3GPP TSG CN Plenary Meeting #20 **NP-030216**
4th – 6th June 2003 Hämeenlinna, FINLAND.

Source: TSG CN WG4

Title: Corrections on Sh-interface

Agenda item: 8.1

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.328	027		N4-030456	Rel-5	Discrepancy between XML schema of Cx and Sh interface	F	
29.329	016		N4-030457	Rel-5	Correction on Current-Location AVP values	F	5.3.0
29.328	029		N4-030476	Rel-5	Correction to the use of User-Identity	F	5.3.2
29.329	018		N4-030477	Rel-5	Correction to the use of User-Identity	F	5.3.0
29.328	030		N4-030494	Rel-5	Clarification on the handling of the "Charging Information" via the Sh interface	F	5.3.2
29.328	022	1	N4-030627	Rel-5	Co-ordination of Update of Repository Data	F	5.3.2
29.329	014	1	N4-030628	Rel-5	Co-ordination of Update of Repository Data	F	5.3.0
29.328	023	1	N4-030629	Rel-5	Enhanced description of Sh-Pull Request and Response	F	5.3.2
29.329	019	1	N4-030632	Rel-5	Correction to the use of Data-Reference	F	5.3.0
29.328	024	2	N4-030633	Rel-5	Enhanced description of Sh-Notif and Sh-Notif-Subs Request and Response	F	5.3.2
29.329	015	1	N4-030634	Rel-5	Command code correction for UDA plus editorial corrections.	F	5.3.0
29.328	025	2	N4-030636	Rel-5	A range of editorial changes and corrections and additions of references	F	5.3.2

3GPP TSG-CN4 Meeting #19
San Diego, California, USA, 19th – 23rd May 2003

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CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **023** ⌘ **rev** **1** ⌘ Current version: **5.3.2** ⌘

*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:	⌘	Enhanced description of Sh-Pull Request and Response
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	09/04/03
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:	⌘	The current description of the Sh-Pull Request and Response mechanism does not contain enough detail to allow implementers to produce an accurate and easily interoperable implementation, due to some of the required detail being absent in the description of the messages and the HSS reaction to a Request. Also it is not clear whether a single Sh-Pull can be used to retrieve multiple pieces of data or single pieces of data.
Summary of change:	⌘	The section describing the behaviours is rewritten. The aim is to make the description of the behaviours similar to those in 29.228 for Cx interface commands. It is also clarified that Sh-Pull can only retrieve a single piece of data at any one time.
Consequences if not approved:	⌘	Insufficient detail is contained in the specification for consistent implementation across vendors.

Clauses affected:	⌘	6.1.1			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	29.329 CR 019r1
		Y			
		N: **X**	Test specifications		
		N: **X**	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

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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.

6.1.1 Data read (Sh-Pull)

This procedure is used ~~by~~ between the~~an~~ AS and the HSS. The procedure is invoked by the AS and is used:

- T~~t~~o read transparent and/or non-transparent data for a specified user from the HSS. ~~Tables 6.1.1.1 and 6.1.1.2 detail the involved information elements.~~

This procedure is mapped to the commands User-Data-Request/Answer in the Diameter application specified in 3GPP TS 29.329 [5]. Tables 6.1.1.1 and 6.1.1.2 detail the involved information elements.

Table 6.1.1.1: Sh-Pull

Information element name	Mapping to Diameter AVP	Cat.	Description
User Identity (See 7.1)	User-Identity	M	Identity of the user for whom the data is required.
Requested data (See 7. 3)	Data-Reference	M	This information element indicates the ~~list of~~ reference~~s~~ to the requested information. The set of valid reference values are defined in 7. 6.
Requested domain (See 7.2)	Requested-Domain	C	This information element indicates the domains to which the operation is applicable. Check table 7.6.1 to see when it is applicable.
Current Location (See 7.8)	Current-Location	C	This information element indicates whether an active location retrieval has to be initiated or not. It shall be present if Location Information is requested. If this information element takes the value InitiateActiveLocationRetrieval (1) the HSS shall indicate to the MSC/VLR and/or SGSN the need to initiate an active location retrieval.
Service Indication (See 7. 4)	Service-Indication	C~~O~~	IE that identifies, together with the User-Identity and Data-Reference, the set of service related transparent data that is being requested.~~.~~
Application Server Identity (See 7.9)	Origin-Host	M	IE that identifies the AS originator of the request and that is used to check the AS permission list.
Application Server Name	Server-Name	C	IE that is used, together with the user identity and Data-Reference, as key to identify the filter criteria. This element shall be present when the Data-Reference value is InitialFilterCriteria (13).

Table 6.1.1.2: Sh-Pull Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Result (See 7. 5)	Result-Code / Experimental_ Result	M	Result of the request. Result-Code AVP shall be used for errors defined in the Diameter Base Protocol. Experimental-Result AVP shall be used for Sh errors. This is a grouped AVP which contains the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP.
Data (See 7. 6)	User-Data	O	Requested data.

6.1.1.1 Detailed behaviour

The conditions for the inclusion of Requested-Domain as an additional key to the requested data are described in table 7.6.1. If repository data is requested, Service-Indication shall be present in the request. If initial filter criteria are requested, the Server-Name AVP shall contain the SIP URL of the AS that initiates the request; requests for initial filter criteria are limited to those initial filter criteria which are relevant to the requesting AS.

Upon reception of the Sh-Pull request, the HSS shall, in the following order ~~(if there is an error in any of the following steps the HSS shall stop processing and return the corresponding error code, see 3GPP TS 29.329 [5] and 3GPP TS 29.229 [7])~~:

1. Check that the AS sending the request (identified by the Origin-Host AVP) has Sh-Pull permission in the AS Permissions List (See 6.2). If not, Experimental-Result-Code shall be set to DIAMETER_ERROR_OPERATION_NOT_ALLOWED in the Sh-Pull Response.

2. ~~the HSS may c~~Check that the user for whom data is asked exists in HSS. If not, Experimental-Result-Code shall be set to ~~-~~DIAMETER_ERROR_USER_UNKNOWN in the Sh-Pull Response.

3. Check that the requested user data is allowed to be read by the AS.

If the data referenced in the request is not allowed to be read, Experimental-Result Code shall be set to DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ in the Sh-Pull~~Update~~ Response.

~~If the AS is allowed to read at least one datum referenced in the request, the HSS shall continue processing. The HSS shall cCheck that the AS sending the request (identified by the Origin-Host AVP) has Sh-Pull permission in the AS Permissions List (See 6.2). If not, Experimental-Result-Code shall be set to DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ in the Sh-Pull Response.~~

4. Check whether or not the data that is requested to be downloaded by the AS is currently being updated by another entity. If there is an update of the data in progress, the HSS shall delay the Sh-Pull-Resp message until the update has been completed and shall include in the Sh-Pull-Resp message the updated data requested ~~including the update that has just taken place~~.

If there is an error in any of the above steps then the HSS shall stop processing and shall return the error code specified in the respective step (see 3GPP TS 29.329 [5] and 3GPP TS 29.229 [7] for an explanation of the error codes). Otherwise, the requested operation shall take place and the HSS shall return the Result-Code AVP set to DIAMETER_SUCCESS and~~The HSS shall return~~ the requested data identified by User-Identity and Data-Reference in the Sh-Pull Response message. ~~Check table 7.6.1 to see when Requested-Domain must be present in the request as an additional key to the requested data. If repository data are requested Service-Indication shall be present in the request. If initial filter criteria are requested, the Server-Name AVP shall contain the SIP-URL of the AS that initiates the request; requests of initial filter criteria are limited to those initial filter criteria which are relevant to the requesting AS.~~

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San Diego, California, USA, 19th – 23rd May 2003

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CHANGE REQUEST

⌘ **29.328** **CR** **024** ⌘**rev** **2** ⌘ Current version: **5.3.2** ⌘

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

Title:	⌘	Enhanced description of Sh-Notif and Sh-Notif-Subs Request and Response
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	09/04/03
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:	⌘	The current descriptions of the Sh-Notif Request and Response mechanism and the Sh-Notif-Subs Request and Response mechanism do not contain enough detail to allow implementers to produce an accurate and easily interoperable implementation, due to some of the required detail being absent in the description of the messages and the HSS reaction to a Request.
Summary of change:	⌘	The section describing the behaviours is rewritten. The aim is to make the description of the behaviours similar to those in 29.228 for Cx interface commands.
Consequences if not approved:	⌘	Insufficient detail is contained in the specification for consistent implementation across vendors.

Clauses affected:	⌘	6.1.3, 6.1.4

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.1.3 Subscription to notifications (Sh-Subs-Notif)

This procedure is used ~~by an~~between the AS ~~to subscribe to notifications from~~and the HSS ~~of changes in data~~. The procedure is invoked by the AS and is used:

- To subscribe to Notifications for when particular transparent and/or non-transparent data for a specified user is updated, from the HSS. ~~Tables 6.1.3.1 and 6.1.3.2 detail the involved information elements.~~

This procedure is mapped to the commands Subscribe-Notifications-Request/Answer in the Diameter application specified in 3GPP TS 29.329 [5]. Tables 6.1.3.1 and 6.1.3.2 detail the information elements involved.

Table 6.1.3.1: Sh-Subs-Notif

Information element name	Mapping to Diameter AVP	Cat.	Description
User Identity (See 7.1)	User-Identity	M	IMS public identity of the user for whom notifications of data changes are requested.
Requested data (See 7. 3)	Data-Reference	M	This information element includes the ~~list of~~reference~~s~~ to the data on which notifications of change are required (valid reference values are defined in 7. 6).
Subscription request type (See 7.7)	Subs-Req-Type	M	This information element indicates the action requested on subscription to notifications.
Service Indication (See 7. 4)	Service-Indication	O	IE that identifies, together with the User-Identity and Data-Reference, the set of service related transparent data for which notifications of changes are requested..
Application Server Identity (See 7.9)	Origin-Host	M	IE that identifies the AS originator of the request and that is used to check the AS permission list.
Application Server Name	Server-Name	C	IE that is used, together with the user identity and Data-Reference, as key to identify the filter criteria. This element shall be present when the Data-Reference value is InitialFilterCriteria (13).

Table 6.1.3.2: Sh-Subs-Notif Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7. 5)	Result-Code / Experimental-Result	M	Result of the request. Result-Code AVP shall be used for errors defined in the Diameter Base Protocol. Experimental-Result AVP shall be used for Sh errors. This is a grouped AVP which contains the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP.
~~Requested data (See 7.3)~~	~~Data-Reference~~	~~C~~	~~This information element includes the list of references to data for which subscription to notifications of change is rejected by the HSS.~~

6.1.3.1 Detailed behaviour

The HSS shall take note of the subscription request on the data identified by User-Identity and Data-Reference. If notifications on changes of repository data are requested, Service-Indication shall be present in the request. If notifications on changes of filter criteria are requested, the Server-Name AVP shall be used as key to the filter criteria. The Server-Name AVP shall contain the SIP URL of the AS sending the request.

Upon reception of the Sh-Subs-Notif request, the HSS shall, in the following order (if there is an error in any of the following steps the HSS shall stop processing and return the corresponding error code, see 3GPP TS 29.329 [5] and 3GPP TS 29.229 [7]):

1. ~~the HSS may~~ Ccheck that the user for whom notifications are asked exists in HSS. If not, Experimental-Result Code shall be set to DIAMETER_ERROR_USER_UNKNOWN in the Sh-Subs-Notif Response.

2. ~~The HSS shall c~~Check that the AS sending the request (identified by the Origin-Host AVP) has Sh-Subs-Notif permission in the AS Permissions List (See 6.2). If the AS does not have Sh-Subs-Notif permission, Experimental-Result Code shall be set to DIAMETER_ERROR_OPERATION_NOT_ALLOWED in the Sh-Subs-Notif Response.

3. Check that Notifications are allowed for the requested user (see table 7.6). If the Notifications of changes in the data referenced in the request are not allowed, Experimental-Result Code shall be set to DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED in the Sh-Subs-Notif Response.

~~The HSS shall take note of the subscription request on the data identified by User-Identity and Data-Reference. If notifications on changes of repository data are requested Service-Indication shall be present in the request. If notifications on changes of filter criteria are requested the Server-Name AVP shall be used as key to the filter criteria. The Server-Name AVP shall contain the SIP URL of the AS sending the request.~~

~~If there were values of Data-Reference for which the AS is not allowed to subscribe to notifications of change, the HSS shall include the list of values in the Sh-Subs-Notif Resp.~~

6.1.4 Notifications (Sh-Notif)

This procedure is used ~~by~~ between the HSS ~~to send to an~~and the AS. The procedure is invoked by the HSS and is used:

- To inform the AS of ~~notifications of~~ changes in transparent and/or non-transparent data to which the AS has previously subscribed to receive Notifications for, using Sh-Subs-Notif (see 6.1.3). ~~Tables 6.1.4.1 and 6.1.4.2 detail the involved information elements.~~

This procedure is mapped to the commands Push-Notification-Request/Answer in the Diameter application specified in 3GPP TS 29.329 [5]. Tables 6.1.4.1 and 6.1.4.2 detail the involved information elements.

Table 6.1.4.1: Sh-Notif

Information element name	Mapping to Diameter AVP	Cat.	Description
User Identity (See 7.1)	User-Identity	M	IMS public identity of the user which data has changed.
Requested Data (See 7. 6)	User-Data	M	Changed data.

Table 6.1.4.2: Sh-Notif Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7. 5)	Result-Code / Experimental-Result	M	Result of the request. Result-Code AVP shall be used for errors defined in the Diameter Base Protocol. Experimental-Result AVP shall be used for Sh errors. This is a grouped AVP which contains the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP.

6.1.4.1 Detailed behaviour

The keys to the updated data are part of the information element User-Data (See Annex C). When data repository is updated Service-Indication is also part of the information element User-Data.

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CHANGE REQUEST

⌘ **29.328** **CR** **025** ⌘ **rev** **2** ⌘ Current version: **5.3.2** ⌘

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

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

Reason for change:	⌘	There are currently a large number of specifications included within the text of 29.328 that do not appear on the reference list. Similarly, there are places where references are not correctly formatted. A number of other editorial changes are made to align the style of the specification.
Summary of change:	⌘	References updated and format of references corrected. Style of specification aligned.
Consequences if not approved:	⌘	References are not correctly identified – many references are unidentified.

Clauses affected:	⌘	2, 7.5, 7.6, Annex B, Annex D

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

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2 References

[1] 3GPP TS 23.228: "IP Multimedia (IM) Subsystem – Stage 2".

[2] 3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP".

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

[4] 3GPP TS 23.218: "“IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model"”

[5] 3GPP TS 29.329: "Sh Interface based on Diameter – Protocol details"

[6] 3GPP TS 29.228: "IP multimedia (IM) Subsystem Cx Interface; Signalling flows and Message Elements".

[7] 3GPP TS 29.229: "“Cx and Dx Interfaces based on the Diameter protocol ; Protocol details"”

[8] draft-ietf-aaa-diameter-17, "“Diameter Base Protocol"”, work in progress

[9] ITU-T recommendation Q.763: "Signalling System No. 7 - ISDN User Part formats and codes"

[10] 3GPP TS 23.018: "Basic Call Handling; Technical realization"

[11] 3GPP TS 23.003: "Numbering, Addressing and Identification"

[12] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)"

[13] 3GPP TS 29.002: "Mobile Application Part (MAP) specification"

[14] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2"

[15] RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies"

[16] RFC 3261: "SIP: Session Initiation Protocol"

[17] RFC 2806: "URLs for Telephone Calls"

****** *Next Changed Section* ******

7.5 Result

This information element contains the result code of the operation. See 3GPP TS 29.329 [5] for the list of possible values.

7.6 Data

This information element contains an XML document conformant to the XML schema defined in Annex D.

Annex C specifies the UML logical model of the data downloaded via the Sh interface.

Table 7.-6.1 defines the reference values, access key and recommended access rights for the data accessible via the Sh interface. It is a matter of operator policy to further restrict the access rights defined in table 7.-6.1.

Table 7.6.1: Data accessible via Sh interface

Data Ref.	XML tag	Defined in	Access key	May be included in the operations:
0	RepositoryData	7.6.1	Public-Identity + Data-Reference + Service-Indication	Sh-Pull, Sh-Update, Sh-Subs-Notif
10	PublicIdentifiers	7.6.2	User-Identity + Data-Reference	Sh-Pull
11	IMSUserState	7.6.3		Sh-Pull, Sh-Subs-Notif
12	S-CSCFName	7.6.4		Sh-Pull, Sh-Subs-Notif
13	InitialFilterCriteria	7.6.5	User-Identity + Data-Reference + Server-Name	Sh-Pull, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference+ Requested-Domain	Sh-Pull
15	UserState	7.6.7		
16	Charging information	7.6.8		Sh-Pull, Sh-Update

7.6.1 Repository Data

This information element contains transparent data. A data repository may be shared by more than one AS implementing the same service.

7.6.2 PublicIdentifiers

This information element contains the l~~L~~ist of public identities of the user.

7.6.3 IMS User State

This information element contains the IMS User State of the public identifier referenced. Its possible values are:

- ~~-~~REGISTERED~~,~~
- NOT_REGISTERED~~,~~
- AUTHENTICATION_PENDING ~~and~~
- REGISTERED_UNREG_SERVICES.

7.6.4 S-CSCF Name

This information element contains the name of the S-CSCF where a multimedia public identity is registered.

7.6.5 Initial Filter Criteria

This information element contains the triggering information for a service.

For a more detailed description, refer to 3GPP TS 23.218 [4] and 3GPP TS 29.228 [6].

7.6.6 Location Information

This information element~~IE~~ contains the location of the served subscriber in the MSC/VLR if the requested domain is CS, or the location of the served subscriber in the SGSN if the requested domain is PS. If the HSS has to communicate with the MSC/VLR and/or SGSN to retrieve location information, it shall make use of the service MAP-PROVIDE-SUBSCRIBER-INFO.

For both Location Information for CS and Location Information for GPRS, the considerations described in 3GPP TS 23.078 [14] apply.

7.6.6.1 Location information for CS

This information element~~It~~ consists of the following subordinate information elements:

- Location number: defined in ITU-T Recommendation Q.763 [9]. Considerations described in 3GPP TS 23.018 [10] ~~—~~apply.
- Service area ID: defined in 3GPP TS 23.003 [11].
- Global Cell ID: defined in 3GPP TS 23.003 [11].
- Location area ID: defined in 3GPP TS 23.003 [11].
- Geographical Information: defined in 3GPP TS 23.032 [12]. Considerations described in 3GPP TS 23.018 [10] and ~~—~~3GPP TS 29.002 [13] apply.
- Geodetic Information: defined in ITU-T Recommendation Q.763 [9]. Considerations described in 3GPP TS ~~—~~23.018 [10] and 3GPP TS 29.002 [13] apply.
- VLR Number: defined in 3GPP TS 23.003 [11].
- MSC Number: defined in 3GPP TS 23.003 [11].
- Age of location information: defined in 3GPP TS 23.018 [10].
- Current Location Retrieved: shall be present when location information was obtained after a successful paging procedure for Active Location Retrieval.

7.6.6.2 Location information for GPRS

This information element~~It~~ consists of the following subordinate information elements:

- Service area ID: defined in 3GPP TS 23.003 [11].
- Global Cell ID: defined in 3GPP TS 23.003 [11].
- Location area ID: defined in 3GPP TS 23.003 [11].
- Geographical Information: defined in 3GPP TS 23.032 [12]. Considerations described in 3GPP TS 23.018 [10] and ~~—~~3GPP TS 29.002 [13] apply.
- Geodetic Information: defined in ITU-T Recommendation Q.763 [9]. Considerations described in 3GPP TS 23.018 [10] and 3GPP TS 29.002 [13] apply.
- SGSN Number: defined in 3GPP TS 23.003 [11].
- Routing Area ID: defined in 3GPP TS 23.003 [11].
- Current Location Retrieved: shall be present when location information was obtained after a successful paging procedure for Active Location Retrieval.

~~For both information elements, Location Information for CS and Location Information for GPRS, the considerations described in 3GPP TS 23.078 apply.~~

7.6.7 User state

This information element indicates the state of the user in the domain indicated by the Requested-Domain (see 7.2), with the values specified in 3GPP TS 23.078 [14] for Subscriber State and PS Domain Subscriber State. The HSS shall make use of the operation MAP-PROVIDE-SUBSCRIBER-INFO towards the MSC/VLR and/or the SGSN to obtain this information.

7.6.8 Charging information

This information element contains the a~~A~~ddresses of the charging functions (primary event charging function name, secondary event charging function name, primary charging collection function name, secondary charging collection

function name). When a~~the~~ clash occurs between the charging function address(es) received over the ISC interface and those received over the Sh interface, the address(es) received over the ISC interface should take precedence.

NOTE: The use of the Sh interface to retrieve charging function addresses is not intended as a general-purpose alternative to receiving charging function addresses from the ISC interfaces. Rather, it is meant to address a special case where the AS needs to interact with the charging system before initiating a request to a user when the AS has not received the third party REGISTER for that user.

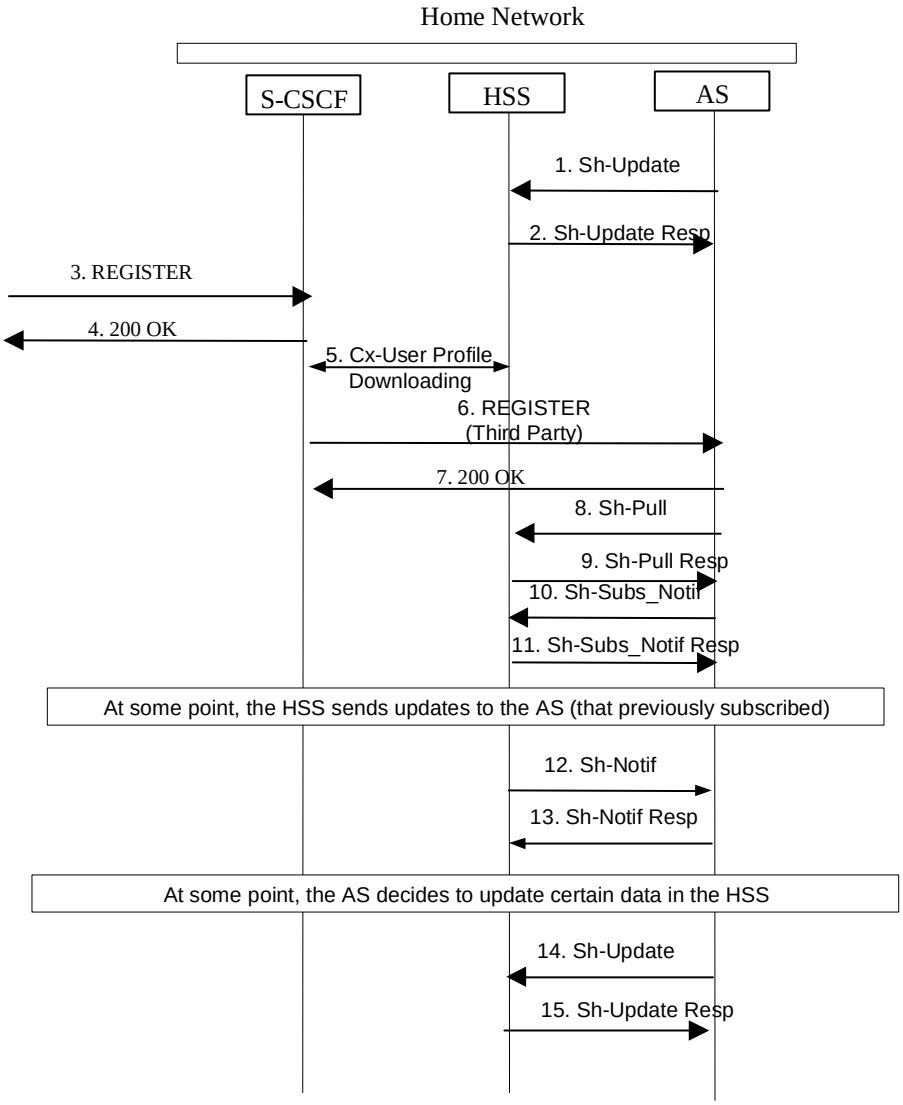
******* Next Changed Section *******

Annex B (informative): Message flow

B.1 Message flows

The following message flows give examples regarding which Diameter messages shall be sent in scenarios described in 3GPP TS 23.218 [4].

B.1.1 Data Update, Registration, Notification Subscription.


Home Network
S-CSCF
HSS
AS
1. Sh-Update
2. Sh-Update Resp
3. REGISTER
4. 200 OK
5. Cx-User Profile Downloading
6. REGISTER (Third Party)
7. 200 OK
8. Sh-Pull
9. Sh-Pull Resp
10. Sh-Subs_Notif
11. Sh-Subs_Notif Resp
At some point, the HSS sends updates to the AS (that previously subscribed)
12. Sh-Notif
13. Sh-Notif Resp
At some point, the AS decides to update certain data in the HSS
14. Sh-Update
15. Sh-Update Resp

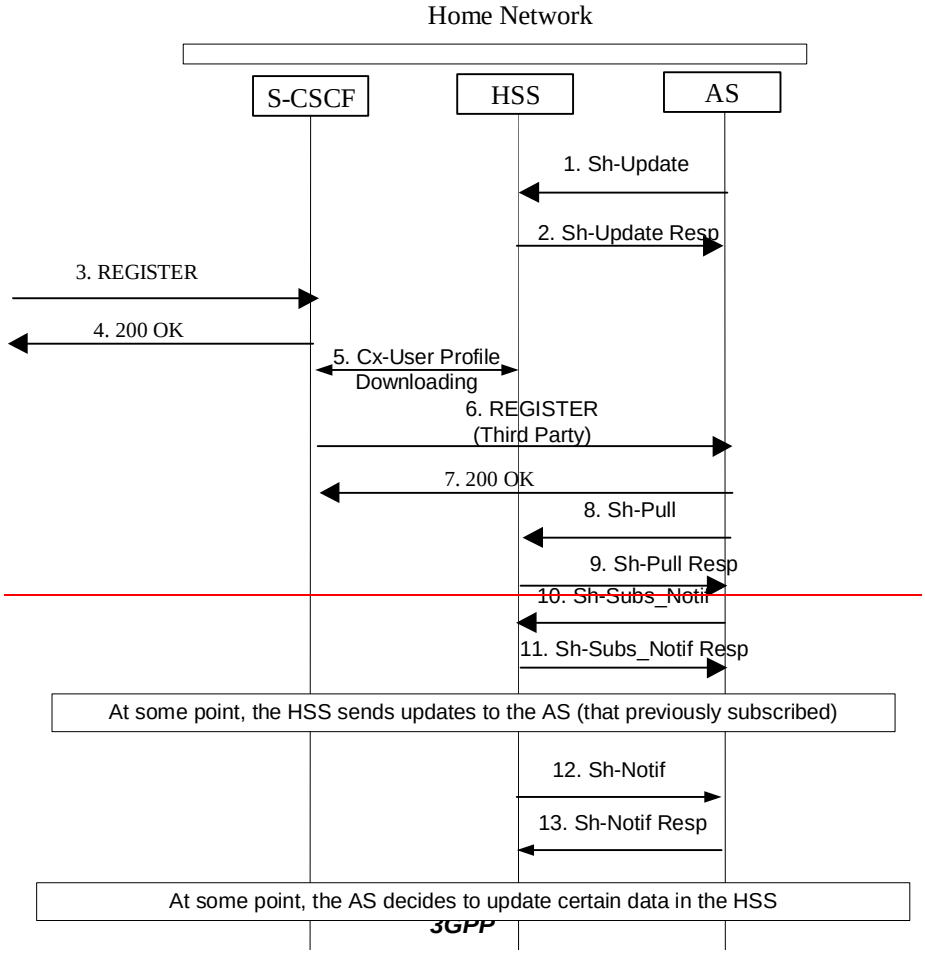

Home Network
S-CSCF
HSS
AS
1. Sh-Update
2. Sh-Update Resp
3. REGISTER
4. 200 OK
5. Cx-User Profile Downloading
6. REGISTER (Third Party)
7. 200 OK
8. Sh-Pull
9. Sh-Pull Resp
10. Sh-Subs_Notif
11. Sh-Subs_Notif Resp
At some point, the HSS sends updates to the AS (that previously subscribed)
12. Sh-Notif
13. Sh-Notif Resp
At some point, the AS decides to update certain data in the HSS

Figure B.1.1: Data Update, Registration, Notification Subscription

1. A user subscribes to a new service. The operator provisions the service in an AS. The AS stores some service data for a user in the HSS, Sh-Update (user identity, updated data) e.g. ~~filter criteria,~~ repository data.
2. HSS confirms the data is updated
3. Some time later, user registers with the network
4. 200 OK
5. S-CSCF downloads the data from the HSS. Filter criteria specify that the AS wants to be notified that the end user is registered.
6. S-CSCF sends third party registration message to the application server to notify that user is registered.
7. 200 OK
8. The AS downloads data needed for providing service from HSS, by means of Sh-Pull (user identity, requested data, and service information).
9. HSS sends data to AS
10. The AS subscribes to notifications from the HSS of changes in data, by means of Sh-Subs-Notif (user identity, requested data, and/or service information).
11. The HSS confirms the subscription request.
12. At some moment, user data is updated in the HSS. As the AS subscribed to notifications (step 10), the HSS sends to the AS the requested updates, by means of Sh-Notif (user identity, updated data).
13. The AS acknowledges the notification.
14. At some moment, the AS decides to update user's service data e.g. repository data~~filter criteria~~ in the HSS, by means of Sh~~Cx~~-Update (user identity, updated data).
15. The HSS confirms the service data is updated.

~~16. If the updated data is needed in the S-CSCF, e.g. filter criteria, the HSS updates the data in the S-CSCF.~~

****** *Next Changed Section* ******

Annex D (normative): XML schema for the Sh interface user profile

The file ShDataType.xsd, attached to this specification, contains the XML schema for the Sh interface user profile. Such XML schema details all the data types on which XML documents containing Sh profile information shall be based. The XML schema file is intended to be used by an XML parser.

Tables D.1 and D.2 describe the data types and the dependencies among them that configure the XML schema.

Table D.1: XML schema for Sh interface: simple data types

Data type	Tag	Base type	Comments
tPriority	Priority	integer	>= 0
tGroupID	Group	integer	>= 0
tDefaultHandling	DefaultHandling	enumerated	Possible values: 0 (SESSION_CONTINUED) 1 (SESSION_TERMINATED)
tDirectionOfRequest	SessionCase	enumerated	Possible values: 0 (ORIGINATING_SESSION) 1 TERMINATING_SESSION 2 (TERMINATING_UNREGISTERED)
tIMSUserState	IMSUserState	Enumerated	Possible values: 0 (NOT_REGISTERED) 1 (REGISTERED) 2 (REGISTERED_UNREG_SERVICES) 3 (AUTHENTICATION_PENDING)
tCSUserState	CSUserState	Enumerated	Possible values (as defined in 3GPP TS 23.078 [14]): 0 (CAMELBusy) 1 (NetworkDeterminedNotReachable) 2 (AssumedIdle) 3 (NotProvidedfromVLR)
tPSUserState	PSUserState	Enumerated	Possible values (as defined in 3GPP TS 23.078 [14]): 0 (Detached) 1 (AttachedNotReachableForPaging) 2 (AttachedReachableForPaging) 3 (ConnectedNotReachableForPaging) 4 (ConnectedReachableForPaging) 5 (NotProvidedFromSGSN)
tLocationNumber	LocationNumber	string	Syntax described in ITU-T Q.763 [9] (~~base 64~~Base64 encoded according to RFC 2045

			[15]). Lengthht >=4 and <=16 (multiples of 4).
tGlobalCellId	GlobalCellId	string	Syntax described in 3GPP TS 29.002 [13] (base 64 Base64 encoded according to RFC 2045 [15]). Length = 12.
tServiceAreaId	ServiceAreaId	string	Syntax described in 3GPP TS 29.002 [13] (base 64 Base64 encoded according to RFC 2045 [15]). Length = 12.
tLocationAreaId	LocationAreaId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045)29.002 [13] (Base64 encoded according to RFC 2045 [15]). Length = 8.
tRoutingAreaId	RoutingAreaId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045)29.002 [13] (Base64 encoded according to RFC 2045 [15]). Length = 8.
tGeographicalInformation	GeographicalInformation	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045)29.002 [13] (Base64 encoded according to RFC 2045 [15]). Length = 12.
tGeodeticInformation	GeodeticInformation	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045)29.002 [13] (Base64 encoded according to RFC 2045 [15]). Length = 16.
tAgeOfLocationInformation	AgeOfLocationInformation	integer	>=0, <=32767
tAddressString	AddressString	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045)29.002 [13] (Base64 encoded according to RFC 2045 [15]). Length >= 4 and <=28 (multiples of 4).
tMSISDN	MSISDN	string	Syntax described in 3GPP TS 23.003 [11].
tSIP_URL	PublicIdentity	anyURI	Syntax described in RFC 3261 [16].
tTEL_URL	PublicIdentity	anyURI	Syntax described in RFC 2806 [17].
tDiameterURI	DiameterURI	string	Syntax of a Diameter URI as described in [8]
tIMSPublicIdentity	IMSPublicIdentity	(union)	Union of tSIP_URL and tTEL_URL

tServiceInfo	ServiceInfo	string	
tString	RequestURI, Method, Header, Content, Line	string	
tBool	ConditionTypeCNF, ConditionNegated	boolean	Possible values: 0 (false) 1 (true)

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CHANGE REQUEST

⌘ **29.328** **CR** **029** ⌘ **rev** **-** ⌘ Current version: **5.3.2** ⌘

*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:	⌘	Correction to the use of User-Identity
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	07/05/2003
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:	⌘	The Public-Identity AVP is used errorneously instead of User-Identity AVP.
Summary of change:	⌘	It is proposed to replace the Public-Identity AVP with the User-Identity AVP in the relevant clauses.
Consequences if not approved:	⌘	Misalignment between 29.328 and 29.329.

Clauses affected:	⌘	7.6			
Other specs affected:	⌘	**Y** / **N**		⌘	CR 29.329 - 018
		X /	Other core specifications		
		/ **X**	Test specifications		
		/ **X**	O&M Specifications		
Other comments:	⌘				

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Below is a brief summary:

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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.

7.6 Data

This information element contains an XML document conformant to the XML schema defined in Annex D.

Annex C specifies the UML logical model of the data downloaded via the Sh interface.

Table 7. 6.1 defines the reference values, access key and recommended access rights for the data accessible via the Sh interface. It is a matter of operator policy to further restrict the access rights defined in table 7. 6.1.

Table 7.6.1: Data accessible via Sh interface

Data Ref.	XML tag	Defined in	Access key	May be included in the operations:
0	RepositoryData	7.6.1	~~Public~~User-Identity + Data-Reference + Service-Indication	Sh-Pull, Sh-Update, Sh-Subs-Notif
10	PublicIdentifiers	7.6.2	User-Identity + Data-Reference	Sh-Pull
11	IMSUserState	7.6.3		Sh-Pull, Sh-Subs-Notif
12	S-CSCFName	7.6.4		Sh-Pull, Sh-Subs-Notif
13	InitialFilterCriteria	7.6.5	User-Identity + Data-Reference + Server-Name	Sh-Pull, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference+ Requested-Domain	Sh-Pull
15	UserState	7.6.7		
16	Charging information	7.6.8		Sh-Pull, Sh-Update

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CHANGE REQUEST

⌘ **29.328** **CR** **030** ⌘ **rev** **-** ⌘ Current version: **5.3.2** ⌘

*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:	⌘	Clarification on the handling of the "Charging Information" via the Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	07/05/2003
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:	⌘	In CN4#18, "Charging Information" was added into information accessible via the Sh interface. This was to allow application servers to retrieve charging function addresses from the HSS. In 29.328, the table 7.6.1 was updated according to this modification. The table 7.6.1 indicates that "Charging Information" may be read (Sh-Pull operation) and modify (Sh-Update operation) via the Sh interface. This is not aligned with the current SA2 and SA5 requirements specifying that the Charging Information could only be retrieved by the AS via the Sh interface (and not modified). It is therefore suggested to remove from the table the possiblity of updating the charging information.
Summary of change:	⌘	Update of the Table 7.6.1 in 29.328 to remove the Sh-Update operation from the possible operations handling Charging Information.
Consequences if not approved:	⌘	Although it is not required by any stage 2 specification, it would be possible for an AS to modify the Charging Information through the Sh interface.

Clauses affected:	⌘	Clause 7.6

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Beginning of the modified section

7.6 Data

This information element contains an XML document conformant to the XML schema defined in Annex D.

Annex C specifies the UML logical model of the data downloaded via the Sh interface.

Table 7. 6.1 defines the reference values, access key and recommended access rights for the data accessible via the Sh interface. It is a matter of operator policy to further restrict the access rights defined in table 7. 6.1.

Table 7.6.1: Data accessible via Sh interface

Data Ref.	XML tag	Defined in	Access key	May be included in the operations:
0	RepositoryData	7.6.1	Public-Identity + Data-Reference + Service-Indication	Sh-Pull, Sh-Update, Sh-Subs-Notif
10	PublicIdentifiers	7.6.2	User-Identity + Data-Reference	Sh-Pull
11	IMSUserState	7.6.3		Sh-Pull, Sh-Subs-Notif
12	S-CSCFName	7.6.4		Sh-Pull, Sh-Subs-Notif
13	InitialFilterCriteria	7.6.5	User-Identity + Data-Reference + Server-Name	Sh-Pull, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference+ Requested-Domain	Sh-Pull
15	UserState	7.6.7		
16	Charging information	7.6.8		Sh-Pull~~, Sh-Update~~

End of the modified section

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CHANGE REQUEST

⌘ **29.329** **CR** **014** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Co-ordination of Update of Repository Data
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	09/04/03
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:	⌘	In CN4 #18, two proposals on the synchronisation of updates of repository data were discussed, but no resolution was found. Since then, considerable work has taken place to find a suitable and agreeable solution to this problem. A mechanism is required to ensure that an AS updating the repository data stored at the HSS for a specific subscriber is updating it based on the most recently stored version of that data. Further, a mechanism is required to allow the HSS to reject updates that are not based on the most recent version of the data stored at the HSS.
Summary of change:	⌘	New cause codes are added
Consequences if not approved:	⌘	HSS is unable to indicate the cause of failure of Sh-Update to AS

Clauses affected:	⌘	6.2.2, 6.2.3, 6.4.2			
Other specs affected:	⌘	**Y**	**N**		
		X		Other core specifications	⌘ 29.328 CR022
			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.

6.2.2 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.

6.2.2.1 DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED (5100)

The data required, in the XML~~LM~~ schema, does not match that which is specified within the HSS.

6.2.2.2 DIAMETER_ERROR_OPERATION_NOT_ALLOWED (5101)

The requested operation is not allowed for the user

6.2.2.3 DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ (5102)

The requested user data is not allowed to be read.

6.2.2.4 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIED (5103)

The requested user data is not allowed to be modified.

6.2.2.5 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED (5104)

The requested user data is not allowed to be notified on changes.

6.2.2.6 DIAMETER_ERROR_TOO_MUCH_DATA (5008)

The size of the data pushed to the receiving entity exceeds its capacity. This error code is defined in 3GPP TS 29.229 [6].

6.2.2.7 DIAMETER_ERROR_TRANSPARENT_DATA_~~NOT_CURRENT_VERSION~~ OUT_OF_SYNC (5105)

The request to update the repository data at the HSS could not be completed because the requested update is based on an out-of-date version of the repository data. That is, the sequence number in the Sh-Update Request message~~,~~ does not match with the immediate successor of the associated sequence number stored for that repository data at the HSS. It is also used where an AS tries to create a new set of repository data when the identified repository data already exists in the HSS.

6.2.3 Transient Failures

Errors that fall within the transient failures category are those used to inform a peer that the request could not be satisfied at the time that it was received. The request may be able to be satisfied in the future.

6.2.3.1 ~~-~~DIAMETER_USER_DATA_NOT_AVAILABLE (4100)

The requested user data is not available at this time to satisfy the requested operation.

6.2.3.2 DIAMETER_PRIOR_UPDATE_IN_PROGRESS (4101)

The request to update the repository data at the HSS could not be completed because the related repository data is currently being updated by another entity.

****** *Next Changed Section* ******

6.4.2 Experimental-Result-Code AVP values

This specification has assigned Experimental-Result-Code AVP values 4100-4101 and 5100-51054. See section 6.2.

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CHANGE REQUEST

⌘ **29.329** **CR** **015** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Command code correction for UDA plus editorial corrections.
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	10/04/03
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:	⌘	Command code is corrected in the description of User-Data-Answer Command. Also, there are a number of misaligned references and a lack of common textual style and format.
Summary of change:	⌘	Textual style is aligned across the document and references are corrected and reformatted. Command code for UDA is corrected.
Consequences if not approved:	⌘	References are not correctly identified. Document doesn't read clearly.

Clauses affected:	⌘	2, 4, 6.1, 6.2, 6.3, 6.3.4, 6.4.3

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments:	⌘	

How to create CRs using this form:
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Below is a brief summary:

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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.

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 (Release 5)”

[2] 3GPP TS 33.210 “3G Security; Network Domain Security; IP Network Layer Security (Release 5)”

[3] IETF RFC 2960 “Stream Control Transmission Protocol”

[4] draft-ietf-aaa-diameter-17.txt, “Diameter Base Protocol”, work in progress

[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 (Release 5)”

[7] draft-loughney-aaa-cc-3gpp-01, “Diameter Command Codes for 3GPP Release 5”

****** *Next Changed Section* ******

4 General

The Diameter Base Protocol as specified in [4] 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~~5~~ of this specification. Unless otherwise specified, the procedures (including error handling and unrecognised information handling) are unmodified.

****** *Next Changed Section* ******

6.1 Command-Code values

This section 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 rules in [4]. Whenever the definition and use of an AVP is not specified in this document, what is stated in [4] or~~-~~ 3GPP TS 29.229 [6] shall apply.

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

The following Command Codes are defined in this specification:

Table 6.1.1: Command-Code values

Command-Name	Abbreviation	Code	Section
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

****** *Next Changed Section* ******

6.1.2 User-Data-Answer (UDA) Command

The User-Data-Answer (UDA~~SAA~~) 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 Result-Code or Experimental-Result AVP may contain one of the values defined in section 6.2 in addition to the values defined in 3GPP TS 29.229 [6].

Message Format

< User-Data-Answer > ::= < Diameter Header: ~~10415: 1~~306: TBD >
< Session-Id >
{ Vendor-Specific-Application-Id }
[Result-Code]
[Experimental-Result]
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
[User-Data]
*[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, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
{ Destination-Host }
{ Destination-Realm }
{ Public-Identity }
{ User-Data }

*[AVP]
*[Proxy-Info]
*[Route-Record]

6.1.4 Profile-Update-Answer (PUA) Command

The Profile-Update-Answer (PUA) command, indicated by the Command-Code field set to 307 and the 'R' bit cleared in the Command Flags field, is sent by a client in response to the Profile-Update-Request command. The Result-Code or Experimental-Result AVP may contain one of the values defined in section 6.2 in addition to the values defined in 3GPP TS 29.229 [6].

Message Format

< Profile-Update-Answer > ::=< Diameter Header: 307, TBD >
< Session-Id >
{ Vendor-Specific-Application-Id }
[Result-Code]
[Experimental-Result]
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
*[AVP]
*[Proxy-Info]
*[Route-Record]

****** *Next Changed Section* ******

6.1.6 Subscribe-Notifications-Answer (SNA) Command

The Subscribe-Notifications-Answer command, indicated by the Command-Code field set to 308 and the 'R' bit cleared in the Command Flags field, is sent by a client in response to the Subscribe-Notifications-Request command. The Result-Code or Experimental-Result AVP may contain one of the values defined in section 6.2 in addition to the values defined in 3GPP TS 29.229 [6].

Message Format

< Subscribe-Notifications-Answer > ::= < Diameter Header: 308, TBD >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
[Result-Code]
[Experimental-Result]
{ Origin-Host }
{ Origin-Realm }
***[Data-Reference]**
*[AVP]
*[Proxy-Info]
*[Route-Record]

6.1.7 Push-Notification-Request (PNR) Command

The Push-Notification-Request (PNR) command, indicated by the Command-Code field set to 309 and the 'R' bit set in the Command Flags field, is sent by a Diameter server to a Diameter client in order to notify changes in the user data in the server.

Message Format

< Push-Notification-Request > ::= < Diameter Header: 309, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }

{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
{ Destination-Host }
{ Destination-Realm }
{ Public-Identity }
{ User-Data }
*[AVP]
*[Proxy-Info]
*[Route-Record]

6.1.8 Push-Notifications-Answer (PNA) Command

The Push-Notifications-Answer (PNA) command, indicated by the Command-Code field set to 309 and the 'R' bit cleared in the Command Flags field, is sent by a client in response to the Push-Notification-Request command. The Result-Code or Experimental-Result AVP may contain one of the values defined in section 6.2 in addition to the values defined in 3GPP TS 29.229 [6].

Message Format

< Push-Notification-Answer > ::=< Diameter Header: 309, TBD >
< Session-Id >
{ Vendor-Specific-Application-Id }
[Result-Code]
[Experimental-Result]
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
*[AVP]
*[Proxy-Info]
*[Route-Record]

****** *Next Changed Section* ******

6.2 Result-Code AVP values

This section defines new result code values that must be supported by all Diameter implementations that conform to this specification. The result codes defined in 3GPP TS 29.229 [6] are also applicable. When one of the result codes defined here is included in a response, it shall be inside an Experimental-Result AVP and Result-Code AVP shall be absent.

****** *Next Changed Section* ******

6.3 AVPs

The following table describes the Diameter AVPs defined for the Sh interface protocol, their AVP Code values, types, possible flag values and whether the AVP may or not be encrypted.

Table 6.3.1: Diameter Multimedia Application AVPs

				AVP Flag rules				
Attribute Name	**AVP Code**	**Section defined**	**Value Type**	**Must**	**May**	**Should not**	**Must not**	**May Encr.**
User-Identity	100	6.3.1	Grouped	M, V				N
MSISDN	101	6.3.2	OctetString	M, V				N

User-Data	102	6.3.3	OctetString	M, V				N
Data-Reference	103	6.3.4	Enumerated	M, V				
Service-Indication	104	6.3.5	OctetString	M, V				N
Subs-Req-Type	105	6.3.6	Enumerated	M, V				N
Requested-Domain	106	6.3.7	Enumerated	M, V				N
Current-Location	107	6.3.8	Enumerated	M, V				N
Server-Name	3	6.3.9	UTF8String	M, V				N
NOTE 1: The AVP header bit denoted as 'M', indicates whether support of the AVP is required. The AVP header bit denoted as 'V', indicates whether the optional Vendor-ID field is present in the AVP header. For further details, see 3GPP TS 29.229 [6]. NOTE 2: Depending on the concrete command.								

****** *Next Changed Section* ******

6.3.4 Data-Reference AVP

The Data-Reference AVP (AVP code 103) is of type Enumerated, and indicates the type of the requested user data in the operation UDR and SNR. Its exact values and meaning is defined in 3GPP TS 29.328 [1]. The following values are defined (more details are given in 3GPP TS 29.328 [1]):

RepositoryData (0)

PublicIdentifiers (10)

This value is used to request the read or notification of changes in the IMS public identities fields

IMSUserState (11)

S-CSCFName (12)

InitialFilterCriteria (13)

This value is used to request initial filter criteria relevant to the requesting AS

LocationInformation (14)

UserState (15)

ChargingInformation (16)

****** *Next Changed Section* ******

6.4.3 Command Code values

This specification assigns the values 306-309 from the range allocated by IANA to 3GPP in- [7~~12~~].

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San Diego, CALIFORNIA, 19th – 23th May 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.329** **CR** **016** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

*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:	⌘	Correction on Current-Location AVP values
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	30/04/2003
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:	⌘	Current-Location AVP can take InitiateActiveLocationRetrieval (1) value and DoNotNeedInitiateActiveLocationRetrieval (0) value depending on whether an initiation of active location retrieval is required or not respectively. However, currently the specification initiates the active location retrieval for both values.
Summary of change:	⌘	Correct the DoNotNeedInitiateActiveLocationRetrieval (0) value to mean that no active location retrieval is needed to initiate.
Consequences if not approved:	⌘	Inconsistency of the values within Current-Location AVP.

Clauses affected:	⌘	6.3.8

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments: ⌘

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

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

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.

Beginning of modified section

6.3.8 Current-Location AVP

The Current-Location AVP (AVP code 107) is of type Enumerated, and indicates whether an active location retrieval has to be initiated or not:

DoNotNeedInitiateActiveLocationRetrieval (0)

The request indicates that the initiation of an active location retrieval is not required.

InitiateActiveLocationRetrieval (1)

It is requested that an active location retrieval is initiated.

End of modified section

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Tdoc N4-030477

CR-Form-v7

CHANGE REQUEST

⌘ **29.329** **CR** **018** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Correction to the use of User-Identity
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	07/05/2003
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:	⌘	The Public-Identity AVP is used errorneously instead of User-Identity AVP.
Summary of change:	⌘	It is proposed to replace the Public-Identity AVP with the User-Identity AVP in the relevant clauses.
Consequences if not approved:	⌘	Misalignment between 29.328 and 29.329.

Clauses affected:	⌘	6.1.3, 6.1.5 and 6.1.7			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	CR 29.328 - 029
		☐ / **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.

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, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
{ Destination-Host }
{ Destination-Realm }
{ User-Identity }~~{ Public-Identity }~~
{ User-Data }
*[AVP]
*[Proxy-Info]
*[Route-Record

********** Next change **********

6.1.5 Subscribe-Notifications-Request (SNR) Command

The Subscribe-Notifications-Request (SNR) command, indicated by the Command-Code field set to 308 and the 'R' bit set in the Command Flags field, is sent by a Diameter client to a Diameter server in order to request notifications of changes in user data.

Message Format

< Subscribe-Notifications-Request > ::= < Diameter Header: 308, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
[Destination-Host]
{ Destination-Realm }
{ User-Identity }~~{ Public-Identity }~~
[Service-Indication]
[Server-Name]
{ Subs-Req-Type }
1*[Data-Reference]
*[AVP]
*[Proxy-Info]
*[Route-Record]

********** Next change **********

6.1.7 Push-Notification-Request (PNR) Command

The Push-Notification-Request (PNR) command, indicated by the Command-Code field set to 309 and the 'R' bit set in the Command Flags field, is sent by a Diameter server to a Diameter client in order to notify changes in the user data in the server.

Message Format

< Push-Notification-Request > ::= < Diameter Header: 309, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
{ Destination-Host }
{ Destination-Realm }
{ User-Identity }~~{ Public-Identity }~~
{ User-Data }
*[AVP]
*[Proxy-Info]
*[Route-Record]

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San Diego, CA, USA, 19th – 23rd May 2003

Tdoc N4-030632

CR-Form-v7

CHANGE REQUEST

⌘ **29.329** **CR** **019** ⌘**rev** **1** ⌘ Current version: **5.3.0** ⌘

*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:	⌘	Correction to the use of Data-Reference
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	21/05/2003
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:	⌘	The Data-Reference AVP is marked to be optional in the ABNF of UDR (Sh-Pull) and SNR (Sh-Subs-Notif) commands, but it should be mandatory according to the TS 29.328. According to the current definition, the UDR and SNR commands can contain multiple Data-Reference AVPs, but it is not defined how to handle situations when only a subset of the requested data is allowed to be read. In order to clarify the situation, the UDR and SNR shall contain only single Data-Reference AVP.
Summary of change:	⌘	It is proposed to change the ABNF of UDR and SNR commands to have mandatory Data-Reference AVP and update the ABNF of UDR and SNR command to contain only single Data-Reference AVP.
Consequences if not approved:	⌘	Misalignment between 29.328 and 29.329 and interoperability problems.

Clauses affected:	⌘	6.1.1 and 6.1.5

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments:	⌘	If CR 29.329 – 017 is approved it shall be implemented after this CR.

How to create CRs using this form:
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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.

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, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
[Destination-Host]
{ Destination-Realm }
{ User-Identity }
[Server-Name]
[Service-Indication]
***{Data-Reference}~~1*[Data-Reference]~~**
***[Requested-Domain]**
[Current-Location]
*[AVP]
*[Proxy-Info]
*[Route-Record]

********** Next change **********

6.1.5 Subscribe-Notifications-Request (SNR) Command

The Subscribe-Notifications-Request (SNR) command, indicated by the Command-Code field set to 308 and the 'R' bit set in the Command Flags field, is sent by a Diameter client to a Diameter server in order to request notifications of changes in user data.

Message Format

< Subscribe-Notifications-Request > ::= < Diameter Header: 308, TBD, REQ, PXY >
< Session-Id >
{ Vendor-Specific-Application-Id }
{ Auth-Session-State }
{ Origin-Host }
{ Origin-Realm }
[Destination-Host]
{ Destination-Realm }
{ Public-Identity }
[Service-Indication]
[Server-Name]
{ Subs-Req-Type }
***{Data-Reference}~~1*[Data-Reference]~~**
*[AVP]
*[Proxy-Info]
*[Route-Record]

3GPP TSG CN WG4 Meeting #19 **N4-030456**
San Diego, CALIFORNIA, 19th – 23th May 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **027** ⌘ **rev** **-** ⌘ Current version: **5.3.2** ⌘

*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:	⌘	Discrepancy between XML schema of Cx and Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	30/04/2003
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:	⌘	XML schema of Cx and Sh interface differ in the order of the elements within the tTrigger complex element.
Summary of change:	⌘	XML schema of Cx lists within tTrigger complex element ConditionTypeCNF and then SPI element. XML schema of Sh lists within tTrigger complex element SPI and then ConditionTypeCNF element. Alignment is performed by following the Cx XML schema.
Consequences if not approved:	⌘	Misalignment between Cx and Sh XML schema.

Clauses affected:	⌘	2, 6.1, 6.4

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments: ⌘

How to create CRs using this form:
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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.

Beginning of modified section

Table D.2: XML schema for Sh interface: complex data types

Data type	Tag	Compound of		
		Tag	Type	Cardinality
tSh-Data	Sh-Data	PublicIdentifiers	tPublicIdentity	0 to 1
		RepositoryData	tTransparentData	0 to 1
		Sh-IMS-Data	tShIMSData	0 to 1
		LocationInformation	tLocationInformation	0 to 1
tTransparentData	RepositoryData	ServiceIndication	string	1
		ServiceData	string	0 to 1
tShIMSData	Sh-IMS-Data	SCSCFName	tSIP_URL	0 to n
		InitialFilterCriteria	tInitialFilterCriteria	0 to 10
		IMSUserState	tIMSUserState	0 to 1
		ChargingInformation	tChargingInformation	0 to 1
tCSLocationInformation	CSLocationInformation	LocationNumber	tLocationNumber	0 to 1
		CellGlobalId	tGlobalCellId	0 to 1
		ServiceAreaId	tServiceAreaId	0 to 1
		LocationAreaId	tLocationAreaId	0 to 1
		GeographicalInformation	tGeographicalInformation	0 to 1
		GeodeticInformation	tGeodeticInformation	0 to 1
		VLRNumber	tISDNAddress	0 to 1
		MSCNumber	tISDNAddress	0 to 1
		CurrentLocationRetrieved	tBool	0 to 1
		AgeOfLocationInformation	tAgeOfLocationInformation	0 to 1

tPSLocationInformation	PSLocationInformation	CellGlobalId		tGlobalCellId	0 to 1
		ServiceAreaId		tServiceAreaId	0 to 1
		LocationAreaId		tLocationAreaId	0 to 1
		RoutingAreaId		tRoutingAreaId	0 to 1
		GeographicalInformation		tGeographicalInformation	0 to 1
		GeodeticInformation		tGeodeticInformation	0 to 1
		SGSNNumber		tISDNAddress	0 to 1
		CurrentLocationRetrieved		tBool	0 to 1
		AgeOfLocationInformation		tAgeOfLocationInformation	0 to 1
tPublicIdentity	PublicIdentity	IMSPublicIdentity		tIMSPublicIdentity	0 to n
		MSISDN		tMSISDN	0 to n
tInitialFilterCriteria	InitialFilterCriteria	Priority		tPriority	1
		TriggerPoint		tTrigger	0 to 1
		ApplicationServer		tApplicationServer	1
tTrigger	TriggerPoint	ConditionTypeCNF~~S PT~~		tBool~~tSePoTri~~	~~0 to n~~1
		~~ConditionTypeCNF~~SPT		~~tBool~~tSePoTri	0 to n~~1~~
tSePoTri	SPT	ConditionNegated		tBool	0 to 1
		Group		tGroupID	1 to n
		Choice of	RequestURI	tString	1
			Method	tString	1
			SIPHeader	tHeader	1

			SessionCase	tDirectionOfRequest	1
			SessionDescription	tSessionDescription	1
tHeader	SIPHeader	Header		tString	1
		Content		tString	0 to 1
tSessionDescription	SessionDescription	Line		tString	1
		Content		tString	0 to 1
tApplicationServer	ApplicationServer	ServerName		tSIP_URL	1
		DefaultHandling		tDefaultHandling	0 to 1
		ServiceInfo		tServiceInfo	0 to 1
tChargingInformation	ChargingInformation	PrimaryEventChargingFunctionName		tDiameterURI	1
		SecondaryEventChargingFunctionName		tDiameterURI	1
		PrimaryChargingCollectionFunctionName		tDiameterURI	1
		SecondaryChargingCollectionFunctionName		tDiameterURI	1
NOTE: “n” shall be interpreted as non-bounded.					

End of modified section

3GPP TSG-CN4 Meeting #19
San Diego, California, USA, 19th – 23rd May 2003

Tdoc ⌘N4-030627

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **022** ⌘ **rev** **1** ⌘ Current version: **5.3.2** ⌘

*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:	⌘	Co-ordination of Update of Repository Data
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	09/04/03
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:	⌘	In CN4 #18, two proposals on the synchronisation of updates of repository data were discussed, but no resolution was found. Since then, considerable work has taken place to find a suitable and agreeable solution to this problem. It is clear that an AS should be updating repository data stored at the HSS, using the data that the HSS has stored at that time as the basis for the update (as opposed to an older version of the relevant repository data). To ensure this happens, a mechanism is required for the HSS to be able to check that the AS is using the correct version of the repository data as the basis for the update. Further, a mechanism is required to allow the HSS to reject updates that are not based on the most recent version of the data stored at the HSS.
Summary of change:	⌘	Considerable logic is described for the HSS to do a series of checks before allowing the Sh-Update initiated by an AS to overwrite the repository data within the HSS. A Sequence Number is introduced so that the HSS can determine which version of the repository data the update that is being performed is based upon.
Consequences if not approved:	⌘	There will be no way for the HSS to determine if the Sh-Update it receives from an AS is based upon the most recent version of the repository data that it holds. Thus, AS's would be able to write over each other's repository data at the HSS, potentially losing important service related information for the subscriber.

Clauses affected:	⌘	6.1.2, Annex C, Annex D

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	29.329 CR014
			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.

6.1.2 Data Update (Sh-Update)

This procedure is used between the~~by an~~ AS ~~to update data in~~and the HSS. The procedure is invoked by the AS and is used:

- To allow the AS to update the transparent (repository) data stored at the HSS for a specified user.

~~Tables 6.1.2.1 and 6.1.2.2 detail the involved information elements.~~

This procedure is mapped to the commands Profile-Update-Request/Answer in the Diameter application specified in 3GPP TS 29.329 [5]. Tables 6.1.2.1 and 6.1.2.2 detail the involved information elements.

Table 6.1.2.1: Sh-Update

Information element name	Mapping to Diameter AVP	Cat.	Description
User Identity (See 7.1)	User-Identity	M	IMS public identity of the user which data is updated.
Data (See 7. 6)	User-Data	M	Updated data.
Application Server Identity (See 7.9)	Origin-Host	M	IE that identifies the AS originator of the request and that is used to check the AS permission list.

Table 6.1.2.2: Sh-Update Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Result (See 7. 5)	Result-Code / Experimental-Result	M	Result of the update of data in the HSS. Result-Code AVP shall be used for errors defined in the Diameter Base Protocol. Experimental-Result AVP shall be used for Sh errors. This is a grouped AVP which contains the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP.

6.1.2.1 Detailed behaviour

Within the Sh-Update Request, the keys to determine the updated data are part of the information element Data (See 7.6). When data in the repository is updated (i.e. added, modified or removed) Service-Indication and Sequence-Number are also sent as part of the information element Data.

Newly added transparent data shall be associated with a Sequence Number of 0 in the Sh-Update Request. Sequence Number value 0 is reserved exclusively for indication of newly added transparent data.

Modified and removed transparent data shall be associated within the Sh-Update Request with a Sequence Number of n+1 where n is the original Sequence Number ~~-~~associated with the transparent data before modification or removal. If n equals 65535, then the next modification or deletion of that transparent data shall be associated with a Sequence Number of 1.

Upon reception of the Sh-Update request,~~-~~ the HSS shall, in the following order:

~~the HSS may c~~Check that the user for whom data is asked to be updated exists in the HSS. ~~If not, Experimental-Result-Code shall be set to DIAMETER_ERROR_USER_UNKNOWN in the Sh-Update Response.~~

1. ~~The HSS shall c~~Check that the AS sending the request (identified by the Origin-Host AVP) has Sh-Update permission in the AS Permissions List (See 6.2). If the AS does not have Sh-Update permission, Experimental-Result-Code shall be set to DIAMETER_ERROR_OPERATION_NOT_ALLOWED in the Sh-Update Response.

2. ~~the HSS may c~~Check that the user for whom data is asked to be updated exists in the HSS. If not, Experimental-Result-Code shall be set to DIAMETER_ERROR_USER_UNKNOWN in the Sh-Update Response.

3. Check that the user data that is requested to be updated by the AS, is allowed to be updated. If the data is not allowed to be updated, Experimental-Result Code shall be set to DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIED in the Sh-Update Response.

4. Check whether or not the data that is requested to be updated by the AS, as identified by the Service-Indication, is currently being updated by another entity. If there is an update of the data in progress, Experimental-Result Code shall be set to DIAMETER_PRIOR_UPDATE_IN_PROGRESS in the Sh-Update Response.

5. ~~The keys to determine the updated data are part of the information element Data (See 7.6). When data in the repository is updated (i.e. added, modified or removed) Service Indication is also sent as part of the information element Data. The HSS shall check whether repository data identified by the Service-Indication is already stored for the user and whether Service Data is received.~~

~~-~~ Check whether or not there is any repository data stored at the HSS already for the specified Service-Indication and the associated user.

- If ~~so, the stored data is replaced with the received data~~repository data identified by the Service-Indication is stored at the HSS for the specified user, check the following premises:

  1. Sequence_Number_in_Sh_Update is not equal to 0

  2. (Sequence_Number_in_Sh_Update - 1) is equal to (Sequence_Number_In_HSS modulo 65535)

  - If either of the above premises is~~are~~ false then Experimental-Result-Code shall be set to DIAMETER_ERROR_TRANSPARENT_DATA_OUT_OF_SYNC in the Sh-Update Response.

  - If both of the above premises are true, then check whether or not Service Data is received within the Sh-Update Req.

    - If Service Data is included in the Sh-Update Req, check whether or not the size of the data is greater than that which the HSS is prepared to accept.

      - If there is more data than the HSS is prepared to accept then Experimental-Result-Code shall be set to DIAMETER_ERROR_TOO_MUCH_DATA and the new data shall be discarded.

      - If the HSS is prepared to accept the data, then the repository data stored at the HSS shall be updated with the repository data sent in the Sh-Update Req and the Sequence Number associated with that repository data shall be updated with that sent in the Sh-Update Req. This triggers the sending of Sh-Notif messages to any other ASs that are subscribed to Notifications for updates to the service data for that user (see 6.1.4).

    - If Service Data is not received, the data stored in the repository at the HSS shall be removed, and as a consequence the Service Indication and the Sequence Number associated with the removed data shall also be removed. This triggers the sending of Sh-Notif messages to any other ASs that are subscribed to Notifications for updates to the service data for that user (see 6.1.4). After sending Sh-Notif messages, the subscriptions to Notifications for the removed Repository Data shall be deleted.

~~-~~

~~If repository data identified by the Service-Indication is stored for the user and Service-Data is not received, the stored data is removed from the repository.~~

- ~~If~~ repository data identified by the Service-Indication is not stored for the user~~, it is understood that~~i.e. the Sh-Update Req intends to create a new repository data,~~., and Service-Data is received, the received data is added to the repository.~~C~~check whether or not the Sequence Number in the Sh-Update Req is 0.

  - If the sequence number is not set to 0, Experimental-Result Code shall be set to DIAMETER_ERROR_TRANSPARENT_DATA_OUT_OF_SYNC

  - If the sequence number is set to 0 check ~~the size of the data~~whether Service Data is included within the Sh-Update Req.

- If Service Data ~~there~~ is not ~~data~~ included in the Sh-Update Req, then Experimental-Result-Code shall be set to DIAMETER_ERROR_OPERATION_NOT_ALLOWED and the ~~update~~operation shall be ignored by the HSS.

- If Service Data is included in the Sh-Update Req, check whether or not the size of the data is greater than that which the HSS is prepared to accept. If there is more data than the HSS is prepared to accept then Experimental-Result-Code shall be set to DIAMETER_ERROR_TOO_MUCH_DATA and the new data shall be discarded.

- If the HSS is prepared to accept the data included in the Sh-Update Req, then the data shall be stored ~~in~~within the data repository in the HSS.

~~If repository data identified by the Service Indication is not stored for the user and Service Data is not received, the repository data is not updated.~~

If there is an error in any of the above steps then the HSS shall stop processing and shall return the error code specified in the respective step (see 3GPP TS 29.329 [5] and 3GPP TS 29.229 [7] for an explanation of the error codes). Otherwise, the requested operation shall take place and the HSS shall return the Result-Code AVP set to DIAMETER_SUCCESS.

NOTE: When an AS receives DIAMETER_ERROR_TRANSPARENT_DATA_OUT_OF_SYNC the AS may attempt to resolve the inconsitency between the version of the repository data that it holds and that stored at the HSS. It may execute a Sh-Pull to retrieve the current version of the data from the HSS or it tmay wait to receive a subsequent Sh-Notif message from the HSS for the affected repository data.

~~If the HSS receives more user data than it is prepared to accept, it shall return Experimental-Result-Code AVP to DIAMETER_ERROR_TOO_MUCH_DATA and discard the data received from the AS.~~

Annex C (informative): UML model of the data downloaded over Sh i/f

The purpose of this UML model is to define in an abstract level the structure of the data downloaded over the Sh interface and describe the purpose of the different information classes included in it.

C.1 General description

The following picture gives an outline of the UML model of the user profile, which is exchanged between the HSS and an AS:

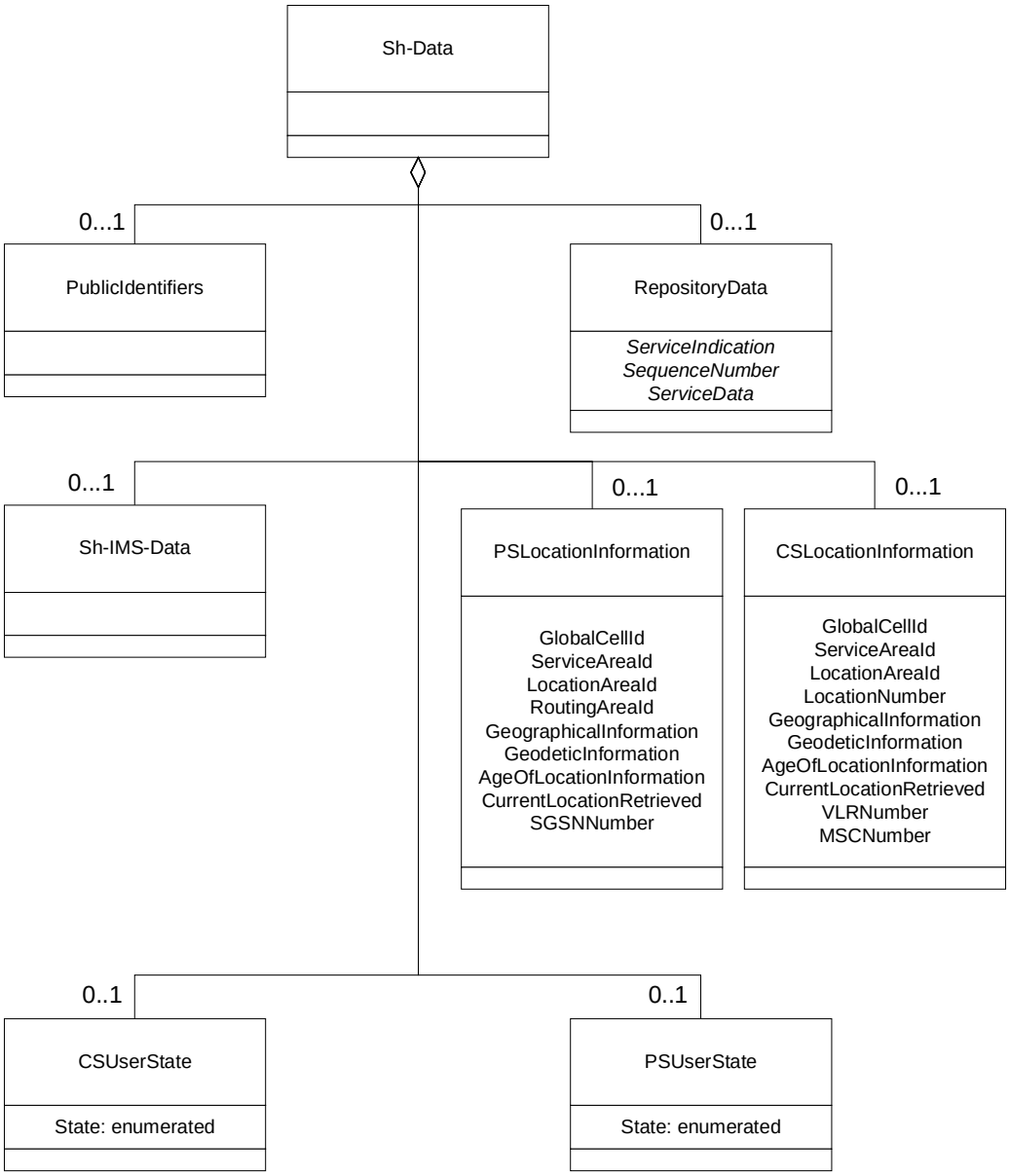

Figure C.1.1: Sh-Data

Each instance of the Sh-Data class contains 0 or 1 instance of the class PublicIdentifiers, 0 or 1 instance of the class Repository, 0 or 1 instance of the class Sh-IMS-Data, 0 or 1 instance of the class CSUserState, 0 or 1 instance of the

class PSUserState and/or 0 or 1 instance of the class CSLocationInformation or 0 or 1 instance of the class PSLocationInformation.

Class RepositoryData contains repository data (transparent data) for a given service. It has attributes ServiceIndication, SequenceNumber and ServiceData.

Class CSUserState contains the state of a user in the CS domain. Its only attribute, State, is an enumeration whose possible values are defined in chapter 7.6.7.

Class PSUserState contains the state of a user in the PS domain. Its only attribute, State, is an enumeration whose possible values are defined in chapter 7.6.7.

NOTE: the fact that attribute State is an enumeration is a difference from what can be carried in the MAP protocol.

Class CSLocationInformation has the attributes Location Number, Service Area ID, GlobalCellId, LocationAreaId, GeographicalInformation, GeodeticInformation, VLR Number, MSC Number, AgeOfLocationInformation and CurrentLocationRetrieved. They are defined in 7.6.

Class PSLocationInformation has the attributes ServiceAreaId, GlobalCellId, LocationAreaID, RoutingAreaID, GeographicalInformation, GeodeticInformation, SGSN Number, AgeOfLocationInformation and CurrentLocationRetrieved. They are defined in 7.6.

C.2 PublicIdentifiers

The following picture details the UML model of the class PublicIdentifiers:

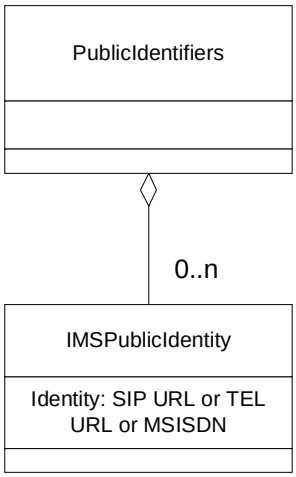

Figure C.2.1: The UML model of the class PublicIdentifiers

Class PublicIdentifiers contains 0 to n user public identities. The identifiers are of format SIP URL, TEL URL or MSISDN.

C.3 Sh-IMS-Data

The following picture details the UML model of the class Sh-IMS-Data.

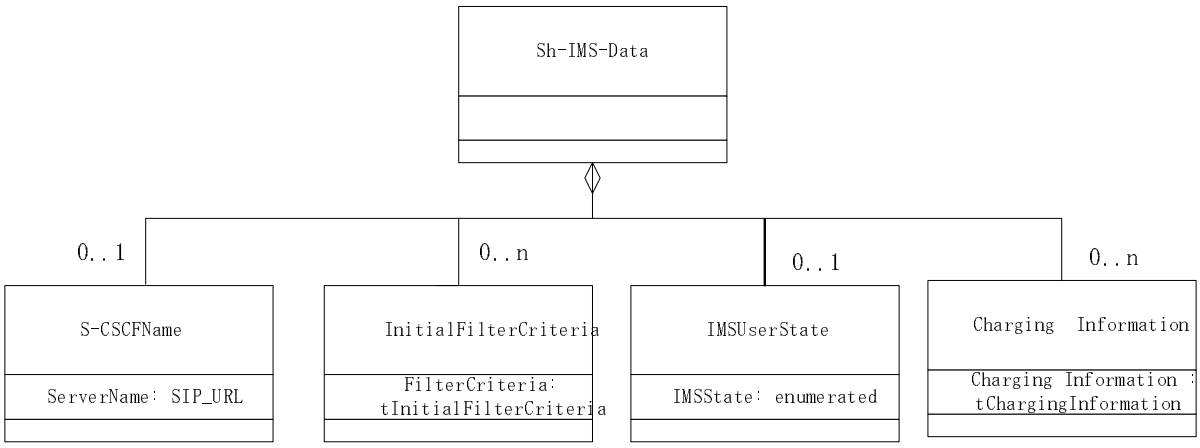

Figure C.3.1: Sh-IMS-Data

Each instance of the class Sh-IMS-Data contains 0 or 1 instance of the class S-CSCFName, 0 to n instances of the class InitialFilterCriteria and/or 0 or 1 instance or the IMSUserState class.

Class S-CSCFName contains the SIP URL of the S-CSCF where the multimedia public identity that the AS included in the request is registered.

Class InitialFilterCriteria is defined in 3GPP TS 29.228 [6] and contains the initial filter criteria of the multimedia public identity that the AS included in the request.

Class IMSUserState contains the registration state of the identity given by the attribute of class Sh-IMS-Data. See chapter 7.6 for possible values.

Class Charging Information contains the online and offline charging function addresses. See chapter 7.6 for possible values.

Annex D (normative): XML schema for the Sh interface user profile

The file ShDataType.xsd, attached to this specification, contains the XML schema for the Sh interface user profile. Such XML schema details all the data types on which XML documents containing Sh profile information shall be based. The XML schema file is intended to be used by an XML parser.

Tables D.1 and D.2 describe the data types and the dependencies among them that configure the XML schema.

Table D.1: XML schema for Sh interface: simple data types

Data type	Tag	Base type	Comments
tPriority	Priority	integer	>= 0
tGroupID	Group	integer	>= 0
tDefaultHandling	DefaultHandling	enumerated	Possible values: 0 (SESSION_CONTINUED) 1 (SESSION_TERMINATED)
tDirectionOfRequest	SessionCase	enumerated	Possible values: 0 (ORIGINATING_SESSION) 1 TERMINATING_SESSION 2 (TERMINATING_UNREGISTERED)
tIMSUserState	IMSUserState	Enumerated	Possible values: 0 (NOT_REGISTERED) 1 (REGISTERED) 2 (REGISTERED_UNREG_SERVICES) 3 (AUTHENTICATION_PENDING)
tCSUserState	CSUserState	Enumerated	Possible values (as defined in 3GPP TS 23.078): 0 (CAMELBusy) 1 (NetworkDeterminedNotReachable) 2 (AssumedIdle) 3 (NotProvidedfromVLR)
tPSUserState	PSUserState	Enumerated	Possible values (as defined in 3GPP TS 23.078): 0 (Detached) 1 (AttachedNotReachableForPaging) 2 (AttachedReachableForPaging) 3 (ConnectedNotReachableForPaging) 4 (ConnectedReachableForPaging) 5 (NotProvidedFromSGSN)
tLocationNumber	LocationNumber	string	Syntax described in ITU-T Q.763 (base 64

			encoded according to RFC 2045). Lenght >=4 and <=16 (multiples of 4).
tGlobalCellId	GlobalCellId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 12.
tServiceAreaId	ServiceAreaId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 12.
tLocationAreaId	LocationAreaId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 8.
tRoutingAreaId	RoutingAreaId	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 8.
tGeographicalInformation	GeographicalInformation	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 12.
tGeodeticInformation	GeodeticInformation	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length = 16.
tAgeOfLocationInformation	AgeOfLocationInformation	integer	>=0, <=32767
tAddressString	AddressString	string	Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC 2045). Length >= 4 and <=28 (multiples of 4).
tMSISDN	MSISDN	string	Syntax described in 3GPP TS 23.003.
tSIP_URL	PublicIdentity	anyURI	Syntax described in RFC 3261
tTEL_URL	PublicIdentity	anyURI	Syntax described in RFC 2806
tDiameterURI	DiameterURI	string	Syntax of a Diameter URI as described in [8]
tIMSPublicIdentity	IMSPublicIdentity	(union)	Union of tSIP_URL and tTEL_URL
tServiceInfo	ServiceInfo	string	
tString	RequestURI, Method, Header, Content, Line	string	
tBool	ConditionTypeCNF,	boolean	Possible values:

	ConditionNegated		0 (false) 1 (true)
tSequenceNumber	SequenceNumber	integer	>=0, <=65535

Table D.2: XML schema for Sh interface: complex data types

Data type	Tag	Compound of		
		Tag	Type	Cardinality
tSh-Data	Sh-Data	PublicIdentifiers	tPublicIdentity	0 to 1
		RepositoryData	tTransparentData	0 to 1
		Sh-IMS-Data	tShIMSData	0 to 1
		LocationInformation	tLocationInformation	0 to 1
tTransparentData	RepositoryData	ServiceIndication	string	1
		SequenceNumber	tSequenceNumber	1
		ServiceData	string	0 to 1
tShIMSData	Sh-IMS-Data	SCSCFName	tSIP_URL	0 to n
		InitialFilterCriteria	tInitialFilterCriteria	0 to 10
		IMSUserState	tIMSUserState	0 to 1
		ChargingInformation	tChargingInformation	0 to 1
tCSLocationInformation	CSLocationInformation	LocationNumber	tLocationNumber	0 to 1
		CellGlobalId	tGlobalCellId	0 to 1
		ServiceAreaId	tServiceAreaId	0 to 1
		LocationAreaId	tLocationAreaId	0 to 1
		GeographicalInformation	tGeographicalInformation	0 to 1
		GeodeticInformation	tGeodeticInformation	0 to 1
		VLRNumber	tISDNAddress	0 to 1
		MSCNumber	tISDNAddress	0 to 1
		CurrentLocationRetrieved	tBool	0 to 1

		AgeOfLocationInformation		tAgeOfLocationInformation	0 to 1
tPSLocationInformation	PSLocationInformation	CellGlobalId		tGlobalCellId	0 to 1
		ServiceAreaId		tServiceAreaId	0 to 1
		LocationAreaId		tLocationAreaId	0 to 1
		RoutingAreaId		tRoutingAreaId	0 to 1
		GeographicalInformation		tGeographicalInformation	0 to 1
		GeodeticInformation		tGeodeticInformation	0 to 1
		SGSNNumber		tISDNAddress	0 to 1
		CurrentLocationRetrieved		tBool	0 to 1
		AgeOfLocationInformation		tAgeOfLocationInformation	0 to 1
tPublicIdentity	PublicIdentity	IMSPublicIdentity		tIMSPublicIdentity	0 to n
		MSISDN		tMSISDN	0 to n
tInitialFilterCriteria	InitialFilterCriteria	Priority		tPriority	1
		TriggerPoint		tTrigger	0 to 1
		ApplicationServer		tApplicationServer	1
tTrigger	Trigger	SPT		tSePoTri	0 to n
		ConditionTypeCNF		tBool	1
tSePoTri	SPT	ConditionNegated		tBool	0 to 1
		Group		tGroupID	1 to n
		Choice of	RequestURI	tString	1
			Method	tString	1
			SIPHeader	tHeader	1

			SessionCase	tDirectionOfRequest	1
			SessionDescription	tSessionDescription	1
tHeader	SIPHeader	Header		tString	1
		Content		tString	0 to 1
tSessionDescription	SessionDescription	Line		tString	1
		Content		tString	0 to 1
tApplicationServer	ApplicationServer	ServerName		tSIP_URL	1
		DefaultHandling		tDefaultHandling	0 to 1
		ServiceInfo		tServiceInfo	0 to 1
tChargingInformation	ChargingInformation	PrimaryEventChargingFunctionName		tDiameterURI	1
		SecondaryEventChargingFunctionName		tDiameterURI	1
		PrimaryChargingCollectionFunctionName		tDiameterURI	1
		SecondaryChargingCollectionFunctionName		tDiameterURI	1
NOTE: “n” shall be interpreted as non-bounded.					

********* Changes to .xsd file *********

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:simpleType name="tSIP_URL" final="list restriction">
    <xs:restriction base="xs:anyURI"/>
  </xs:simpleType>
  <xs:simpleType name="tTEL_URL" final="list restriction">
    <xs:restriction base="xs:anyURI"/>
  </xs:simpleType>
  <xs:simpleType name="tDiameterURI" final="list restriction">
    <xs:restriction base="xs:anyURI"/>
  </xs:simpleType>
  <xs:simpleType name="tIMSPublicIdentity" final="#all">
    <xs:union memberTypes="tSIP_URL tTEL_URL"/>
  </xs:simpleType>
  <xs:simpleType name="tServiceInfo" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
```

```
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tString" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tMSISDN" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tIMSUserState" final="list restriction">
    <xs:restriction base="xs:unsignedByte">
      <xs:maxInclusive value="3"/>
      <xs:enumeration value="0">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">NOT_REGISTERED</label>
            <definition xml:lang="en">Not registered</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">REGISTERED</label>
            <definition xml:lang="en">Registered</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="2">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">REGISTERED_UNREG_SERVICES</label>
            <definition xml:lang="en">Registered, with services for
unregistered</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="3">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">AUTHENTICATION_PENDING </label>
            <definition xml:lang="en">Pending of authentication</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tCSUserState" final="list restriction">
    <xs:restriction base="xs:unsignedByte">
      <xs:maxInclusive value="3"/>
      <xs:enumeration value="0">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">CAMELBusy</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <xs:annotation>
          <xs:documentation>
```

```
            <label xml:lang="en">NetworkDeterminedNotReachable</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="2">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">AssumedIdle</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="3">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">NotProvidedFromVLR</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tPSUserState" final="list restriction">
    <xs:restriction base="xs:unsignedByte">
      <xs:maxInclusive value="5"/>
      <xs:enumeration value="0">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">Detached </label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">AttachedNotReachableForPaging</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="2">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">AttachedReachableForPaging</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="3">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">ConnectedNotReachableForPaging</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="4">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">ConnectedReachableForPaging</label>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="5">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">notProvidedFromSGSN</label>
          </xs:documentation>
```

```
        </xs:annotation>
      </xs:enumeration>
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      <xs:maxLength value="16"/>
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    </xs:restriction>
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    <xs:restriction base="xs:string">
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    </xs:restriction>
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    <xs:restriction base="xs:string">
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    </xs:restriction>
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    </xs:restriction>
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    <xs:restriction base="xs:string">
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    </xs:restriction>
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  <xs:simpleType name="tGeodeticInformation" final="list restriction">
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    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tGroupID" final="list restriction">
    <xs:restriction base="xs:int">
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  </xs:simpleType>
  <xs:simpleType name="tID" final="list restriction">
    <xs:restriction base="xs:int">
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            <definition xml:lang="en">Originating Session</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">TERMINATING_SESSION</label>
            <definition xml:lang="en">Terminating Session</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="2">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">TERMINATING_UNREGISTERED</label>
            <definition xml:lang="en">Terminating Session for unregistered
user</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
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          <xs:documentation>
            <label xml:lang="en">SESSION_CONTINUED</label>
            <definition xml:lang="en">Session Continued</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
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        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">SESSION_TERMINATED</label>
            <definition xml:lang="en">Session Terminated</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
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minOccurs="0"/>
      <xs:element name="RepositoryData" type="tTransparentData" minOccurs="0"/>
      <xs:element name="Sh-IMS-Data" type="tShIMSData" minOccurs="0"/>
      <xs:element name="CSLocationInformation" type="tCSLocationInformation"
minOccurs="0"/>
      <xs:element name="PSLocationInformation" type="tPSLocationInformation"
minOccurs="0"/>
      <xs:element name="CSUserState" type="tCSUserState" minOccurs="0"/>
      <xs:element name="PSUserState" type="tPSUserState" minOccurs="0"/>
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maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tTransparentData">
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maxOccurs="unbounded"/>
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minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="IMSUserState" type="tIMSUserState" minOccurs="0"/>
      <xs:element name="ChargingInformation" type="tChargingInformation"
minOccurs="0"/>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
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  </xs:complexType>
  <xs:complexType name="tCSLocationInformation">
    <xs:sequence>
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        <xs:element name="CellGlobalId" type="tCellGlobalId" minOccurs="0"/>
        <xs:element name="ServiceAreaId" type="tServiceAreaId" minOccurs="0"/>
        <xs:element name="LocationAreaId" type="tLocationAreaId"
minOccurs="0"/>
      </xs:choice>
      <xs:element name="GeographicalInformation"
type="tGeographicalInformation" minOccurs="0"/>
      <xs:element name="GeodeticInformation" type="tGeodeticInformation"
minOccurs="0"/>
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```

```
      <xs:element name="CurrentLocationRetrieved" type="tBool" minOccurs="0"/>
      <xs:element name="AgeOfLocationInformation"
type="tAgeOfLocationInformation" minOccurs="0"/>
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maxOccurs="unbounded"/>
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  <xs:complexType name="tPSLocationInformation">
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      <xs:choice>
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        <xs:element name="ServiceAreaId" type="tServiceAreaId" minOccurs="0"/>
        <xs:element name="LocationAreaId" type="tLocationAreaId"
minOccurs="0"/>
      </xs:choice>
      <xs:element name="RoutingAreaId" type="tRoutingAreaId" minOccurs="0"/>
      <xs:element name="GeographicalInformation"
type="tGeographicalInformation" minOccurs="0"/>
      <xs:element name="GeodeticInformation" type="tGeodeticInformation"
minOccurs="0"/>
      <xs:element name="SGSNNumber" type="tISDNAddress" minOccurs="0"/>
      <xs:element name="CurrentLocationRetrieved" type="tBool" minOccurs="0"/>
      <xs:element name="AgeOfLocationInformation"
type="tAgeOfLocationInformation" minOccurs="0"/>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
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  </xs:complexType>
  <xs:complexType name="tPublicIdentity">
    <xs:sequence>
      <xs:element name="IMSPublicIdentity" type="tIMSPublicIdentity"
minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="MSISDN" type="tMSISDN" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tInitialFilterCriteria">
    <xs:sequence>
      <xs:element name="Priority" type="tPriority"/>
      <xs:element name="TriggerPoint" type="tTrigger" minOccurs="0"/>
      <xs:element name="ApplicationServer" type="tApplicationServer"/>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
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  </xs:complexType>
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maxOccurs="unbounded"/>
      <xs:element name="ConditionTypeCNF" type="tBool"/>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tSePoTri">
    <xs:sequence>
      <xs:element name="ConditionNegated" type="tBool" minOccurs="0"/>
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```

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       <xs:choice>
         <xs:element name="RequestURI" type="tString"/>
         <xs:element name="Method" type="tString"/>
         <xs:element name="SIPHeader" type="tHeader"/>
         <xs:element name="SessionCase" type="tDirectionOfRequest"/>
         <xs:element name="SessionDescription" type="tSessionDescription"/>
       </xs:choice>
       <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
     </xs:sequence>
   </xs:complexType>
   <xs:complexType name="tSessionDescription">
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     </xs:sequence>
   </xs:complexType>
   <xs:complexType name="tHeader">
     <xs:sequence>
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       <xs:element name="Content" type="tString" minOccurs="0"/>
     </xs:sequence>
   </xs:complexType>
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     <xs:sequence>
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       <xs:element name="DefaultHandling" type="tDefaultHandling"
minOccurs="0"/>
       <xs:element name="ServiceInfo" type="tServiceInfo" minOccurs="0"/>
       <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
     </xs:sequence>
   </xs:complexType>
   <xs:complexType name="tChargingInformation">
     <xs:sequence>
       <xs:element name="PrimaryEventChargingFunctionName" type="tDiameterURI"/>
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type="tDiameterURI"/>
       <xs:element name="PrimaryChargingCollectionFunctionName"
type="tDiameterURI"/>
       <xs:element name="SecondaryChargingCollectionFunctionName"
type="tDiameterURI"/>
     </xs:sequence>
   </xs:complexType>
   <xs:element name="Sh-Data" type="tSh-Data"/>
</xs:schema>
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