3GPP TSG CN Plenary Meeting #17 **NP-020450**
4th – 6th September 2002 Biarritz, FRANCE.

Source: TSG CN WG4

Title: IMS

Agenda item: 8.1 IMS Sh-interface

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.328	001	1	N4-021033	Rel5	Correction of Section 7 Numbering and internal referencing	F	5.0.0
29.328	002	1	N4-021034	Rel5	Correction of handling of subscriptions to notifications	F	5.0.0
29.328	003	1	N4-021036	Rel5	Definition of User Location for Sh interface	F	5.0.0
29.328	004	1	N4-021037	Rel5	Definition of User State for Sh interface	F	5.0.0
29.328	005		N4-020905	Rel5	Missing references to XML schema for Sh interface	F	5.0.0
29.328	006		N4-020906	Rel5	Extensibility of XML schema for Sh interface	F	5.0.0
29.329	002	1	N4-021035	Rel5	Cancellation of subscriptions to notifications	F	5.0.0
29.329	003	1	N4-021038	Rel5	Addition of AVPs to User-Data-Request	F	5.0.0

3GPP TSG CN WG4 Meeting #15 ***N4-021033***
Helsinki, Finland, 29th July – 2nd August 2002 **(Revision of N4-020844)**

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **001** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	CR to 29.328 for the Correction of Section 7 Numbering and internal referencing
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	30/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	Section 7.2 is missing and incorrect internal referencing of section 7 sub-sections.
Summary of change:	⌘	Section 7.2 is to be made Void and the internal referencing corrected.
Consequences if not approved:	⌘	There would continue to be incorrect internal referencing within the specification.

Clauses affected:	⌘	6.1, 7

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

⌘

Other comments:	⌘	This CR should be applied before the CR 29.328-004 that introduces the new section 7.2.

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

***** First Modified Section *****

6.1 User data handling procedures

6.1.1 Data read (Sh-Pull)

This procedure is used by an AS to read transparent and/or non-transparent data from the HSS. 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~~2~~)	Data-Reference	M	This information element indicates the list of references to the requested information. The set of valid reference values are defined in 7.~~5~~6.
Service Indication (See 7.3~~4~~)	Service-Indication	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	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the filter criteria.

Table 6.1.1.2: Sh-Pull Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7.4~~5~~)	Result-Code	M	Result of the request.
Requested data (See 7.~~5~~6)	User-Data	O	Requested data.

6.1.1.1 Detailed behaviour

Upon reception of the Sh-Pull request, the HSS may check that the user for whom data is asked exists in HSS. The HSS shall 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).

The HSS shall return the requested data identified by User-Identity and Data-Reference. If repository data are requested Service-Indication shall be present in the request. If filter criteria are requested the Origin-Host AVP identifies the AS that initiates the request.

6.1.2 Data Update (Sh-Update)

This procedure is used by an AS to update data in the HSS. 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.
Updated data (See 7.~~5~~6)	User-Data	M	Updated data.
Application Server Identity	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the updated filter criteria.

Table 6.1.2.2: Sh-Update Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data update result (See 7.~~4~~5)	Result-Code	M	Result of the update of data in the HSS.

6.1.2.1 Detailed behaviour

Upon reception of the Sh-Update request, the HSS may check that the user for whom data is asked exists in HSS. The HSS shall 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).

The keys to determine the updated data are part of the information element User-Data (See Annex X). When data repository is updated Service-Indication is also part of the information element User-Data. When initial filter criteria are updated the Origin-Host AVP identifies the AS that initiates the request.

6.1.3 Subscription to notifications (Sh-Subs-Notif)

This procedure is used by an AS to subscribe to notifications from the HSS of changes in data. Tables 6.1.3.1 and 6.1.3.2 detail the involved information elements.

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.~~2~~3)	Data-Reference	M	This information element includes the list of references to the data on which notifications of change are required (valid reference values are defined in 7.~~5~~6).
Service Indication (See 7.~~3~~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	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the filter criteria.

Table 6.1.3.2: Sh-Subs-Notif Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7.45)	Result-Code	M	Result of the request.

6.1.3.1 Detailed behaviour

Upon reception of the Sh-Subs-Notif request, the HSS may check that the user for whom notifications are asked exists in HSS. The HSS shall 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).

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 Origin-Host AVP shall be used as key to the filter criteria.

6.1.4 Notifications (Sh-Notif)

This procedure is used by the HSS to send to an AS notifications of changes in data to which the AS has previously subscribed using Sh-Subs-Notif. 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.
Changed data (See 7.56)	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 7.45)	Result-Code	M	Result of the request.

6.1.4.1 Detailed behaviour

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

***** Next Modified Section *****

7 Information element contents

7.1 User Identity

This information element contains a user public identity (either SIP-URL, TEL-URL or MSISDN).

7.2 Void

7.3 Data Reference

Reference to the data that an AS is requesting from the HSS. Reference to the data which if changed, an AS wants to be notified of. See chapter 7.6.

7.4 Service Indication

Identifier of one set of service related transparent data,]), which is stored in an HSS in an operator network. It shall be unique within an operator network. Per user and value of Service Indication the HSS may allocate memory space to implement a data repository to store transparent data.

7.5 Result

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

7.6 Data

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

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

Table 7.~~5~~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 relax or further restrict the access rights defined in table 7.~~5~~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	RegistrationState	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 + Origin-Host	Sh-Pull, Sh-Update, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference	Sh-Pull
15	SubscriberState	7.6.7		

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

List of public identities of the user.

7.6.3 Registration State

This information element contains the IMS Registration 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 IE contains geographical and/or geodetic location of the user and/or the age of location information. Geographical information is defined in 3GPP TS 23.032. Geodetic information is defined in ITU-T Recommendation Q.763. The age of location information is defined in 3GPP TS 23.018.

7.6.7 Subscriber state

The exact nature of this information element is FFS.

3GPP TSG CN WG4 Meeting #15 ***N4-021034***
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **002** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Correction of handling of subscriptions to notifications
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	10/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	The procedure Sh-Subs-Notif (used by an AS to subscribe to notifications from the HSS of changes in data) does not allow an AS to cancel a subscription to notifications. Also, its response is not able to convey the list of data references for which the subscription to notifications could not be accepted in the HSS. The AS cannot know which subscriptions to notifications of change succeeded. Essential correction.
Summary of change:	⌘	1. Added the ability to request cancellations of subscriptions to notifications of changes. A new parameter is added to the request to indicate whether it is a subscription request or a subscription cancellation request. 2. Added a new parameter to the response to convey the list of data references for which the subscription to notifications was not accepted in the HSS.
Consequences if not approved:	⌘	It is not possible to cancel subscriptions to notifications of changes in data. This imposes an overload of the HSS that may be sending notifications to an AS that no longer needs them. The HSS cannot indicate to which data references changes an AS couldn't subscribe. The service logic in an AS may not work properly. Although the AS will know of the partial success of the operation it won't know which notifications of changes it will be receiving.

Clauses affected:	⌘	6.1.3, added 7.7, A.3			
Other specs affected:	⌘	**Y** / **N**		⌘	TS 29.329 CR002
		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

6.1.3 Subscription to notifications (Sh-Subs-Notif)

This procedure is used by an AS to subscribe to notifications from the HSS of changes in data. Tables 6.1.3.1 and 6.1.3.2 detail the involved information elements.

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 7.2)	Data-Reference	M	This information element includes the list of references to the data on which notifications of change are required (valid reference values are defined in 7.5).
Subscription request type (See 7.7)	Subs-Req-Type	M	This information element indicates the ~~type~~ action requested on ~~of~~ subscription to notifications ~~requested (e.g. subscribe, unsubscribe).~~
Service Indication (See 7.3)	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	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the filter criteria.

Table 6.1.3.2: Sh-Subs-Notif Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7.4)	Result-Code	M	Result of the request.
Unauthorized data (See 7.2)	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

Upon reception of the Sh-Subs-Notif request, the HSS may check that the user for whom notifications are asked exists in HSS. The HSS shall 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).

The HSS shall take note of the subscription request ~~(or of the cancellation to subscription request, depending on the value of Subs-Req-Type)~~ 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 Origin-Host AVP shall be used as key to the filter criteria.

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

End of modified section

New section

7 Information element contents

…

7.7 Subscription request type

This information element indicates the ~~type of~~ action requested for subscription to notifications ~~request~~. See 3GPP TS 29.329 [5] for the list of valid values.

End of new section

Beginning of modified section

A.3 Sh message parameters to Diameter AVP mapping

The following table gives an overview about the mapping:

Table A.3.1: Sh message parameters to Diameter AVP mapping

Sh parameter	AVP Name
User identity	User-Identity
Requested data, Changed data	Data-Reference
Service Indication	Service-Indication
Result	Result-Code / Vendor-Specific-Result
Requested Data, Updated data	User-Data
Subscription request type	Subs-Req-Type
Unauthorized data	Data-Reference

End of modified section

3GPP TSG CN WG4 Meeting #15 ***N4-021036***
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **003** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

*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:	⌘	Definition of User Location for Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	30/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	SA2'LS S2-022038 (N4-020869) states that the location information transferred on the Sh interface should be aligned with the location information that the HSS can retrieve from the MSC/VLR and SGSN. The current content of location information for Sh interface is currently limited to geographical, geodetic information and age of location. The format of geographic and geodetic information for its transport using XML is not defined. Essential correction.
Summary of change:	⌘	The Sh interface shall provide, upon demand, the same user location information recovered by the HSS from the MSC/VLR and SGSN by means of the MAP-Provide-Subscriber-Info operation. Whenever binary data has to be transferred inside XML, a base 64 encoding according to RFC 2045 shall be used.
Consequences if not approved:	⌘	User Location information recovered over Sh interface would not be aligned with stage 2 requirements stated in TS 23.228.

Clauses affected:	⌘	6.1, new 7.2, 7.6, new 7.7, A.3, C.1, new Annex D, attached ShDataType.xsd and ShDataTypes.xml

	Y	N			
Other specs affected: ⌘	X		Other core specifications	⌘	TS 29.329 CR003
		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

6.1 User data handling procedures

6.1.1 Data read (Sh-Pull)

This procedure is used by an AS to read transparent and/or non-transparent data from the HSS. 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.~~2~~6)	Data-Reference	M	This information element indicates the list of references to the requested information. The set of valid reference values are defined in 7.5.
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 7.7)	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 7.3)	Service-Indication	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	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the filter criteria.

Table 6.1.1.2: Sh-Pull Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7.4)	Result-Code	M	Result of the request.
Requested data (See 7.5)	User-Data	O	Requested data.

6.1.1.1 Detailed behaviour

Upon reception of the Sh-Pull request, the HSS may check that the user for whom data is asked exists in HSS. The HSS shall 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).

The HSS shall return the requested data identified by User-Identity and Data-Reference. 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 filter criteria are requested the Origin-Host AVP identifies the AS that initiates the request.

End of modified section

Beginning of new section

7.2 Requested Domain

This information element details the access domains for which certain data (e.g. user state, location information) are requested. See 3GPP TS 29.329 [5] for the list of possible values.

End of new section

Beginning of modified section

7.6 Data

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

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

Table 7.5.1 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 relax or further restrict the access rights defined in table 7.5.1.

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	RegistrationState	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 + Origin-Host	Sh-Pull, Sh-Update, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference + Requested Domain	Sh-Pull

…Data skipped for clarity

7.6.6 Location Information

This IE contains the location of the served subscriber in the MSC/VLR ~~in case~~ if the requested domain is CS, or the location of the served subscriber in the SGSN ~~in case~~if the requested domain is PS.~~geographical and/or geodetic location of the user and/or the age of location information. Geographical information is defined in 3GPP TS 23.032. Geodetic information is defined in ITU-T Recommendation Q.763. The age of location information is defined in 3GPP TS 23.018.~~ 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.

7.6.6.1 Location information for CS~~:~~

It consists of the following subordinate information elements:

- Location number: defined in ITU-T Recommendation Q.763. Considerations described in 3GPP TS 23.018 apply.

- Service area ID: defined in 3GPP TS 23.003~~18~~.

- ~~-~~ Global Cell ID: defined in 3GPP TS 23.003~~18~~.

- Location area ID: defined in 3GPP TS 23.003

- Geographical Information: defined in 3GPP TS 23.032. Considerations described in 3GPP TS 23.018 and 3GPP TS 29.002 apply.

- Geodetic Information: defined in ITU-T Recommendation Q.763. Considerations described in 3GPP TS 23.018 and 3GPP TS 29.002 apply.

- VLR Number: defined in 3GPP TS 23.003~~18~~.

- MSC Number: defined in 3GPP TS 23.003.

- Age of location information: defined in 3GPP TS 23.018.

- Current Location Retrieved: shall be present when location information was obtained after a successful paging procedure for Active Location Retrieval~~ defined in 3GPP TS 23.018~~.

7.6.6.2 Location information for GPRS~~:~~

It consists of the following subordinate information elements:

- ~~-~~ Service area ID: defined in 3GPP TS 23.003~~18~~.

- Global Cell ID: defined in 3GPP TS 23.003~~18~~.

- Location area ID: defined in 3GPP TS 23.003

- ~~-~~ Geographical Information: defined in 3GPP TS 23.032. Considerations described in 3GPP TS 23.018 and 3GPP TS 29.002 apply.

- Geodetic Information: defined in ITU-T Recommendation Q.763. Considerations described in 3GPP TS 23.018 and 3GPP TS 29.002 apply.

- ~~-~~ SGSN Number: defined in 3GPP TS 23.003~~60~~.

- ~~-~~ Routing Area ID: defined in 3GPP TS 23.003.

- Current Location Retrieved: shall be present when location information was obtained after a successful paging procedure for Active Location Retrieval~~defined in 3GPP TS 23.018~~.

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

End of modified section

Beginning of new section

7.7 Current Location

This information element indicates whether an active location retrieval has to be initiated or not when an AS requested location information. See 3GPP TS 29.329 [5] for the list of possible values.

End of new section

Beginning of modified section

A.3 Sh message parameters to Diameter AVP mapping

The following table gives an overview about the mapping:

Table A.3.1: Sh message parameters to Diameter AVP mapping

Sh parameter	AVP Name
User identity	User-Identity
Requested data, Changed data	Data-Reference
Service Indication	Service-Indication
Result	Result-Code / Vendor-Specific-Result
Requested Data, Updated data	User-Data
Requested Domain	Requested-Domain
Current Location	Current-Location

End of modified section

Beginning of modified section

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:

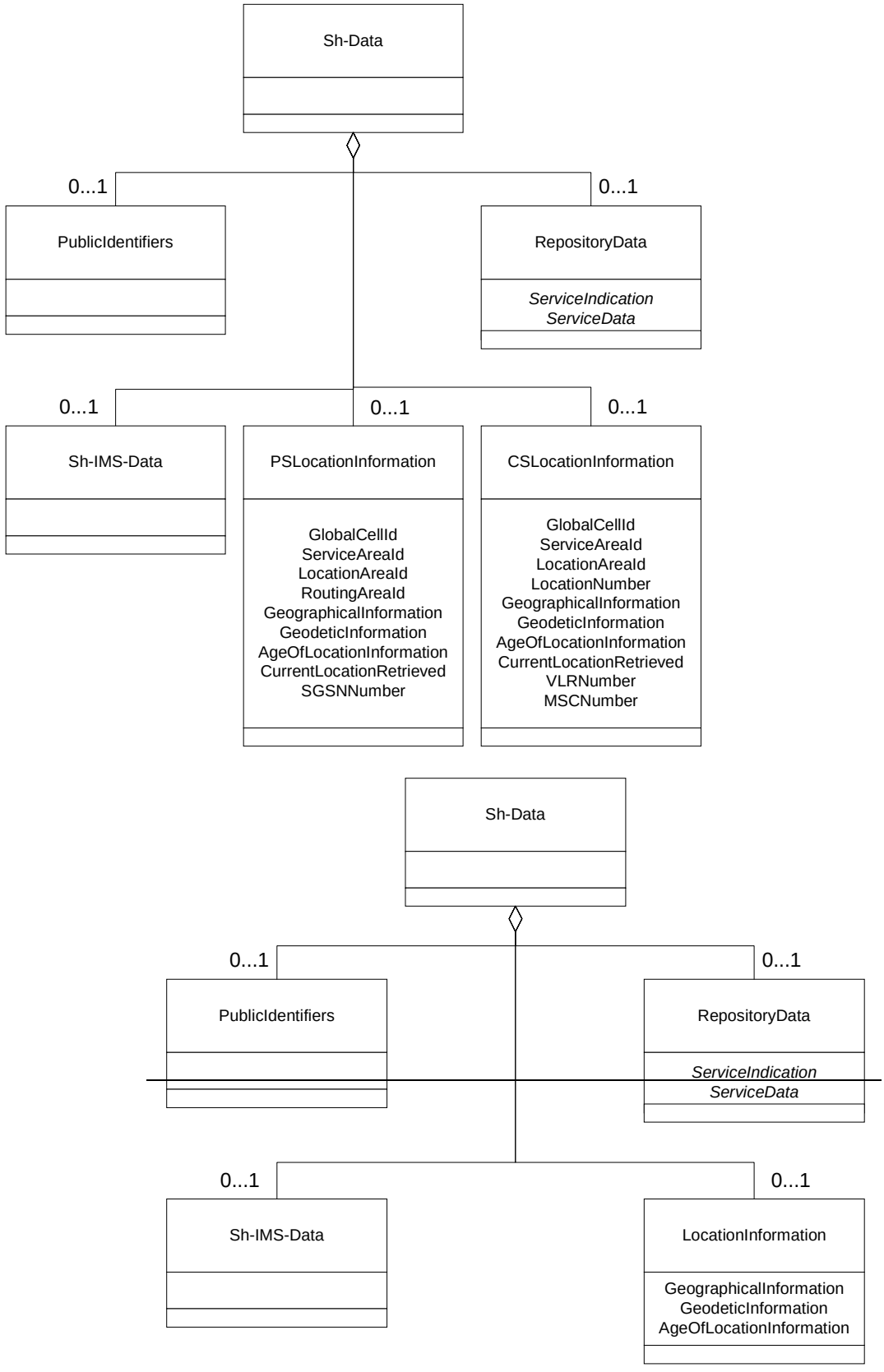

Figure C.1.1: Sh-Data

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, 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 and ServiceData.

Class CSLocationInformation has the attributes Location Number, Service Area ID, GlobalCell-IDd, LocationAreaId, GeographicalInformation, GeodeticInformation, VLR Number, MSC Number, AgeOfLocationInformation and Current Location-Retrieved. They are defined in 7.6. ~~The exact coding of the location information for its transport over XML is for further study.~~

Class PSLocationInformation has the attributes- Service-Area-IDd, GlobalCell-IDd, Location-Area-ID, Routing-Area-ID, GeographicalInformation, GeodeticInformation, SGSN Number, AgeOfLocationInformation and Current-Location Retrieved. They are defined in 7.6.

~~...~~

End of modified section

Beginning of new 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)
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
tIMSPublicIdentity	IMSPublicIdentity	(union)	Union of tSIP_URL and tTEL_URL
tServiceInfo	ServiceInfo	string	
tString	Method, Header, Content, Line	string	
tBool	ConditionTypeCNF, ConditionNegated	enumerated	Possible values: 0 (FALSE) 1 (TRUE)

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
		CSLocationInformation	tCSLocationInformation	0 to 1
		PSLocationInformation	tPSLocationInformation	0 to 1
tTransparentData	RepositoryData	ServiceIndication	string	1
		ServiceData	string	1
tShIMSData	Sh-IMS-Data	SCSCFName	tSIP_URL	0 to 1
		InitialFilterCriteria	tInitialFilterCriteria	0 to 10
		IMSUserState	tIMSUserState	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 20
		MSISDN	tMSISDN	0 to 20
		InitialFilterCriteria	tInitialFilterCriteria	1 to 10
tInitialFilterCriteria	InitialFilterCriteria	Priority	tPriority	1
		TriggerPoint	tTrigger	0 to 1
		ApplicationServer	tApplicationServer	1
tTrigger	Trigger	SPI	tSiPoInt	0 to 25
		ConditionTypeCNF	tBool	1
tSiPoInt	SPI	ConditionNegated	tBool	0 to 1
		Group	tGroupID	1 to 25
		Cn| 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

End of new section

Beginning of changes in ShDataTypes.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="DDF_Schemas\3GPPdatatype2Xsd.xsl"?>
<datatypes xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="DDF_Schemas\3GPPdatatype.xsd">
  <atomicType name="tSIP_URL">
    <!--Syntax described in RFC 3261.-->
    <restriction base="anyURI">
      <pattern value="sip:([0-9a-zA-Z&amp;amp;=\\+$,\\-_\\.!~*'\\(\\)]+(:[0-9a-zA-
Z&amp;amp;=\\+$,\\-_\\.!~*'\\(\\)]+)?@)?((([0-9a-zA-Z]+\\-?[0-9a-zA-Z]+\\.)+[0-9a-
zA-Z]+\\.?)|(([0-9]{1,3}\\.){1,3}[0-9]{1,3}\\.?))(:[0-9]+)?(;[a-zA-Z]+=[a-zA-Z0-
9\\-\\.]*)*"/>
    </restriction>
  </atomicType>
  <atomicType name="tTEL_URL">
    <!--Syntax described in RFC 2806.-->
    <restriction base="anyURI">
      <pattern value="tel:\\\\\+?[0-9A-Dpw\\*#\\-\\.\\(\\)/]+(;[a-zA-Z\\-]+=[0-
9a-zA-Z\\+\\.]+)"/>
    </restriction>
  </atomicType>
  <atomicType name="tIMSPublicIdentity">
    <union>
      <member datatype="tSIP_URL"/>
      <member datatype="tTEL_URL"/>
    </union>
  </atomicType>
  <atomicType name="tServiceInfo">
    <!--TBD-->
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tString">
```

```
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tMSISDN">
    <!--Syntax described in 3GPP TS 23.003-->
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tIMSUserState">
    <restriction base="unsignedByte">
      <maxInclusive value="3"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">NOT_REGISTERED</label>
          <definition lang="en">Not registered</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">REGISTERED</label>
          <definition lang="en">Registered</definition>
        </semantic>
      </enumeration>
      <enumeration value="2">
        <semantic>
          <label lang="en">REGISTERED_UNREG_SERVICES</label>
          <definition lang="en">Registered, with services for
unregistered</definition>
        </semantic>
      </enumeration>
      <enumeration value="3">
        <semantic>
          <label lang="en">AUTHENTICATION_PENDING </label>
          <definition lang="en">Pending of authentication</definition>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <atomicType name="tLocationNumber">
    <!--Syntax described in 3GPP TS 29.002-->ITU-T Q.763 (base 64 encoded
according to RFC 2045)-->
    <restriction base="string">
      <minLength value="2"/>value="4"/>
      <maxLength value="10"/>value="16"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeographicalInformation">name="tCellGlobalId">
    <!--Syntax described in 3GPP TS 23.032-->29.002 (base 64 encoded according
to RFC 2045)-->
    <restriction base="string">
      <length value="8"/>value="12"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeodeticInformation">name="tServiceAreaId">
    <!--Syntax described in ITU-T Q.763-->3GPP TS 29.002 (base 64 encoded
according to RFC 2045)-->
    <restriction base="string">
      <length value="10"/>value="12"/>
    </restriction>
  </atomicType>
  <atomicType name="tLocationAreaId">
```

```
    <!--Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC
2045)-->
    <restriction base="string">
      <length value="8"/>
    </restriction>
  </atomicType>
  <atomicType name="tRoutingAreaId">
    <!--Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC
2045)-->
    <restriction base="string">
      <length value="8"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeographicalInformation">
    <!--Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC
2045)-->
    <restriction base="string">
      <length value="12"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeodeticInformation">
    <!--Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC
2045)-->
    <restriction base="string">
      <length value="16"/>
    </restriction>
  </atomicType>
  <atomicType name="tAddressString">
    <!--Syntax described in 3GPP TS 29.002 (base 64 encoded according to RFC
2045)-->
    <restriction base="string">
      <minLength value="4"/>
      <maxLength value="28"/>

    </restriction>
  </atomicType>
  <atomicType name="tPriority">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tGroupID">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tID">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tDirectionOfRequest">
    <restriction base="unsignedByte">
      <maxInclusive value="3"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">ORIGINATING_SESSION</label>
          <definition lang="en">Originating Session</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">TERMINATING_SESSION</label>
```

```
            <definition lang="en">Terminating Session</definition>
          </semantic>
        </enumeration>
        <enumeration value="2">
          <semantic>
            <label lang="en">TERMINATING_UNREGISTERED</label>
            <definition lang="en">Terminating Session for unregistered
user</definition>
          </semantic>
        </enumeration>
      </restriction>
    </atomicType>
    <atomicType name="tDefaultHandling">
      <restriction base="unsignedByte">
        <maxInclusive value="1"/>
        <enumeration value="0">
          <semantic>
            <label lang="en">SESSION_CONTINUED</label>
            <definition lang="en">Session Continued</definition>
          </semantic>
        </enumeration>
        <enumeration value="1">
          <semantic>
            <label lang="en">SESSION_TERMINATED</label>
            <definition lang="en">Session Terminated</definition>
          </semantic>
        </enumeration>
      </restriction>
    </atomicType>
    <atomicType name="tAgeOfLocationInformation">
      <restriction base="int">
        <minInclusive value="0"/>
        <maxInclusive value="32767"/>

      </restriction>
    </atomicType>
    <atomicType name="tBool">
      <restriction base="boolean">
        <enumeration value="0">
          <semantic>
            <label lang="en">FALSE</label>
            <definition lang="en">False</definition>
          </semantic>
        </enumeration>
        <enumeration value="1">
          <semantic>
            <label lang="en">TRUE</label>
            <definition lang="en">True</definition>
          </semantic>
        </enumeration>
      </restriction>
    </atomicType>
    <recordType name="Sh-Data">
      <fieldVector name="PublicIdentifiers" datatype="tPublicIdentity"
minOccurs="0" maxOccurs="1"/>
      <fieldVector name="RepositoryData" datatype="tTransparentData"
minOccurs="0" maxOccurs="1"/>
      <fieldVector name="Sh-IMS-Data" datatype="tShIMSData" minOccurs="0"
maxOccurs="1"/>
      <fieldVector name="CSLocationInformation" datatype="tCSLocationInformation"
minOccurs="0" maxOccurs="1"/>
```

```
name="LocationInformation" datatype="tLocationInformation"    <fieldVector
name="PSLocationInformation" datatype="tPSLocationInformation" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tTransparentData">
    <fieldVector name="ServiceIndication" datatype="tString" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="ServiceData" datatype="tString" minOccurs="1"
maxOccurs="1"/>
  </recordType>
  <recordType name="tShIMSData">
    <fieldVector name="SCSCFName" datatype="tSIP_URL" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="InitialFilterCriteria" datatype="tInitialFilterCriteria"
minOccurs="0" maxOccurs="10"/>
    <fieldVector name="IMSUserState" datatype="tIMSUserState" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tCSLocationInformation">
    <fieldVector name="AgeOfLocationInformation"
datatype="tAgeOfLocationInformation"name="LocationNumber"
datatype="tLocationNumber" minOccurs="0" maxOccurs="1"/>
    <fieldVector name="CellGlobalId" datatype="tCellGlobalId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="ServiceAreaId" datatype="tServiceAreaId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="LocationAreaId" datatype="tLocationAreaId" minOccurs="0"
maxOccurs="1"/>

    <fieldVector name="GeographicalInformation"
datatype="tGeographicalInformation" minOccurs="0" maxOccurs="1"/>
    <fieldVector name="GeodeticInformation" datatype="tGeodeticInformation"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="VLRNumber" datatype="tISDNAddress" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="MSCNumber" datatype="tISDNAddress" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="CurrentLocationRetrieved" datatype="tBool" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="AgeOfLocationInformation"
datatype="tAgeOfLocationInformation" minOccurs="0" maxOccurs="1"/>
  </recordType>
  <recordType name="tPSLocationInformation">
    <fieldVector name="CellGlobalId" datatype="tCellGlobalId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="ServiceAreaId" datatype="tServiceAreaId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="LocationAreaId" datatype="tLocationAreaId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="RoutingAreaId" datatype="tRoutingAreaId" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="GeographicalInformation"
datatype="tGeographicalInformation" minOccurs="0" maxOccurs="1"/>
    <fieldVector name="GeodeticInformation" datatype="tGeodeticInformation"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="SGSNNumber" datatype="tISDNAddress" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="CurrentLocationRetrieved" datatype="tBool" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="AgeOfLocationInformation"
datatype="tAgeOfLocationInformation" minOccurs="0" maxOccurs="1"/>
  </recordType>
  <recordType name="tISDNAddress">
```

```
    <fieldVector name="Address" datatype="tAddressString" minOccurs="1"
maxOccurs="9"/>

  </recordType>
  <recordType name="tPublicIdentity">
    <fieldVector name="IMSPublicIdentity" datatype="tIMSPublicIdentity"
minOccurs="0" maxOccurs="20"/>
    <fieldVector name="MSISDN" datatype="tMSISDN" minOccurs="0"
maxOccurs="20"/>
  </recordType>
  <recordType name="tInitialFilterCriteria">
    <fieldVector name="Priority" datatype="tPriority" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="TriggerPoint" datatype="tTrigger" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="ApplicationServer" datatype="tApplicationServer"
minOccurs="1" maxOccurs="1"/>
  </recordType>
  <recordType name="tTrigger">
    <fieldVector name="SPI" datatype="tSiPoInt" minOccurs="0" maxOccurs="25"/>
    <fieldVector name="ConditionTypeCNF" datatype="tBool" minOccurs="1"
maxOccurs="1"/>
  </recordType>
  <recordType name="tSiPoInt">
    <fieldVector name="ConditionNegated" datatype="tBool" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="Group" datatype="tGroupID" minOccurs="1"
maxOccurs="25"/>
    <fieldVector name="Method" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="SIPHeader" datatype="tHeader" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="SessionCase" datatype="tDirectionOfRequest"
minOccurs="1" maxOccurs="1"/>
    <fieldVector name="SessionDescription" datatype="tSessionDescription"
minOccurs="1" maxOccurs="1"/>
  </recordType>
  <recordType name="tSessionDescription">
    <fieldVector name="Line" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="Content" datatype="tString" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tHeader">
    <fieldVector name="Header" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="Content" datatype="tString" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tApplicationServer">
    <fieldVector name="ServerName" datatype="tSIP_URL" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="DefaultHandling" datatype="tDefaultHandling"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="ServiceInfo" datatype="tServiceInfo" minOccurs="0"
maxOccurs="1"/>
  </recordType>
</datatypes>
```

End of changes in ShDataTypes.xml

Beginning of changes in ShDataType.xsd

```
<?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:pattern value="sip:([0-9a-zA-Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+(:[0-9a-
zA-Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+)?@)?((([0-9a-zA-Z]+\\-?[0-9a-zA-Z]+\\.)+[0-
9a-zA-Z]+\\.?)|(([0-9]{1,3}\\.){1,3}[0-9]{1,3}\\.?))(:[0-9]+)?(;[a-zA-Z]+=[a-zA-
Z0-9\\-\\.]*)*"/>
     </xs:restriction>
   </xs:simpleType>
   <xs:simpleType name="tTEL_URL" final="list restriction">
     <xs:restriction base="xs:anyURI">
       <xs:pattern value="tel:\\\\\+?[0-9A-Dpw\\*#\\-\\.\\(\\)/]+(;[a-zA-Z\\-
]+=[0-9a-zA-Z\\+\\.]+)"/>
     </xs:restriction>
   </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="tLocationNumber" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:minLength value="2"/>value="4"/>
      <xs:maxLength value="10"/>value="16"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tGeographicalInformation"name="tCellGlobalId"
final="list restriction">
    <xs:restriction base="xs:string">
      <xs:length value="12"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tServiceAreaId" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:length value="12"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tLocationAreaId" final="list restriction">
    <xs:restriction base="xs:string">

      <xs:length value="8"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tRoutingAreaId" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:length value="8"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tGeographicalInformation" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:length value="12"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="tGeodeticInformation" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:length value="10"/>value="16"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tAddressString" final="list restriction">
    <xs:restriction base="xs:string">
      <xs:minLength value="4"/>
      <xs:maxLength value="28"/>

    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tPriority" final="list restriction">
    <xs:restriction base="xs:int">
      <xs:minInclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tGroupID" final="list restriction">
    <xs:restriction base="xs:int">
```

```
      <xs:minInclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tID" final="list restriction">
    <xs:restriction base="xs:int">
      <xs:minInclusive value="0"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tDirectionOfRequest" final="list restriction">
    <xs:restriction base="xs:unsignedByte">
      <xs:maxInclusive value="3"/>
      <xs:enumeration value="0">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">ORIGINATING_SESSION</label>
            <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>
  <xs:simpleType name="tDefaultHandling" final="list restriction">
    <xs:restriction base="xs:unsignedByte">
      <xs:maxInclusive value="1"/>
      <xs:enumeration value="0">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">SESSION_CONTINUED</label>
            <definition xml:lang="en">Session Continued</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <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>
  </xs:simpleType>
  <xs:simpleType name="tAgeOfLocationInformation" final="list restriction">
    <xs:restriction base="xs:int">
      <xs:minInclusive value="0"/>
```

```
        <xs:maxInclusive value="32767"/>

      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tBool" final="list restriction">
      <xs:restriction base="xs:boolean">
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">FALSE</label>
              <definition xml:lang="en">False</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="1">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">TRUE</label>
              <definition xml:lang="en">True</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tSh-Data">
      <xs:sequence>
        <xs:element name="PublicIdentifiers" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tPublicIdentity">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="RepositoryData" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tTransparentData">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="Sh-IMS-Data" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tShIMSData">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="CSLocationInformation" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tCSLocationInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="PSLocationInformation" minOccurs="0">
```

```
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tPSLocationInformation">

                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tTransparentData">
      <xs:sequence>
        <xs:element name="ServiceIndication">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="ServiceData">
          <xs:complexType>
            <xs:sequence>
              <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence><xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>

          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tShIMSData">
      <xs:sequence>
        <xs:element name="SCSCFName" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tSIP_URL">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="InitialFilterCriteria" minOccurs="0" maxOccurs="10">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tInitialFilterCriteria">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="IMSUserState" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tIMSUserState">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
```

```
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tCSLocationInformation">
      <xs:sequence>
        <xs:element ~~name="AgeOfLocationInformation"~~name="LocationNumber"
minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension
~~base="tAgeOfLocationInformation">~~base="tLocationNumber">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:choice>
          <xs:element name="CellGlobalId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tCellGlobalId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
          <xs:element name="ServiceAreaId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tServiceAreaId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
          <xs:element name="LocationAreaId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tLocationAreaId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
        </xs:choice>

        <xs:element name="GeographicalInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tGeographicalInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="GeodeticInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tGeodeticInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
```

```
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="VLRNumber" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tISDNAddress">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="MSCNumber" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tISDNAddress">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="CurrentLocationRetrieved" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tBool">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="AgeOfLocationInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tAgeOfLocationInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>

      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tPSLocationInformation">
      <xs:sequence>
        <xs:choice>
          <xs:element name="CellGlobalId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tCellGlobalId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
          <xs:element name="ServiceAreaId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tServiceAreaId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
```

```
          <xs:element name="LocationAreaId" minOccurs="0">
            <xs:complexType>
              <xs:simpleContent>
                <xs:extension base="tLocationAreaId">
                  <xs:attribute name="index" type="xs:int" use="required"/>
                </xs:extension>
              </xs:simpleContent>
            </xs:complexType>
          </xs:element>
        </xs:choice>
        <xs:element name="RoutingAreaId" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tRoutingAreaId">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="GeographicalInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tGeographicalInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="GeodeticInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tGeodeticInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SGSNNumber" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tISDNAddress">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="CurrentLocationRetrieved" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tBool">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="AgeOfLocationInformation" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tAgeOfLocationInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
```

```
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tISDNAddress">
    <xs:sequence>
      <xs:element name="Address" maxOccurs="9">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tAddressString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="tPublicIdentity">
    <xs:sequence>
      <xs:element name="IMSPublicIdentity" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tIMSPublicIdentity">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="MSISDN" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tMSISDN">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tInitialFilterCriteria">
    <xs:sequence>
      <xs:element name="Priority">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tPriority">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="TriggerPoint" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tTrigger">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ApplicationServer">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tApplicationServer">
```

```
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tTrigger">
  <xs:sequence>
    <xs:element name="ConditionTypeCNF">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tBool">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>

    <xs:element name="SPI" minOccurs="0" maxOccurs="25">
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="tSiPoInt">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="ConditionTypeCNF">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tBool">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tSiPoInt">
  <xs:sequence>
    <xs:element name="ConditionNegated" minOccurs="0">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tBool">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="Group" maxOccurs="25">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tGroupID">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <xs:choice>
      <xs:element name="Method">
        <xs:complexType>
          <xs:simpleContent>
```

```
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="SIPHeader">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tHeader">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="SessionCase">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tDirectionOfRequest">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="SessionDescription">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tSessionDescription">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tSessionDescription">
  <xs:sequence>
    <xs:element name="Line">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tString">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="Content" minOccurs="0">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="tString">
            <xs:attribute name="index" type="xs:int" use="required"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tHeader">
  <xs:sequence>
    <xs:element name="Header">
      <xs:complexType>
        <xs:simpleContent>
```

```
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="Content" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tApplicationServer">
    <xs:sequence>
      <xs:element name="ServerName">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tSIP_URL">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="DefaultHandling" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tDefaultHandling">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ServiceInfo" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tServiceInfo">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:element~~name="testDatatype">~~
    ~~<xs:complexType>~~
      ~~<xs:choice minOccurs="0" maxOccurs="unbounded">~~
        ~~<xs:element name="tSIP_URL" type="tSIP_URL"/>~~
        ~~<xs:element name="tTEL_URL" type="tTEL_URL"/>~~
        ~~<xs:element name="tIMSPublicIdentity" type="tIMSPublicIdentity"/>~~
        ~~<xs:element name="tServiceInfo" type="tServiceInfo"/>~~
        ~~<xs:element name="tString" type="tString"/>~~
        ~~<xs:element name="tMSISDN" type="tMSISDN"/>~~
        ~~<xs:element name="tIMSUserState" type="tIMSUserState"/>~~
        ~~<xs:element name="tLocationNumber" type="tLocationNumber"/>~~
        ~~<xs:element name="tGeographicalInformation"~~
~~type="tGeographicalInformation"/>~~
        ~~<xs:element name="tGeodeticInformation" type="tGeodeticInformation"/>~~
        ~~<xs:element name="tPriority" type="tPriority"/>~~
```

```
          <xs:element name="tGroupID" type="tGroupID"/>
          <xs:element name="tID" type="tID"/>
          <xs:element name="tDirectionOfRequest" type="tDirectionOfRequest"/>
          <xs:element name="tDefaultHandling" type="tDefaultHandling"/>
          <xs:element name="tAgeOfLocationInformation"
type="tAgeOfLocationInformation"/>
          <xs:element name="tBool" type="tBool"/>
          <xs:element name="Sh-Data" type="tSh-Data"/>
          <xs:element name="tTransparentData" type="tTransparentData"/>
          <xs:element name="tShIMSData" type="tShIMSData"/>
          <xs:element name="tLocationInformation" type="tLocationInformation"/>
          <xs:element name="tPublicIdentity" type="tPublicIdentity"/>
          <xs:element name="tInitialFilterCriteria"
type="tInitialFilterCriteria"/>
          <xs:element name="tTrigger" type="tTrigger"/>
          <xs:element name="tSiPoInt" type="tSiPoInt"/>
          <xs:element name="tSessionDescription" type="tSessionDescription"/>
          <xs:element name="tHeader" type="tHeader"/>
          <xs:element name="tApplicationServer" type="tApplicationServer"/>
        </xs:choice>
      </xs:complexType>
    </xs:element>
</xs:schema>
```

End of changes in ShDataType.xsd

3GPP TSG CN WG4 Meeting #15 **N4-021037**
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **004** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Definition of User State for Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	11/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	Being one of the agreed information elements to be accessible over the Sh interface, the concrete format of User State information is not defined yet. Essential correction
Summary of change:	⌘	The possible user states have been taken from 3GPP TS 23.078, both for CS and PS.
Consequences if not approved:	⌘	User state information could not be retrieved over Sh interface.

Clauses affected:	⌘	6.1, new 7.2, 7.6, C.1, attached ShDataType.xsd and ShDataTypes.xml

	Y	N			
Other specs affected: ⌘	X		Other core specifications	⌘	TS 29.329 CR003
		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

6.1 User data handling procedures

6.1.1 Data read (Sh-Pull)

This procedure is used by an AS to read transparent and/or non-transparent data from the HSS. 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 7.2)	Data-Reference	M	This information element indicates the list of references to the requested information. The set of valid reference values are defined in 7.5.
Requested domain	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.
Service Indication (See 7.3)	Service-Indication	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	Origin-Host	M	IE that identifies the AS originator of the request and that is used, together with the user identity and Data-Reference, as key to identify the filter criteria.

Table 6.1.1.2: Sh-Pull Resp

Information element name	Mapping to Diameter AVP	Cat.	Description
Data request result (See 7.4)	Result-Code	M	Result of the request.
Requested data (See 7.5)	User-Data	O	Requested data.

6.1.1.1 Detailed behaviour

Upon reception of the Sh-Pull request, the HSS may check that the user for whom data is asked exists in HSS. The HSS shall 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).

The HSS shall return the requested data identified by User-Identity and Data-Reference. 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 filter criteria are requested the Origin-Host AVP identifies the AS that initiates the request.

End of modified section

Beginning of new section

7.2 Requested Domain

This information element details the access domains for which certain data (e.g. user state) are requested. See 3GPP TS 29.329 [5] for the list of possible values.

End of new section

Beginning of modified section

7.6 Data

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

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

Table 7.5.1 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 relax or further restrict the access rights defined in table 7.5.1.

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	RegistrationState	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 + Origin-Host	Sh-Pull, Sh-Update, Sh-Subs-Notif
14	LocationInformation	7.6.6	User-Identity + Data-Reference + Requested-Domain	Sh-Pull
15	~~SubscriberState~~UserState	7.6.7		

… (data skipped for clarity)

7.6.7 ~~Subscriber~~ 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 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.

~~The exact nature of this information element is FFS.~~

End of modified section

Beginning of modified section

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:

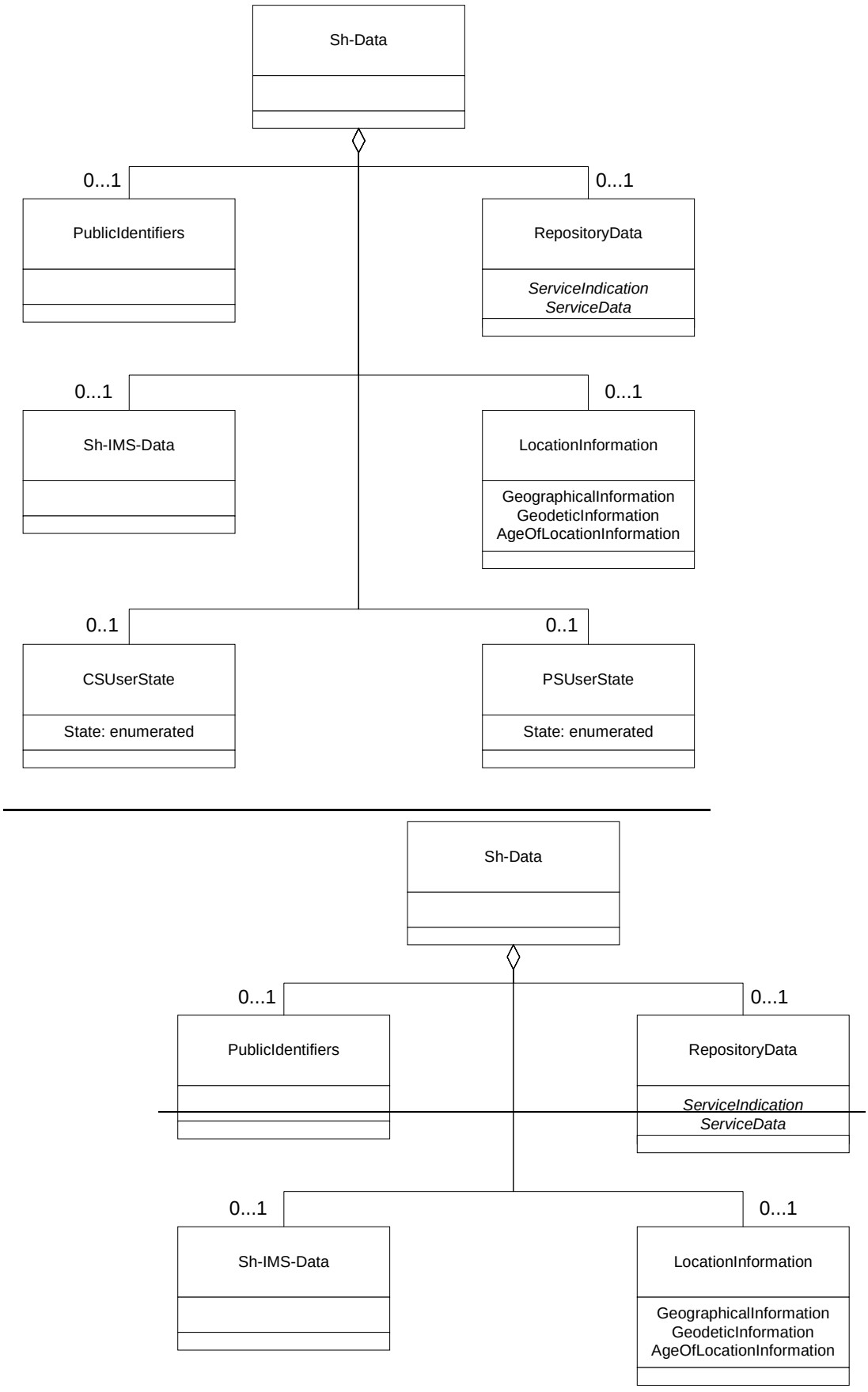

Figure C.1.1: Sh-Data

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 LocationInformation.

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

Class CSUserState contains the state of a user in the CS domain. Its only attribute, State, is an enumeration~~ed~~ whose~~ich~~ 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~~ed~~ whose~~ich~~ 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 LocationInformation has the attributes GeographicalInformation, GeodeticInformation, AgeOfLocationInformation. They are defined in 7.6. The exact coding of the location information for its transport over XML is for further study.

…

End of modified section

Beginning of modified 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): 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	Length >=2 and <=10

tGeographicalInformation	GeographicalInformation	string	Length = 8. Syntax defined in 3GPP TS 23.032.
tGeodeticInformation	GeodeticInformation	string	Length = 10. Syntax defined in ITU-T Q.703.
tAgeOfLocationInformation	AgeOfLocationInformation	integer	>=0, <=32767
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
tIMSPublicIdentity	IMSPublicIdentity	(union)	Union of tSIP_URL and tTEL_URL
tServiceInfo	ServiceInfo	string	
tString	Method, Header, Content, Line	string	
tBool	ConditionTypeCNF, ConditionNegated	enumerated	Possible values: 0 (FALSE) 1 (TRUE)

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
		CSUserState	tCSUserState	0 to 1
		PSUserState	tPSUserState	0 to 1
tTransparentData	RepositoryData	ServiceIndication	string	1
		ServiceData	string	1
tShIMSData	Sh-IMS-Data	SCSCFName	tSIP_URL	0 to 1
		InitialFilterCriteria	tInitialFilterCriteria	0 to 10
		IMSUserState	tIMSUserState	0 to 1
tLocationInformation	LocationInformation	AgeOfLocationInformation	tAgeOfLocationInformation	0 to 1
		GeographicalInformation	tGeographicalInformation	0 to 1
		GeodeticInformation	tGeodeticInformation	0 to 1
tPublicIdentity	PublicIdentity	IMSPublicIdentity	tIMSPublicIdentity	0 to 20
		MSISDN	tMSISDN	0 to 20
		InitialFilterCriteria	tInitialFilterCriteria	1 to 10
tInitialFilterCriteria	InitialFilterCriteria	Priority	tPriority	1
		TriggerPoint	tTrigger	0 to 1
		ApplicationServer	tApplicationServer	1
tTrigger	Trigger	SPI	tSiPoInt	0 to 25
		ConditionTypeCNF	tBool	1

tSiPoInt	SPI	ConditionNegated		tBool	0 to 1
		Group		tGroupID	1 to 25
		Choice of	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

End of modified section

Beginning of changes in ShDataTypes.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="DDF_Schemas\3GPPdatatype2Xsd.xsl"?>
<datatypes xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="DDF_Schemas\3GPPdatatype.xsd">
  <atomicType name="tSIP_URL">
    <!--Syntax described in RFC 3261.-->
    <restriction base="anyURI">
      <pattern value="sip:([0-9a-zA-Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+(:[0-9a-zA-
Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+)?@)?((([0-9a-zA-Z]+\\-?[0-9a-zA-Z]+\\.)+[0-9a-
zA-Z]+\\.?)|(([0-9]{1,3}\\.){1,3}[0-9]{1,3}\\.?))(:[0-9]+)?(;[a-zA-Z]+=[a-zA-Z0-
9\\-\\.]*)*"/>
    </restriction>
  </atomicType>
  <atomicType name="tTEL_URL">
    <!--Syntax described in RFC 2806.-->
    <restriction base="anyURI">
      <pattern value="tel:\\\\\+?[0-9A-Dpw\\*#\\-\\.\\(\\)/]+(;[a-zA-Z\\-]+=[0-
9a-zA-Z\\+\\.]+)"/>
    </restriction>
  </atomicType>
  <atomicType name="tIMSPublicIdentity">
    <union>
      <member datatype="tSIP_URL"/>
```

```
      <member datatype="tTEL_URL"/>
    </union>
  </atomicType>
  <atomicType name="tServiceInfo">
    <!--TBD-->
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tString">
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tMSISDN">
    <!--Syntax described in 3GPP TS 23.003-->
    <restriction base="string">
      <minLength value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tIMSUserState">
    <restriction base="unsignedByte">
      <maxInclusive value="3"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">NOT_REGISTERED</label>
          <definition lang="en">Not registered</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">REGISTERED</label>
          <definition lang="en">Registered</definition>
        </semantic>
      </enumeration>
      <enumeration value="2">
        <semantic>
          <label lang="en">REGISTERED_UNREG_SERVICES</label>
          <definition lang="en">Registered, with services for
unregistered</definition>
        </semantic>
      </enumeration>
      <enumeration value="3">
        <semantic>
          <label lang="en">AUTHENTICATION_PENDING </label>
          <definition lang="en">Pending of authentication</definition>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <atomicType name="tCSUserState">
    <restriction base="unsignedByte">
      <maxInclusive value="3"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">CAMELBusy</label>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">NetworkDeterminedNotReachable</label>
        </semantic>
      </enumeration>
```

```
      <enumeration value="2">
        <semantic>
          <label lang="en">AssumedIdle</label>
        </semantic>
      </enumeration>
      <enumeration value="3">
        <semantic>
          <label lang="en">NotProvidedFromVLR</label>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <atomicType name="tPSUserState">
    <restriction base="unsignedByte">
      <maxInclusive value="5"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">Detached </label>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">AttachedNotReachableForPaging</label>
        </semantic>
      </enumeration>
      <enumeration value="2">
        <semantic>
          <label lang="en">AttachedReachableForPaging</label>
        </semantic>
      </enumeration>
      <enumeration value="3">
        <semantic>
          <label lang="en">ConnectedNotReachableForPaging</label>
        </semantic>
      </enumeration>
      <enumeration value="4">
        <semantic>
          <label lang="en">ConnectedReachableForPaging</label>
        </semantic>
      </enumeration>
      <enumeration value="5">
        <semantic>
          <label lang="en">NotProvidedFromSGSN</label>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>

  <atomicType name="tLocationNumber">
    <!--Syntax described in 3GPP TS 29.002-->
    <restriction base="string">
      <minLength value="2"/>
      <maxLength value="10"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeographicalInformation">
    <!--Syntax described in 3GPP TS 23.032-->
    <restriction base="string">
      <length value="8"/>
    </restriction>
  </atomicType>
  <atomicType name="tGeodeticInformation">
    <!--Syntax described in ITU-T Q.763-->
```

```
    <restriction base="string">
      <length value="10"/>
    </restriction>
  </atomicType>
  <atomicType name="tPriority">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tGroupID">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tID">
    <restriction base="int">
      <minInclusive value="0"/>
    </restriction>
  </atomicType>
  <atomicType name="tDirectionOfRequest">
    <restriction base="unsignedByte">
      <maxInclusive value="3"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">ORIGINATING_SESSION</label>
          <definition lang="en">Originating Session</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">TERMINATING_SESSION</label>
          <definition lang="en">Terminating Session</definition>
        </semantic>
      </enumeration>
      <enumeration value="2">
        <semantic>
          <label lang="en">TERMINATING_UNREGISTERED</label>
          <definition lang="en">Terminating Session for unregistered
user</definition>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <atomicType name="tDefaultHandling">
    <restriction base="unsignedByte">
      <maxInclusive value="1"/>
      <enumeration value="0">
        <semantic>
          <label lang="en">SESSION_CONTINUED</label>
          <definition lang="en">Session Continued</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">SESSION_TERMINATED</label>
          <definition lang="en">Session Terminated</definition>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <atomicType name="tAgeOfLocationInformation">
    <restriction base="int">
      <minInclusive value="0"/>
```

```
    </restriction>
  </atomicType>
  <atomicType name="tBool">
    <restriction base="boolean">
      <enumeration value="0">
        <semantic>
          <label lang="en">FALSE</label>
          <definition lang="en">False</definition>
        </semantic>
      </enumeration>
      <enumeration value="1">
        <semantic>
          <label lang="en">TRUE</label>
          <definition lang="en">True</definition>
        </semantic>
      </enumeration>
    </restriction>
  </atomicType>
  <recordType name="Sh-Data">
    <fieldVector name="PublicIdentifiers" datatype="tPublicIdentity"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="RepositoryData" datatype="tTransparentData"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="Sh-IMS-Data" datatype="tShIMSData" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="LocationInformation" datatype="tLocationInformation"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="CSUserState" datatype="tCSUserState" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="PSUserState" datatype="tPSUserState" minOccurs="0"
maxOccurs="1"/>

  </recordType>
  <recordType name="tTransparentData">
    <fieldVector name="ServiceIndication" datatype="tString" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="ServiceData" datatype="tString" minOccurs="1"
maxOccurs="1"/>
  </recordType>
  <recordType name="tShIMSData">
    <fieldVector name="SCSCFName" datatype="tSIP_URL" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="InitialFilterCriteria" datatype="tInitialFilterCriteria"
minOccurs="0" maxOccurs="10"/>
    <fieldVector name="IMSUserState" datatype="tIMSUserState" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tLocationInformation">
    <fieldVector name="AgeOfLocationInformation"
datatype="tAgeOfLocationInformation" minOccurs="0" maxOccurs="1"/>
    <fieldVector name="GeographicalInformation"
datatype="tGeographicalInformation" minOccurs="0" maxOccurs="1"/>
    <fieldVector name="GeodeticInformation" datatype="tGeodeticInformation"
minOccurs="0" maxOccurs="1"/>
  </recordType>
  <recordType name="tPublicIdentity">
    <fieldVector name="IMSPublicIdentity" datatype="tIMSPublicIdentity"
minOccurs="0" maxOccurs="20"/>
    <fieldVector name="MSISDN" datatype="tMSISDN" minOccurs="0"
maxOccurs="20"/>
  </recordType>
  <recordType name="tInitialFilterCriteria">
```

```
    <fieldVector name="Priority" datatype="tPriority" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="TriggerPoint" datatype="tTrigger" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="ApplicationServer" datatype="tApplicationServer"
minOccurs="1" maxOccurs="1"/>
  </recordType>
  <recordType name="tTrigger">
    <fieldVector name="SPI" datatype="tSiPoInt" minOccurs="0" maxOccurs="25"/>
    <fieldVector name="ConditionTypeCNF" datatype="tBool" minOccurs="1"
maxOccurs="1"/>
  </recordType>
  <recordType name="tSiPoInt">
    <fieldVector name="ConditionNegated" datatype="tBool" minOccurs="0"
maxOccurs="1"/>
    <fieldVector name="Group" datatype="tGroupID" minOccurs="1"
maxOccurs="25"/>
    <fieldVector name="Method" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="SIPHeader" datatype="tHeader" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="SessionCase" datatype="tDirectionOfRequest"
minOccurs="1" maxOccurs="1"/>
    <fieldVector name="SessionDescription" datatype="tSessionDescription"
minOccurs="1" maxOccurs="1"/>
  </recordType>
  <recordType name="tSessionDescription">
    <fieldVector name="Line" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="Content" datatype="tString" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tHeader">
    <fieldVector name="Header" datatype="tString" minOccurs="1" maxOccurs="1"/>
    <fieldVector name="Content" datatype="tString" minOccurs="0"
maxOccurs="1"/>
  </recordType>
  <recordType name="tApplicationServer">
    <fieldVector name="ServerName" datatype="tSIP_URL" minOccurs="1"
maxOccurs="1"/>
    <fieldVector name="DefaultHandling" datatype="tDefaultHandling"
minOccurs="0" maxOccurs="1"/>
    <fieldVector name="ServiceInfo" datatype="tServiceInfo" minOccurs="0"
maxOccurs="1"/>
  </recordType>
</datatypes>
```

End of changes in ShDataTypes.xml

Beginning of changes in ShDataType.xsd

```
<?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:pattern value="sip:([0-9a-zA-Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+(:[0-9a-
zA-Z&amp;=\\+$,\\-_\\.!~*'\\(\\)]+)?@)?((([0-9a-zA-Z]+\\-?[0-9a-zA-Z]+\\.)+[0-
9a-zA-Z]+\\.?)|(([0-9]{1,3}\\.){1,3}[0-9]{1,3}\\.?))(:[0-9]+)?(;[a-zA-Z]+=[a-zA-
Z0-9\\-\\.]*)*"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tTEL_URL" final="list restriction">
```

```
    <xs:restriction base="xs:anyURI">
      <xs:pattern value="tel:\\\\\+?[0-9A-Dpw\\*#\\-\\.\\(\\)/]+(;[a-zA-Z\\-
]+=[0-9a-zA-Z\\+\\.]+)"/>
    </xs:restriction>
  </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>
      </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="tLocationNumber" final="list restriction">
      <xs:restriction base="xs:string">
        <xs:minLength value="2"/>
        <xs:maxLength value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGeographicalInformation" final="list restriction">
      <xs:restriction base="xs:string">
        <xs:length value="8"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGeodeticInformation" final="list restriction">
      <xs:restriction base="xs:string">
        <xs:length value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tPriority" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGroupID" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tID" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tDirectionOfRequest" final="list restriction">
      <xs:restriction base="xs:unsignedByte">
        <xs:maxInclusive value="3"/>
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">ORIGINATING_SESSION</label>
              <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>
    <xs:simpleType name="tDefaultHandling" final="list restriction">
      <xs:restriction base="xs:unsignedByte">
        <xs:maxInclusive value="1"/>
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">SESSION_CONTINUED</label>
              <definition xml:lang="en">Session Continued</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="1">
          <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>
    </xs:simpleType>
    <xs:simpleType name="tAgeOfLocationInformation" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tBool" final="list restriction">
      <xs:restriction base="xs:boolean">
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">FALSE</label>
              <definition xml:lang="en">False</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="1">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">TRUE</label>
              <definition xml:lang="en">True</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tSh-Data">
      <xs:sequence>
        <xs:element name="PublicIdentifiers" minOccurs="0">
```

```
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tPublicIdentity">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="RepositoryData" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tTransparentData">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="Sh-IMS-Data" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tShIMSData">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="LocationInformation" minOccurs="0">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tLocationInformation">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="CSUserState" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tCSUserState">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="PSUserState" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tPSUserState">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>

      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tTransparentData">
      <xs:sequence>
        <xs:element name="ServiceIndication">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
```

```
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ServiceData">
        <xs:complexType>
          <xs:sequence>
            <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>
          </xs:sequence><xs:simpleContent>
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>

        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tShIMSData">
    <xs:sequence>
      <xs:element name="SCSCFName" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tSIP_URL">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="InitialFilterCriteria" minOccurs="0" maxOccurs="10">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tInitialFilterCriteria">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="IMSUserState" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tIMSUserState">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tLocationInformation">
    <xs:sequence>
      <xs:element name="AgeOfLocationInformation" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tAgeOfLocationInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="GeographicalInformation" minOccurs="0">
        <xs:complexType>
```

```
          <xs:simpleContent>
            <xs:extension base="tGeographicalInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="GeodeticInformation" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tGeodeticInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tPublicIdentity">
    <xs:sequence>
      <xs:element name="IMSPublicIdentity" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tIMSPublicIdentity">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="MSISDN" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tMSISDN">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tInitialFilterCriteria">
    <xs:sequence>
      <xs:element name="Priority">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tPriority">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="TriggerPoint" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tTrigger">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ApplicationServer">
        <xs:complexType>
          <xs:complexContent>
```

```
            <xs:extension base="tApplicationServer">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tTrigger">
    <xs:sequence>
      <xs:element name="ConditionTypeCNF">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tBool">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>

      <xs:element name="SPI" minOccurs="0" maxOccurs="25">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tSiPoInt">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ConditionTypeCNF">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tBool">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tSiPoInt">
    <xs:sequence>
      <xs:element name="ConditionNegated" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tBool">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="Group" maxOccurs="25">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tGroupID">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:choice>
        <xs:element name="Method">
          <xs:complexType>
```

```
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SIPHeader">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tHeader">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SessionCase">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tDirectionOfRequest">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SessionDescription">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tSessionDescription">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tSessionDescription">
    <xs:sequence>
      <xs:element name="Line">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="Content" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tHeader">
    <xs:sequence>
      <xs:element name="Header">
        <xs:complexType>
```

```
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="Content" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tApplicationServer">
      <xs:sequence>
        <xs:element name="ServerName">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tSIP_URL">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="DefaultHandling" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tDefaultHandling">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="ServiceInfo" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tServiceInfo">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:element~~name="testDatatype">~~
~~      <xs:complexType>~~
~~        <xs:choice minOccurs="0" maxOccurs="unbounded">~~
~~          <xs:element name="tSIP_URL" type="tSIP_URL"/>~~
~~          <xs:element name="tTEL_URL" type="tTEL_URL"/>~~
~~          <xs:element name="tIMSPublicIdentity" type="tIMSPublicIdentity"/>~~
~~          <xs:element name="tServiceInfo" type="tServiceInfo"/>~~
~~          <xs:element name="tString" type="tString"/>~~
~~          <xs:element name="tMSISDN" type="tMSISDN"/>~~
~~          <xs:element name="tIMSUserState" type="tIMSUserState"/>~~
~~          <xs:element name="tLocationNumber" type="tLocationNumber"/>~~
~~          <xs:element name="tGeographicalInformation"~~
~~type="tGeographicalInformation"/>~~
~~          <xs:element name="tGeodeticInformation" type="tGeodeticInformation"/>~~
```

```
          <xs:element name="tPriority" type="tPriority"/>
          <xs:element name="tGroupID" type="tGroupID"/>
          <xs:element name="tID" type="tID"/>
          <xs:element name="tDirectionOfRequest" type="tDirectionOfRequest"/>
          <xs:element name="tDefaultHandling" type="tDefaultHandling"/>
          <xs:element name="tAgeOfLocationInformation"
type="tAgeOfLocationInformation"/>
          <xs:element name="tBool" type="tBool"/>
          <xs:element name="Sh-Data" type="tSh-Data"/>
          <xs:element name="tTransparentData" type="tTransparentData"/>
          <xs:element name="tShIMSData" type="tShIMSData"/>
          <xs:element name="tLocationInformation" type="tLocationInformation"/>
          <xs:element name="tPublicIdentity" type="tPublicIdentity"/>
          <xs:element name="tInitialFilterCriteria"
type="tInitialFilterCriteria"/>
          <xs:element name="tTrigger" type="tTrigger"/>
          <xs:element name="tSiPoInt" type="tSiPoInt"/>
          <xs:element name="tSessionDescription" type="tSessionDescription"/>
          <xs:element name="tHeader" type="tHeader"/>
          <xs:element name="tApplicationServer" type="tApplicationServer"/>
        </xs:choice>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

End of changes in ShDataType.xsd

3GPP TSG CN WG4 Meeting #15 ***N4-020905***
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **005** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

*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:	⌘	Missing references to XML schema for Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	10/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

Use one of the following releases:

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

Reason for change:	⌘	There is no reference inside TS 29.328 to the XML document and schema that are attached to this specification. Essential correction
Summary of change:	⌘	Addition of annexes D and E with references to the XML document and schema.
Consequences if not approved:	⌘	Documents attached to the specification are not referred from inside it.

Clauses affected:	⌘	New annexes D and E. Current Annex D retitled to Annex F.

	Y	N		
Other specs affected: ⌘		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.

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)
tLocationNumber	LocationNumber	string	Length >=2 and <=10
tGeographicalInformation	GeographicalInformation	string	Length = 8. Syntax defined in 3GPP TS 23.032.
tGeodeticInformation	GeodeticInformation	string	Length = 10. Syntax defined in ITU-T Q.703.
tAgeOfLocationInformation	AgeOfLocationInformation	integer	>=0, <=32767
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
tIMSPublicIdentity	IMSPublicIdentity	(union)	Union of tSIP_URL and tTEL_URL
tServiceInfo	ServiceInfo	string	
tString	Method, Header, Content, Line	string	
tBool	ConditionTypeCNF, ConditionNegated	enumerated	Possible values: 0 (FALSE)

			1 (TRUE)

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	1
tShIMSData	Sh-IMS-Data	SCSCFName	tSIP_URL	0 to 1
		InitialFilterCriteria	tInitialFilterCriteria	0 to 10
		IMSUserState	tIMSUserState	0 to 1
tLocationInformation	LocationInformation	AgeOfLocationInformation	tAgeOfLocationInformation	0 to 1
		GeographicalInformation	tGeographicalInformation	0 to 1
		GeodeticInformation	tGeodeticInformation	0 to 1
tPublicIdentity	PublicIdentity	IMSPublicIdentity	tIMSPublicIdentity	0 to 20
		MSISDN	tMSISDN	0 to 20
		InitialFilterCriteria	tInitialFilterCriteria	1 to 10
tInitialFilterCriteria	InitialFilterCriteria	Priority	tPriority	1
		TriggerPoint	tTrigger	0 to 1
		ApplicationServer	tApplicationServer	1
tTrigger	Trigger	SPI	tSiPoInt	0 to 25
		ConditionTypeCNF	tBool	1
tSiPoInt	SPI	ConditionNegated	tBool	0 to 1

		Group		tGroupID	1 to 25
		Choice of	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

Annex E (informative): XML document for the Sh interface user profile

The file ShDataTypes.xml, attached to this specification, contains the XML document with the data description for Sh interface, compliant with the Data Description Framework.

Annex ~~D~~ F (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Jun 2002	CN#16	NL-020277			Version 2.0.0 approved at CN#16	2.0.0	5.0.0

Beginning of modified section

7.6 Data

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

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

…

End of modified section

3GPP TSG CN WG4 Meeting #15 **N4-020906**
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.328** **CR** **006** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Extensibility of XML schema for Sh interface
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	08/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	The same principle approved as a consequence of N4-020674 to allow the extensibility of the XML schema for Cx interface has not been applied for Sh interface. Essential correction
Summary of change:	⌘	Addition of lines <xs:any namespace="##Other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/> to the XML schema in the lines specified below.
Consequences if not approved:	⌘	The XML schema for Sh interface would not be extensible in a backwards compatible way.

Clauses affected:	⌘	File ShDataType.xsd

		Y	N		
Other specs affected:	⌘		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 changes in ShDataType.xsd

```
<?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:pattern value="sip:([0-9a-zA-Z&amp;amp;=\\+$,\\-
_\\.!~*'\\(\\)]+(:[0-9a-zA-Z&amp;amp;=\\+$,\\-_\\.!~*'\\(\\)]+)?@)?((([0-9a-
zA-Z]+\\-?[0-9a-zA-Z]+\\.)+[0-9a-zA-Z]+\\.?)|(([0-9]{1,3}\\.){1,3}[0-
9]{1,3}\\.?))(:[0-9]+)?(;[a-zA-Z]+=[a-zA-Z0-9\\-\\.]*)*"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="tTEL_URL" final="list restriction">
    <xs:restriction base="xs:anyURI">
      <xs:pattern value="tel:\\\\\+?[0-9A-Dpw\\*#\\-\\.\\(\\)/]+(;[a-zA-
Z\\-]+=[0-9a-zA-Z\\+\\.]+)"/>
    </xs:restriction>
  </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="tLocationNumber" final="list restriction">
      <xs:restriction base="xs:string">
        <xs:minLength value="2"/>
        <xs:maxLength value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGeographicalInformation" final="list
restriction">
      <xs:restriction base="xs:string">
        <xs:length value="8"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGeodeticInformation" final="list restriction">
      <xs:restriction base="xs:string">
        <xs:length value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tPriority" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tGroupID" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tID" final="list restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tDirectionOfRequest" final="list restriction">
      <xs:restriction base="xs:unsignedByte">
        <xs:maxInclusive value="3"/>
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
```

```
              <label xml:lang="en">ORIGINATING_SESSION</label>
              <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>
    <xs:simpleType name="tDefaultHandling" final="list restriction">
      <xs:restriction base="xs:unsignedByte">
        <xs:maxInclusive value="1"/>
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">SESSION_CONTINUED</label>
              <definition xml:lang="en">Session Continued</definition>
            </xs:documentation>
          </xs:annotation>
        </xs:enumeration>
        <xs:enumeration value="1">
          <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>
    </xs:simpleType>
    <xs:simpleType name="tAgeOfLocationInformation" final="list
restriction">
      <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tBool" final="list restriction">
      <xs:restriction base="xs:boolean">
        <xs:enumeration value="0">
          <xs:annotation>
            <xs:documentation>
              <label xml:lang="en">FALSE</label>
```

```
            <definition xml:lang="en">False</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="1">
        <xs:annotation>
          <xs:documentation>
            <label xml:lang="en">TRUE</label>
            <definition xml:lang="en">True</definition>
          </xs:documentation>
        </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="tSh-Data">
    <xs:sequence>
      <xs:element name="PublicIdentifiers" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tPublicIdentity">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="RepositoryData" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tTransparentData">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="Sh-IMS-Data" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tShIMSData">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="LocationInformation" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tLocationInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

    </xs:sequence>
  </xs:complexType>
```

```
  <xs:complexType name="tTransparentData">
    <xs:sequence>
      <xs:element name="ServiceIndication">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tString">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ServiceData">
        <xs:complexType>
          <xs:sequence>
            <xs:any namespace="##Other" processContents="lax"
minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="index" type="xs:int" use="required"/>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tShIMSData">
    <xs:sequence>
      <xs:element name="SCSCFName" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tSIP_URL">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="InitialFilterCriteria" minOccurs="0"
maxOccurs="10">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tInitialFilterCriteria">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="IMSUserState" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tIMSUserState">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

    </xs:sequence>
  </xs:complexType>
```

```
  <xs:complexType name="tLocationInformation">
    <xs:sequence>
      <xs:element name="AgeOfLocationInformation" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tAgeOfLocationInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="GeographicalInformation" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tGeographicalInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="GeodeticInformation" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tGeodeticInformation">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tPublicIdentity">
    <xs:sequence>
      <xs:element name="IMSPublicIdentity" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tIMSPublicIdentity">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="MSISDN" minOccurs="0" maxOccurs="20">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tMSISDN">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tInitialFilterCriteria">
```

```
    <xs:sequence>
      <xs:element name="Priority">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tPriority">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="TriggerPoint" minOccurs="0">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tTrigger">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ApplicationServer">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tApplicationServer">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="tTrigger">
    <xs:sequence>
      <xs:element name="SPI" minOccurs="0" maxOccurs="25">
        <xs:complexType>
          <xs:complexContent>
            <xs:extension base="tSiPoInt">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="ConditionTypeCNF">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tBool">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

    </xs:sequence>
```

```
  </xs:complexType>
  <xs:complexType name="tSiPoInt">
    <xs:sequence>
      <xs:element name="ConditionNegated" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tBool">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="Group" maxOccurs="25">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="tGroupID">
              <xs:attribute name="index" type="xs:int" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:choice>
        <xs:element name="Method">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int"
use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SIPHeader">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tHeader">
                <xs:attribute name="index" type="xs:int"
use="required"/>
              </xs:extension>
            </xs:complexContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SessionCase">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tDirectionOfRequest">
                <xs:attribute name="index" type="xs:int"
use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="SessionDescription">
          <xs:complexType>
            <xs:complexContent>
              <xs:extension base="tSessionDescription">
```

```
                    <xs:attribute name="index" type="xs:int"
use="required"/>
                  </xs:extension>
                </xs:complexContent>
              </xs:complexType>
            </xs:element>
          </xs:choice>
          <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tSessionDescription">
      <xs:sequence>
        <xs:element name="Line">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="Content" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tHeader">
      <xs:sequence>
        <xs:element name="Header">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="Content" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tString">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tApplicationServer">
```

```
      <xs:sequence>
        <xs:element name="ServerName">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tSIP_URL">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="DefaultHandling" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tDefaultHandling">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="ServiceInfo" minOccurs="0">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="tServiceInfo">
                <xs:attribute name="index" type="xs:int" use="required"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:any namespace="##Other" processContents="lax" minOccurs="0"
maxOccurs="unbounded"/>

      </xs:sequence>
    </xs:complexType>
    <xs:element~~name="testDatatype">~~
~~      <xs:complexType>~~
~~        <xs:choice minOccurs="0" maxOccurs="unbounded">~~
~~          <xs:element name="tSIP_URL" type="tSIP_URL"/>~~
~~          <xs:element name="tTEL_URL" type="tTEL_URL"/>~~
~~          <xs:element name="tIMSPublicIdentity"~~
~~type="tIMSPublicIdentity"/>~~
~~          <xs:element name="tServiceInfo" type="tServiceInfo"/>~~
~~          <xs:element name="tString" type="tString"/>~~
~~          <xs:element name="tMSISDN" type="tMSISDN"/>~~
~~          <xs:element name="tIMSUserState" type="tIMSUserState"/>~~
~~          <xs:element name="tLocationNumber" type="tLocationNumber"/>~~
~~          <xs:element name="tGeographicalInformation"~~
~~type="tGeographicalInformation"/>~~
~~          <xs:element name="tGeodeticInformation"~~
~~type="tGeodeticInformation"/>~~
~~          <xs:element name="tPriority" type="tPriority"/>~~
~~          <xs:element name="tGroupID" type="tGroupID"/>~~
~~          <xs:element name="tID" type="tID"/>~~
~~          <xs:element name="tDirectionOfRequest"~~
~~type="tDirectionOfRequest"/>~~
~~          <xs:element name="tDefaultHandling" type="tDefaultHandling"/>~~
~~          <xs:element name="tAgeOfLocationInformation"~~
~~type="tAgeOfLocationInformation"/>~~
```

```
          <xs:element name="tBool" type="tBool"/>
          <xs:element name="Sh-Data" type="tSh-Data"/>
          <xs:element name="tTransparentData" type="tTransparentData"/>
          <xs:element name="tShIMSData" type="tShIMSData"/>
          <xs:element name="tLocationInformation"
type="tLocationInformation"/>
          <xs:element name="tPublicIdentity" type="tPublicIdentity"/>
          <xs:element name="tInitialFilterCriteria"
type="tInitialFilterCriteria"/>
          <xs:element name="tTrigger" type="tTrigger"/>
          <xs:element name="tSiPoInt" type="tSiPoInt"/>
          <xs:element name="tSessionDescription"
type="tSessionDescription"/>
          <xs:element name="tHeader" type="tHeader"/>
          <xs:element name="tApplicationServer"
type="tApplicationServer"/>
        </xs:choice>
      </xs:complexType>
    </xs:element>
</xs:schema>
```

End of changes in ShDataType.xsd

3GPP TSG CN WG4 Meeting #15 ***N4-021035***
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.329** **CR** **002** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Cancellation of subscriptions to notifications
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	30/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	The procedure Sh-Subs-Notif (used by an AS to subscribe to notifications from the HSS of changes in data) does not allow an AS to cancel a subscription to notifications. Its response is not able to convey the list of data references for which the subscription to notifications could not be accepted in the HSS. The AS cannot know which subscriptions to notifications of change succeeded. Essential correction.
Summary of change:	⌘	1. Added the ability to request cancellations of subscriptions to notifications of changes. A new parameter is added to the request to indicate whether it is a subscription request or a subscription cancellation request. 2. Added a new parameter to the response to convey the list of data references for which the subscription to notifications was not accepted in the HSS.
Consequences if not approved:	⌘	It is not possible to cancel subscriptions to notifications of changes in data. This imposes an overload of the HSS that may be sending notifications to an AS that no longer needs them. The HSS cannot indicate to which data references changes an AS couldn't subscribe. The service logic in an AS may not work properly. Although the AS will know of the partial success of the operation it won't know which notifications of changes it will be receiving.

Clauses affected:	⌘	6.1.5, 6.1.6, new 6.3.6, 6.4.1				
		Y	**N**			
Other specs affected:	⌘	**X**		Other core specifications	⌘	TS 29.328 CR002
			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

6.1.5 Subscribe-Notifications-Request (SNR) Command

The Subscribe-Notifications-Request (SNR) command, indicated by the Command-Code field set to 3 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: 10415: 3, REQ, PXY >
                                         < Session-Id >
                                         { Vendor-Specific-Application-Id }
                                         { Auth-Session-State }
                                         { Origin-Host }
                                         { Origin-Realm }
                                         [ Destination-Host ]
                                         { Destination-Realm }
                                         { Public-Identity }
                                         [ Service-Indication]
                                         { Subs-Req-Type }
                                         1*[ Data-Reference ]
                                         *[ AVP ]
                                         *[ Proxy-Info ]
                                         *[ Route-Record ]
```

End of modified section

Beginning of modified section

6.1.6 Subscribe-Notifications-Answer (SNA) Command

The Subscribe-Notifications-Answer command, indicated by the Command-Code field set to 2 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 Vendor-Specific-Result AVP may contain one of the values defined in section 6.2 in addition to the values defined in [6].

Message Format

```
< Subscribe-Notifications-Answer > ::=  < Diameter Header: 10415: 3 >
                                        < Session-Id >
                                        { Vendor-Specific-Application-Id }
                                        { Auth-Session-State }
                                        [ Result-Code ]
                                        [ Vendor-Specific-Result ]
                                        { Origin-Host }
                                        { Origin-Realm }
                                        *[ Data-Reference ]
                                        *[ AVP ]
                                        *[ Proxy-Info ]
                                        *[ Route-Record ]
```

End of modified section

Beginning of modified 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		OctetString	M, V				N
User-Data	102		OctetString	M, V				N
Data-Reference	103		Enumerated	M, V				
Service-Indication	104		OctetString	M, V				N
Subs-Req-Type	105		Enumerated	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 [6]. NOTE 2: Depending on the concrete command.								

End of modified section

New section

6.3.6 Subs-Req-Type AVP

The Subs-Req-Type AVP (AVP code 105) is of type Enumerated, and indicates the type of the subscription-to-notifications request. The following values are defined:

Subscribe (0)

This value is used by an AS to subscribe to notifications of changes in data.

Unsubscribe (1)

This value is used by an AS to unsubscribe to notifications of changes in data.

End of new section

Beginning of modified section

6.4.1 AVP codes

This specification assigns the values 100 ~~104~~ 105 from the AVP Code namespace managed by 3GPP for its Diameter vendor-specific application number 2. See section 6.3 for the assignment of the namespace in this specification.

End of modified section

3GPP TSG CN WG4 Meeting #15 **N4-021038**
Helsinki, Finland, 29th July – 2nd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **29.329** **CR** **003** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

*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:	⌘	Addition of AVPs to User-Data-Request
Source:	⌘	CN4
Work item code:	⌘	IMS-CCR
Date:	⌘	10/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	Some of the information elements (e.g. user state, location information) that can be requested by means of User-Data-Request require an indication of the domain to which the request applies. The request for location information needs an indication about whether an active location retrieval procedure is to be initiated in the MSC/VLR and/or the SGSN or not. Essential correction
Summary of change:	⌘	Added new AVPs Requested-Domain and Current-Location to message UDR.
Consequences if not approved:	⌘	It cannot be specified to which access domain the request for user state or location information applies. The request for location information cannot indicate the desire of the AS that an active location retrieval is initiated.

Clauses affected:	⌘	6.1.1, 6.3, new 6.3.6, new 6.3.7, 6.4.1			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	TS 29.328 CRs 003 and 004
		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

6.1.1 User-Data-Request (UDR) Command

The User-Data-Request (UDR) command, indicated by the Command-Code field set to 1 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: 10415: 1, REQ, PXY >
                                < Session-Id >
                                { Vendor-Specific-Application-Id }
                                { Auth-Session-State }
                                { Origin-Host }
                                { Origin-Realm }
                                [ Destination-Host ]
                                { Destination-Realm }
                                { User-Identity }
                                 [ Service-Indication ]
                                1*[ Data-Reference ]
                                *[ Requested-Domain ]
                                [ Current-Location ]
                                *[ AVP ]
                                *[ Proxy-Info ]
                                *[ Route-Record ]
```

End of modified section

Beginning of modified 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
Requested-Domain	105	6.3.6	Enumerated	M, V				N
Current-Location	106	6.3.7	Enumerated	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 [6].

NOTE 2: Depending on the concrete command.

End of modified section

New section

6.3.6 Requested-Domain AVP

The Requested-Domain AVP (AVP code 105) is of type Enumerated, and indicates the access domain for which certain data (e.g. user state) are requested. The following values are defined:

CS-Domain (0)

The requested data apply to the CS domain.

PS-Domain (1)

The requested data apply to the PS domain.

End of new section

New section

6.3.7 Current-Location AVP

The Current-Location AVP (AVP code 106) 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 required.

InitiateActiveLocationRetrieval (1)

It is requested that an active location retrieval is initiated.

End of new section

Beginning of modified section

6.4.1 AVP codes

This specification assigns the values 100~~-104~~ 106 from the AVP Code namespace managed by 3GPP for its Diameter vendor-specific application number 2. See section 6.3 for the assignment of the namespace in this specification.

End of modified section