

**Oracle® Communications  
Subscriber Data Management**

Cx/Dx Interface Description

Release 9.3

**910-6877-001 Revision B**

January 2014

**ORACLE®**

Oracle® Communications Cx/Dx Interface Description, Release 9.3

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## Publication History

Revision	Date	Reason
A	December 2013	Initial Release. Same as 910-6854-001_rev_a. Date updated.
B	January 2014	Added Oracle front page and copyrights. Updated release date.

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## 1.4 Acronyms

Acronym	Description
AuC	Authentication Center
AUTN	Authentication Token
BGCF	Breakout Gateway Control Function
CSCF	Call Session Control Function
EU	European Union
HSS	Home Subscriber Server
I-CSCF	Interrogating-Control Session Control Function
IM	IP Multimedia
IM-HSS	IP Multimedia - Home Subscriber Service
IM-SSF	IP Multimedia Service Switching Function
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IP-CAN	IP Connectivity Access Network
LIA	Location-Info-Answer
LIR	Location-Info-Request
M	Mandatory
MAA	Multimedia-Auth-Answer
MAP	Mobile Application Part
MAR	Multimedia-Auth-Request
MGCF	Media Gateway Control Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
ngHLR	Tekelec Home Location Register
O	Optional
OSA-SCS	OSA Service Capability Server
P-CSCF	Proxy Call Session Control Function
PPA	Push-Profile-Answer
PPR	Push-Profile-Request
RoHS	Restriction of Hazardous Substances
RTA	Registration-Termination-Answer
RTR	Registration-Termination-Request
S-CSCF	Serving Call Session Control Function
SAA	Server-Assignment-Answer
SAR	Server-Assignment-Request
SDM	Subscriber Data Management
SDS	Subscriber Data Server
SLF	Subscription Locator Function
UAA	User-Authorization-Answer
UAR	User-Authorization-Request
WEEE	Waste Electronic and Electrical Equipment
3GPP	3rd Generation Partnership Project

## 1.5 References

- 3GPP TS 23.008 V6.11.0 (2006-09): "Organization of subscriber data".
- 3GPP TS 23.218 V6.4.0 (2006-06): "IP Multimedia (IM) session handling; IM call model".

- 3GPP TS 23.228 V6.14.0 (2006-06): “IP Multimedia Subsystem (IMS); Stage 2”.
- 3GPP TS 29.228 V6.11.0 (2006-06): “IP Multimedia (IM) Subsystem Cx/Dx Interface; Signaling flows and message contents”.
- 3GPP TS 29.229 V6.9.0 (2006-09): “Cx/Dx Interface based on the Diameter protocol; Protocol details”.
- 3GPP TS 33.203 V6.10.0 (2006-09): “Access security for IP-based services”.

## 2. SUPPORTED Cx/Dx MESSAGES

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### 2.1 List of Cx/Dx Messages received by the HSS/SLF

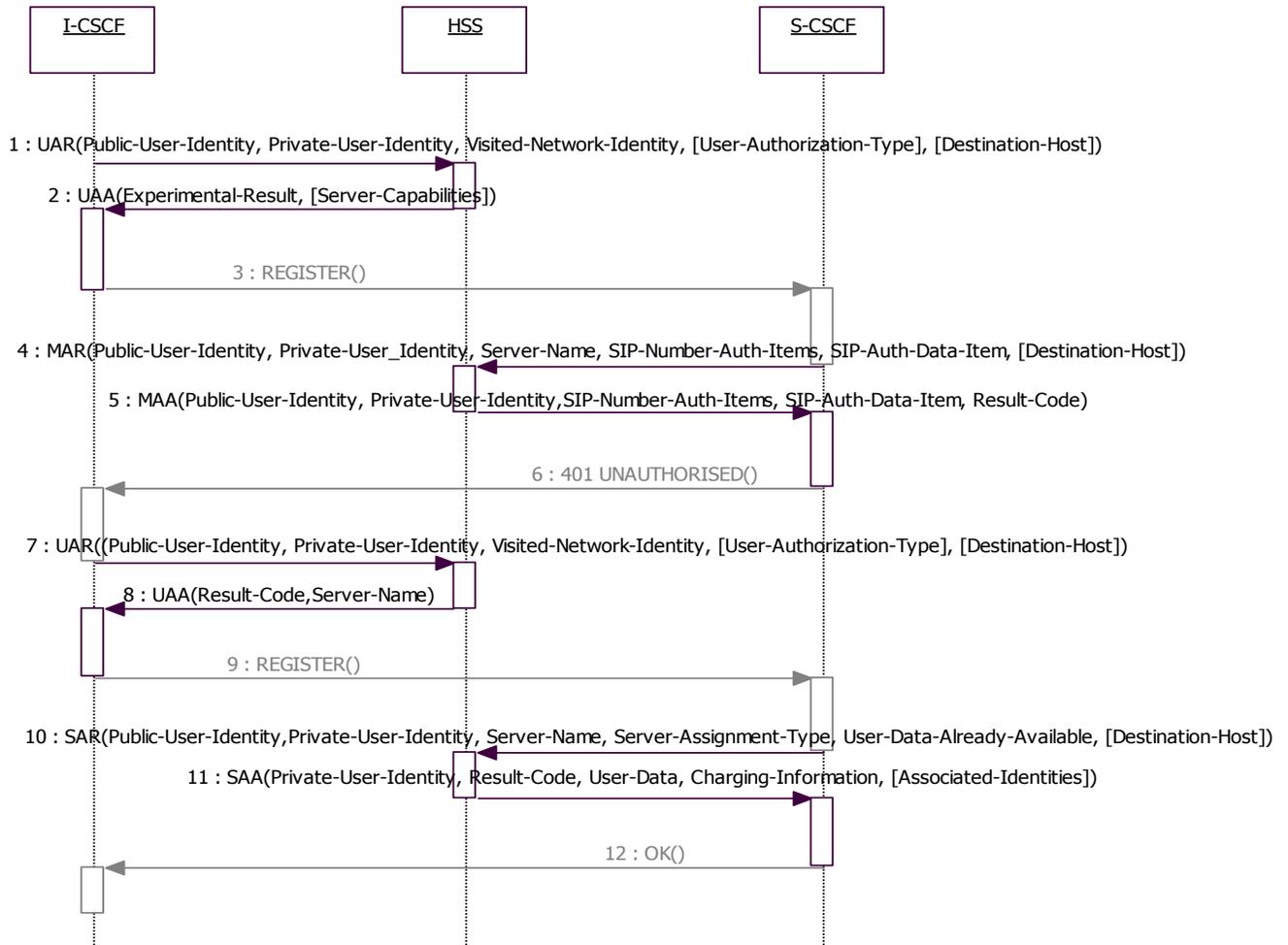
Cx/Dx message	Diameter Command-Name	Abbreviation
Cx-Query + Cx-Select-Pull	User-Authorization-Request	UAR
Cx-Query Resp + Cx-Select-Pull Resp	User-Authorization-Answer	UAA
Cx-Put + Cx-Pull	Server-Assignment-Request	SAR
Cx-Put Resp + Cx-Pull Resp	Server-Assignment-Answer	SAA
Cx-Location-Query	Location-Info-Request	LIR
Cx-Location-Query Resp	Location-Info-Answer	LIA
Cx-AuthDataReq	Multimedia-Authentication-Request	MAR
Cx-AuthDataResp	Multimedia-Authentication-Answer	MAA

### 2.2 List of Cx Messages initiated by the HSS

Cx message	Diameter Command-Name	Abbreviation
Cx-Deregister	Registration-Termination-Request	RTR
Cx-Deregister Resp	Registration-Termination-Answer	RTA
Cx-Update_Subscr_Data	Push-Profile-Request	PPR
Cx-Update_Subscr_Data Resp	Push-Profile-Answer	PPA

### 3. CX MESSAGE FLOWS

#### 3.1 Registration – user not registered



1: User-Authorization-Type = REGISTRATION (0) (default value if not present)

2: Experimental-Result-Code = {DIAMETER\_FIRST\_REGISTRATION (2001),  
DIAMETER\_ERROR\_USER\_UNKNOWN (5001),  
DIAMETER\_ERROR\_IDENTITIES\_DONT\_MATCH (5002),  
DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED (5004)}

5: Result-Code = DIAMETER\_SUCCESS (2001) or Experimental-Result-Code =  
DIAMETER\_ERROR\_AUTH\_SCHEME\_NOT\_SUPPORTED (5006)

7: User-Authorization-Type = REGISTRATION (0) (default value if not present)

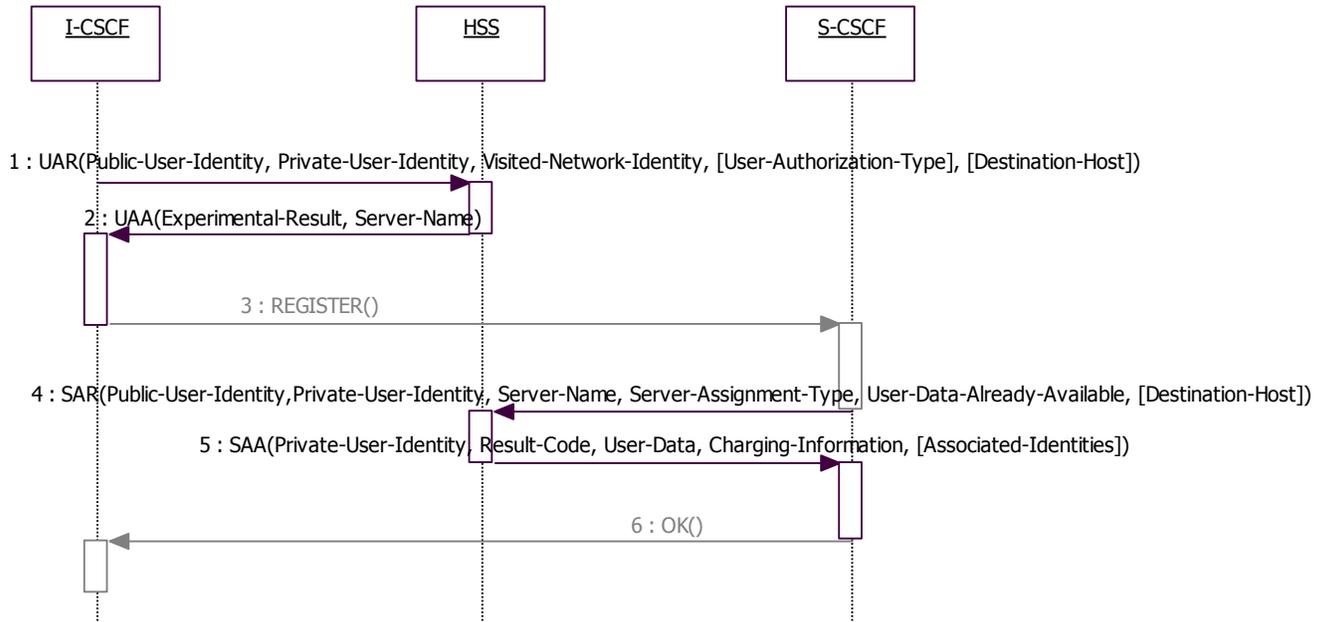
8: Experimental-Result-Code = {DIAMETER\_FIRST\_REGISTRATION (2001),  
DIAMETER\_ERROR\_USER\_UNKNOWN (5001),

DIAMETER\_ERROR\_IDENTITIES\_DONT\_MATCH (5002),  
DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED (5004)}

10: Server-Assignment-Type = REGISTRATION (1)

11: Result-Code = DIAMETER\_SUCCESS (2001)

### 3.2 Registration – user currently registered



1: User-Authorization-Type = REGISTRATION (0) (default value if not present)

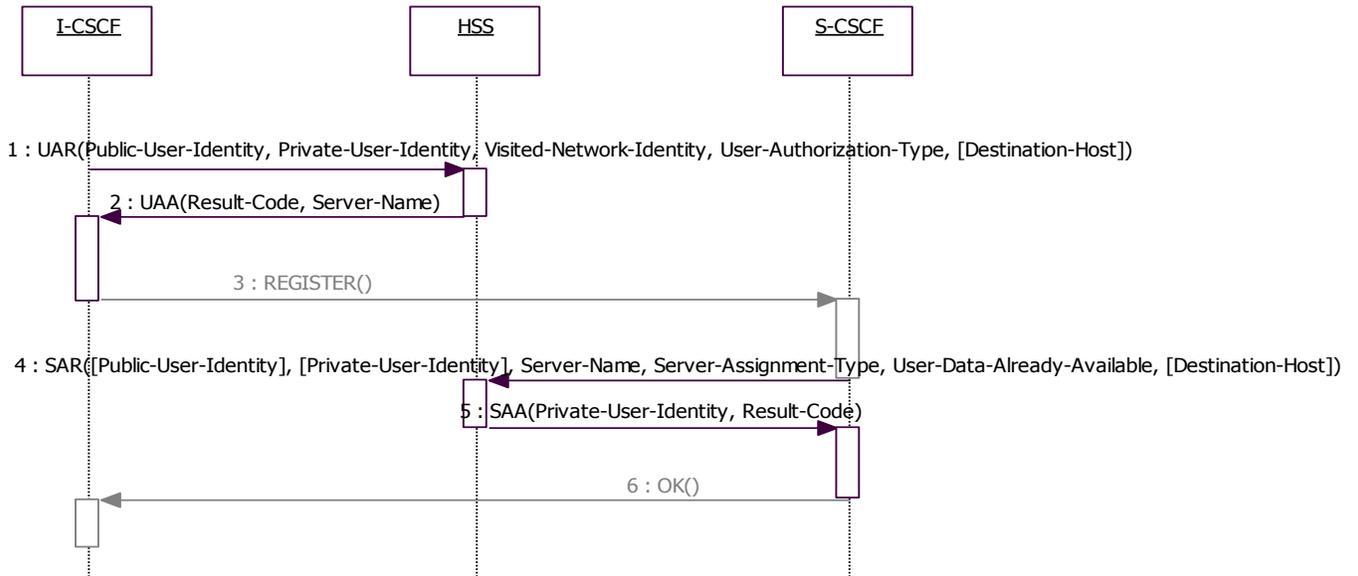
2: Experimental-Result-Code = {DIAMETER\_SUBSEQUENT\_REGISTRATION (2002),  
DIAMETER\_ERROR\_USER\_UNKNOWN (5001),  
DIAMETER\_ERROR\_IDENTITIES\_DONT\_MATCH (5002),  
DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED (5004)}

4: Server-Assignment-Type = RE\_REGISTRATION (2)

5: Result-Code = DIAMETER\_SUCCESS (2001)

Steps 4 and 5 are optional.

### 3.3 Mobile initiated de-registration



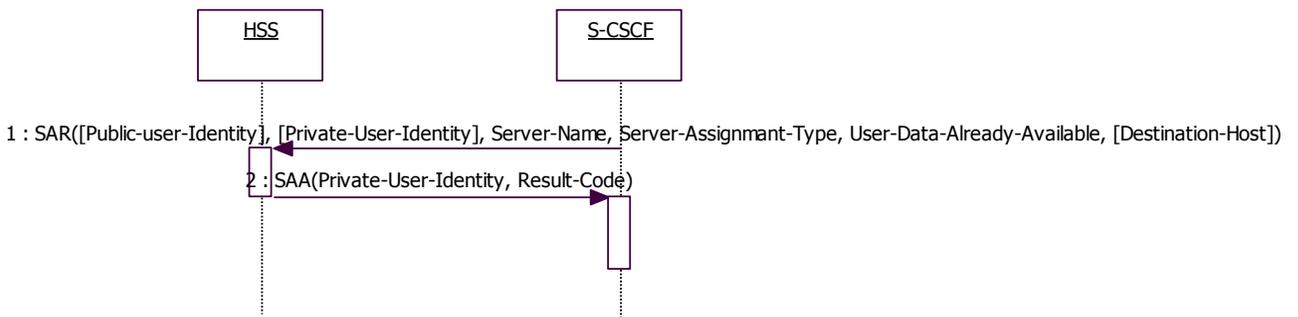
1: User-Authorization-Type = DE\_REGISTRATION (1)

2: Result-Code = DIAMETER\_SUCCESS (2001) or Experimental-Result-Code = {DIAMETER\_ERROR\_USER\_UNKNOWN (5001), DIAMETER\_ERROR\_IDENTITIES\_DONT\_MATCH (5002)}

4: Server-Assignment-Type = USER\_DEREGISTRATION (5)  
Public-User-Identity or Private-User-Identity must be present

5: Result-Code = DIAMETER\_SUCCESS (2001)

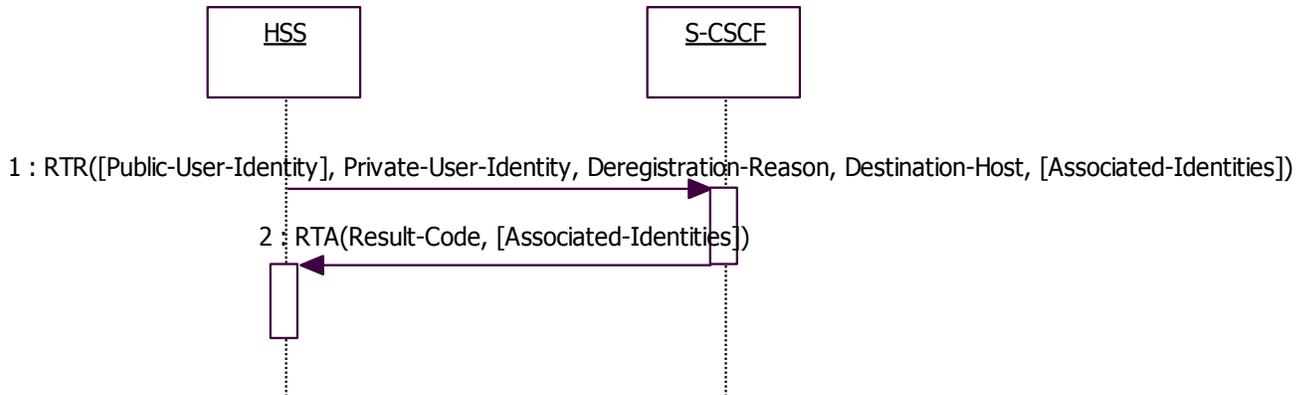
### 3.4 Registration timeout



1: Server-Assignment-Type = {TIMEOUT\_DEREGISTRATION (4), TIMEOUT\_DEREGISTRATION\_STORE\_SERVER\_NAME (6)}  
Public-User-Identity or Private-User-Identity must be present

2: Result-Code = DIAMETER\_SUCCESS (2001)

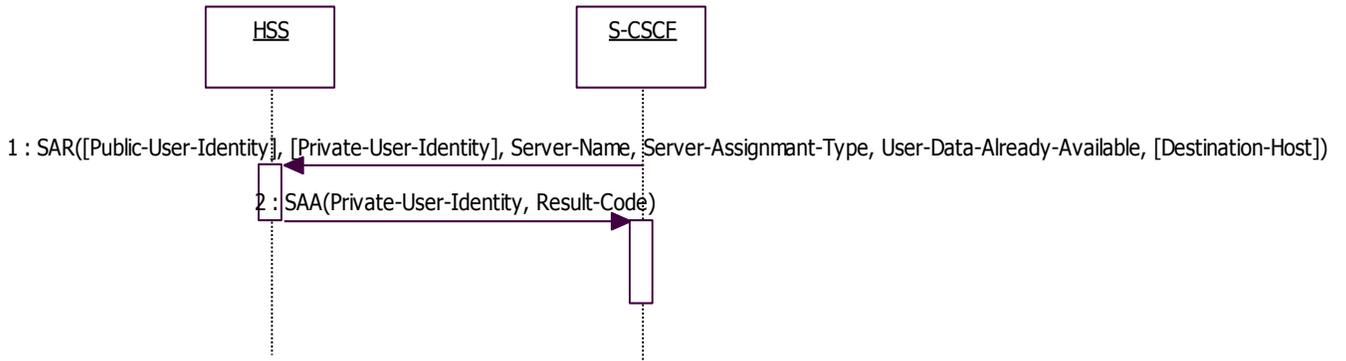
### 3.5 Administrative de-registration



1: Deregistration-Reason = Reason-Code {PERMANENT\_TERMINATION (0)} + Reason-Info {"Subscription deleted"}

2: Result-Code = {DIAMETER\_SUCCESS (2001), or Experimental-Result-Code = {DIAMETER\_ERROR\_USER\_UNKNOWN (5001), DIAMETER\_ERROR\_IDENTITYES\_DONT\_MATCH (5002)}

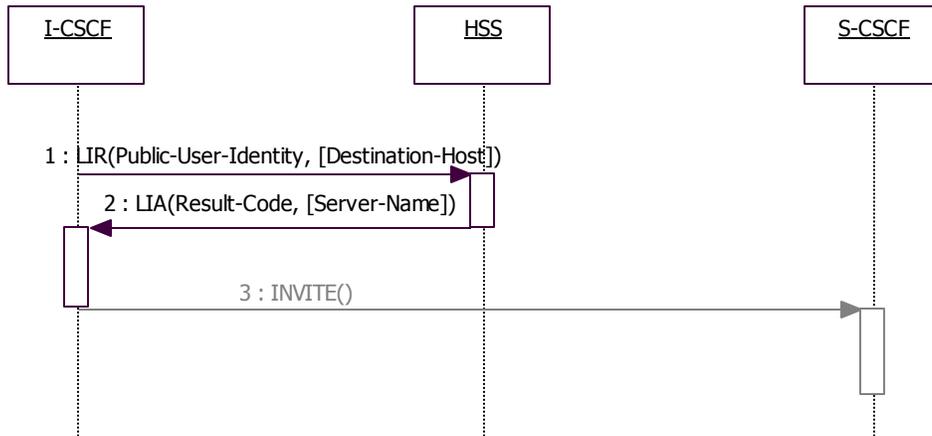
### 3.6 Service Platform initiated de-registration



1: Server-Assignment-Type = ADMINISTRATIVE\_DEREGISTRATION (8)  
Public-User-Identity or Private-User-Identity must be present

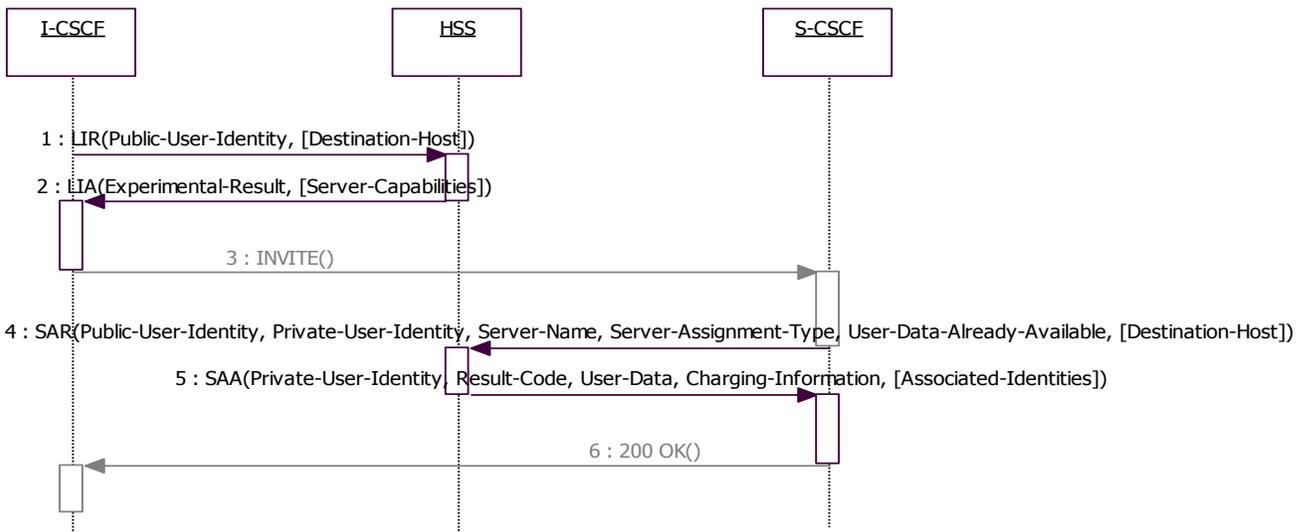
2: Result-Code = DIAMETER\_SUCCESS (2001) or Experimental-Result-Code = {DIAMETER\_ERROR\_USER\_UNKNOWN (5001), DIAMETER\_ERROR\_IDENTITYES\_DONT\_MATCH (5002)}

### 3.7 Mobile terminated SIP session set-up



2: Result-Code =DIAMETER\_SUCCESS (2001) or Experimental-Result-Code = {DIAMETER\_ERROR\_USER\_UNKNOWN (5001), DIAMETER\_ERROR\_INDENTITY\_NOT\_REGISTERED (5003)}

### 3.8 Initiation of a session to a non-registered user

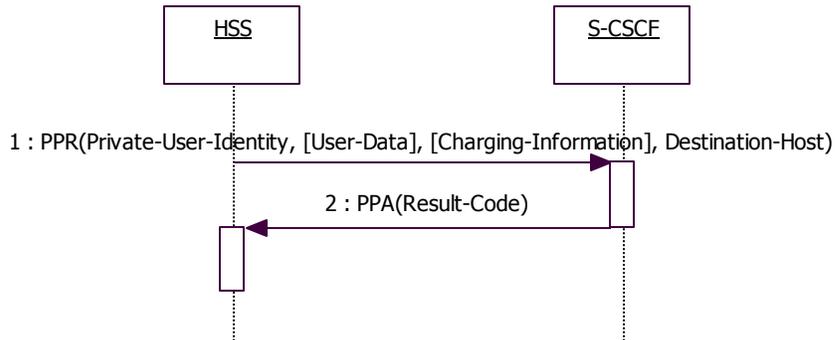


2: Experimental-Result-Code = {DIAMETER\_UNREGISTERED\_SERVICE (2003), DIAMETER\_ERROR\_USER\_UNKNOWN (5001)}  
 If Experimental-Result-Code = 2003 then Server-Capabilities must be present

4: Server-Assignment-Type = UNREGISTERED\_USER (3)

5: Result-Code = DIAMETER\_SUCCESS (2001)

### 3.9 User profile update



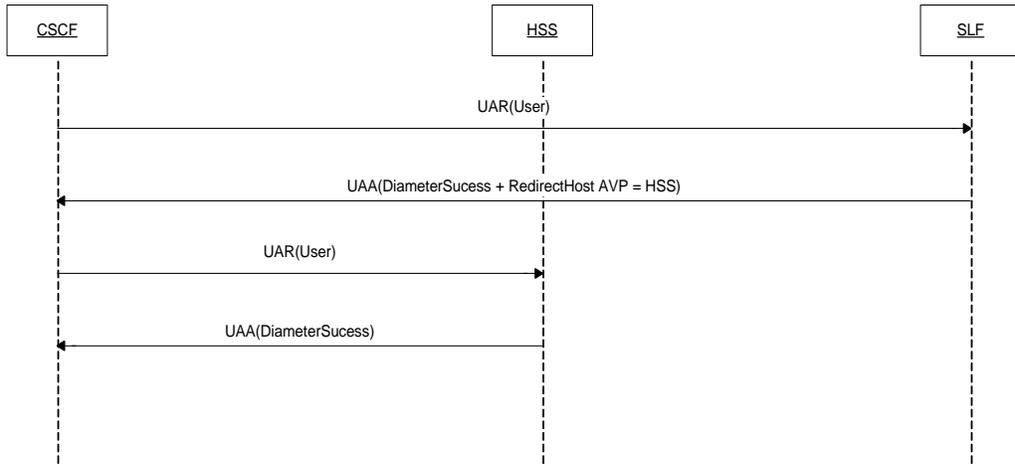
1: User-Data and/or Charging-Information must be present

2: Result-Code = {DIAMETER\_SUCCESS (2001), DIAMETER\_UNABLE\_TO\_COMPLY (5012)}  
or Experimental-Result-Code = DIAMETER\_ERROR\_USER\_UNKNOWN (5001),  
DIAMETER\_ERROR\_TOO\_MUCH\_DATA (5008),  
DIAMETER\_ERROR\_NOT\_SUPPORTED\_USER\_DATA (5009)}

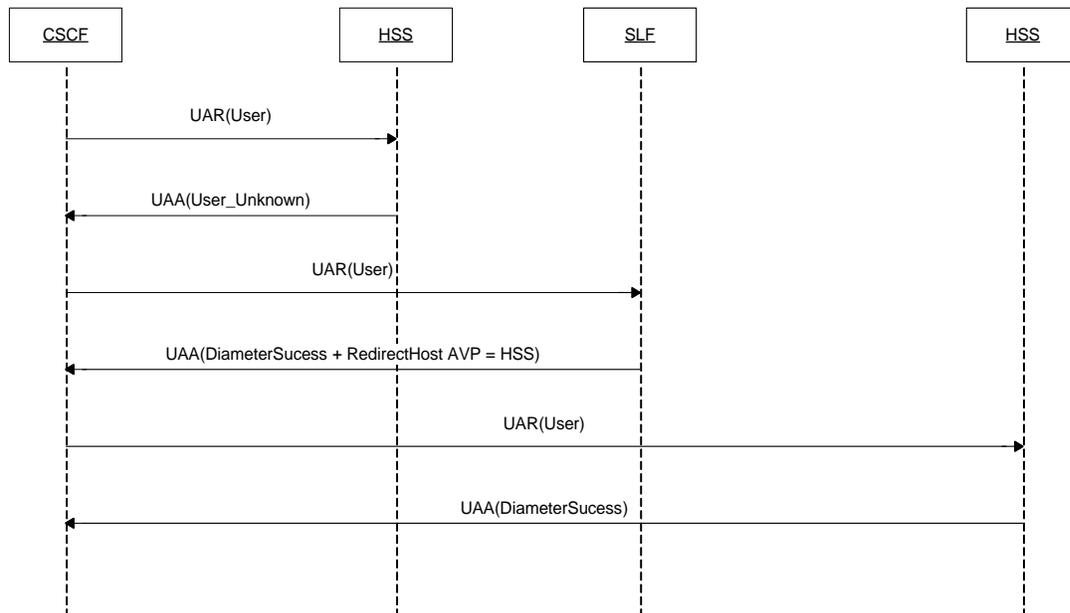
## 4. DX MESSAGE FLOWS

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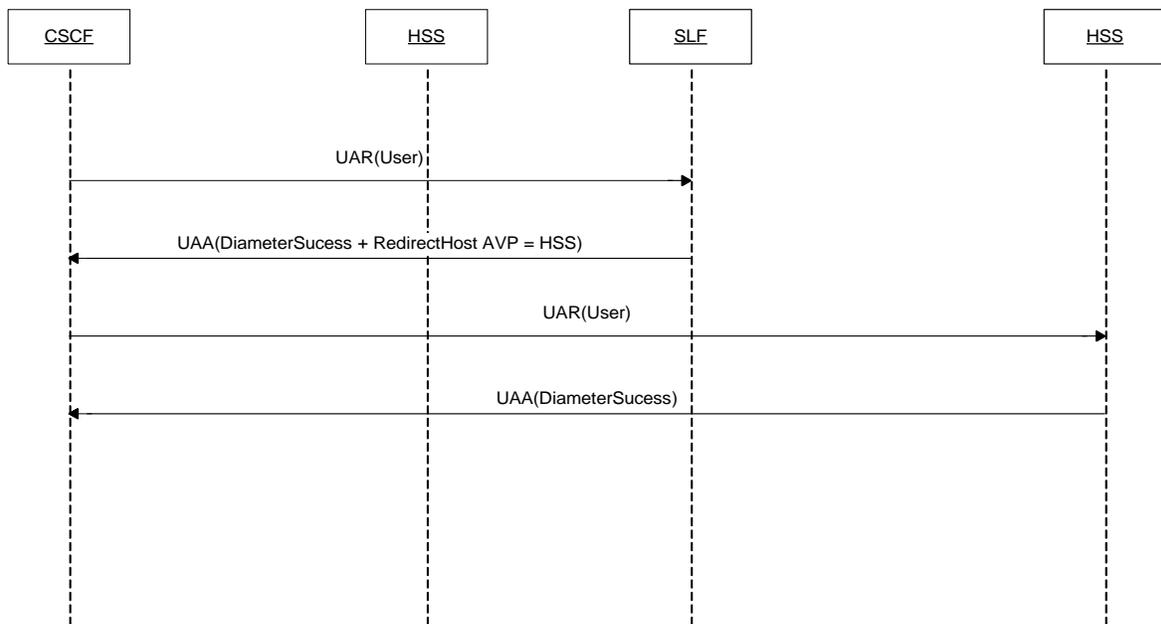
### 4.1 Dx message to SLF, redirected to Tekelec HSS



### 4.2 Cx message to HSS, user unknown



### 4.3 Dx message to SLF, redirected to external HSS



## 5. Cx MESSAGE CONTENT

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Cat values: M (Mandatory), O (Optional)

### 5.1 UAR (User-Authorization-Request)

AVP	Cat	Supported Values
Public-User-Identity	M	
Private-User-Identity	M	
Visited-Network-Identifier	M	
User-Authorization-Type	O	REGISTRATION (0) – Default DE_REGISTRATION (1)
Destination-Host	O	

### 5.2 UAA (User-Authorization-Answer)

AVP	Cat	Supported Values
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) Experimental-Result-Code = DIAMETER_FIRST_REGISTRATION (2001) DIAMETER_SUBSEQUENT_REGISTRATION (2002) DIAMETER_ERROR_USER_UNKNOWN (5001) DIAMETER_ERROR_IDENTITIES_DONT_MATCH (5002) DIAMETER_ERROR_ROAMING_NOT_ALLOWED (5004) DIAMETER_REDIRECT_INDICATION (3006)
Server-Capabilities	O	
Server-Name	O	

### 5.3 SAR (Server-Assignment-Request)

AVP	Cat	Supported Values
Public-User-Identity	O	
Private-User-Identity	O	
Server-Name	M	

AVP	Cat	Supported Values
Server-Assignment-Type	M	REGISTRATION (1) RE_REGISTRATION (2) UNREGISTERED_USER (3) TIMEOUT_DEREGISTRATION (4) USER_DEREGISTRATION (5) TIMEOUT_DEREGISTRATION_STORE_SERVER_NAME (6) ADMINISTRATIVE_DEREGISTRATION (8)
User-Data-Already-Available	M	
Destination-Host	O	

#### 5.4 SAA (Server-Assignment-Answer)

AVP	Cat	Supported Values
Private-User-Identity	O	
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) Experimental-Result-Code = DIAMETER_ERROR_USER_UNKNOWN (5001) DIAMETER_ERROR_IDENTITIES_DONT_MATCH (5002) DIAMETER_REDIRECT_INDICATION (3006)
User-Data	O	
Charging-Information	O	
Associated-Identities	O	
Destination-Host	O	

#### 5.5 LIR (Location-Info-Request)

AVP	Cat	Supported Values
Public-User-Identity	M	
Destination-Host	O	

#### 5.6 LIA (Location-Info-Answer)

AVP	Cat	Supported Values
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) Experimental-Result-Code = DIAMETER_UNREGISTERED_SERVICE (2003) DIAMETER_ERROR_USER_UNKNOWN (5001) DIAMETER_ERROR_IDENTITY_NOT_REGISTERED (5003) DIAMETER_REDIRECT_INDICATION (3006)

AVP	Cat	Supported Values
Server-Capabilities	O	
Server-Name	O	

## 5.7 MAR (Multimedia-Auth-Request)

AVP	Cat	Supported Values
Public-User-Identity	M	
Private-User-Identity	M	
SIP-Number-Auth-Items	M	
SIP-Auth-Data-Item	M	See sections 4.7.1 and 4.7.2
Server-Name	M	
Destination-Host	O	

### 5.7.1 SIP-Auth-Data-Item Content - Request

AVP	Cat	Supported Values
SIP-Authentication-Scheme	M	SIP-Authentication-Scheme = "Digest-AKAv1-MD5"

### 5.7.2 SIP-Auth-Data-Item Content - Request: Synchronization Failure

AVP	Cat	Supported Values
SIP-Authentication-Scheme	M	SIP-Authentication-Scheme = "Digest-AKAv1-MD5"
SIP-Authorization	M	RAND+AUTS (binary encoded)

## 5.8 MAA (Multimedia-Auth-Answer)

AVP	Cat	Supported Values
Public-User-Identity	O	
Private-User-Identity	O	
SIP-Number-Auth-Items	O	
SIP-Auth-Data-Item	O	See section 4.8.1
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) Experimental-Result-Code = DIAMETER_ERROR_AUTH_SCHEME_NOT_SUPPORTED (5006) DIAMETER_REDIRECT_INDICATION (3006)

### 5.8.1 SIP-Auth-Data-Item Content

AVP	Cat	Supported Values
SIP-Item-Number	O	
SIP-Authentication-Scheme	M	SIP-Authentication-Scheme = "Digest-AKAv1-MD5"
SIP-Authenticate	M	RAND+AUTN (binary encoded)
SIP-Authorization	M	XRES
Confidentiality-Key	O	
Integrity-Key	M	

## 5.9 RTR (Registration-Termination-Request)

AVP	Cat	Supported Values
Public-User-Identity	O	
Private-User-Identity	M	
Deregistration-Reason	M	Reason-Code = PERMANENT_TERMINATION (0) Reason-Info = "Subscription deleted"
Destination-Host	M	
Associated-Identities	O	

## 5.10 RTA (Registration-Termination-Answer)

AVP	Cat	Supported Values
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) Experimental-Result-Code = DIAMETER_ERROR_USER_UNKNOWN (5001) DIAMETER_ERROR_IDENTITIES_DONT_MATCH (5002)
Associated-Identities	O	

## 5.11 PPR (Push-Profile-Request)

AVP	Cat	Supported Values
Private-User-Identity	M	
User-Data	O	
Charging-Information	O	
Destination-Host	M	

## 5.12 PPA (Push-Profile-Answer)

AVP	Cat	Supported Values
Result-Code / Experimental-Result	M	Result-Code = DIAMETER_SUCCESS (2001) DIAMETER_UNABLE_TO_COMPLY (5012) Experimental-Result-Code = DIAMETER_ERROR_USER_UNKNOWN (5001), DIAMETER_ERROR_TOO_MUCH_DATA (5008), DIAMETER_ERROR_NOT_SUPPORTED_USER_DATA (5009)

## 6. Dx MESSAGE CONTENT

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The Dx interface message content is the same as the Cx message content described in section 5, [Cx Message Content](#) with the addition of the RedirectHost AVP in the UAA, SAA, LIA, MAA messages.

## **Subscriber Data Management**

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