification-Answer	PNA	309	6.1.8

6.1.1 User-Data-Request (UDR) Command

The User-Data-Request (UDR) command, indicated by the Command-Code field set to 306 and the 'R' bit set in the Command Flags field, is sent by a Diameter client to a Diameter server in order to request user data.

Message Format

```
< User-Data -Request> ::=   < Diameter Header: 306, REQ, PXY, 16777217 >
                    < Session-Id >
                    [ DRMP ]
                    { Vendor-Specific-Application-Id }
                    { Auth-Session-State }
                    { Origin-Host }
                    { Origin-Realm }
                    [ Destination-Host ]
                    { Destination-Realm }
                    *[ Supported-Features ]
                    { User-Identity }
                    [ Wildcarded-Public-Identity ]
                    [ Wildcarded-IMPU ]
                    [ Server-Name ]
```

***[Service-Indication]**
***{ Data-Reference }**
***[Identity-Set]**
[Requested-Domain]
[Current-Location]
***[DSAI-Tag]**
[Session-Priority]
[User-Name]
[Requested-Nodes]
[Serving-Node-Indication]
[Pre-paging-Supported]
[Local-Time-Zone-Indication]
[UDR-Flags]
[Call-Reference-Info]
[OC-Supported-Features]
*[AVP]
*[Proxy-Info]
*[Route-Record]

6.1.2 User-Data-Answer (UDA) Command

The User-Data-Answer (UDA) command, indicated by the Command-Code field set to 306 and the 'R' bit cleared in the Command Flags field, is sent by a server in response to the User-Data-Request command. The Experimental-Result AVP may contain one of the values defined in clause 6.2 or in 3GPP TS 29.229 [6].

Message Format

< User-Data-Answer > ::= < Diameter Header: 306, PXY, 16777217 >
< Session-Id >
[DRMP]
{ Vendor-Specific-Application-Id }
[Result-Code]
[Experimental-Result]
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
***[Supported-Features]**
[Wildcarded-Public-Identity]
[Wildcarded-IMPU]
[User-Data]
[OC-Supported-Features]
[OC-OLR]
*[Load]
*[AVP]
[Failed-AVP]
*[Proxy-Info]
*[Route-Record]

6.1.3 Profile-Update-Request (PUR) Command

The Profile-Update-Request (PUR) command, indicated by the Command-Code field set to 307 and the 'R' bit set in the Command Flags field, is sent by a Diameter client to a Diameter server in order to update user data in the server.

Message Format

< Profile-Update-Request > ::= < Diameter Header: 307, REQ, PXY, 16777217 >
< Session-Id >
[DRMP]
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }