Oracle® Communications Subscriber Data Management

Cx/Dx Interface Description

Release 9.3

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ORACLE®

Oracle® Communications Cx/Dx Interface Description, Release 9.3

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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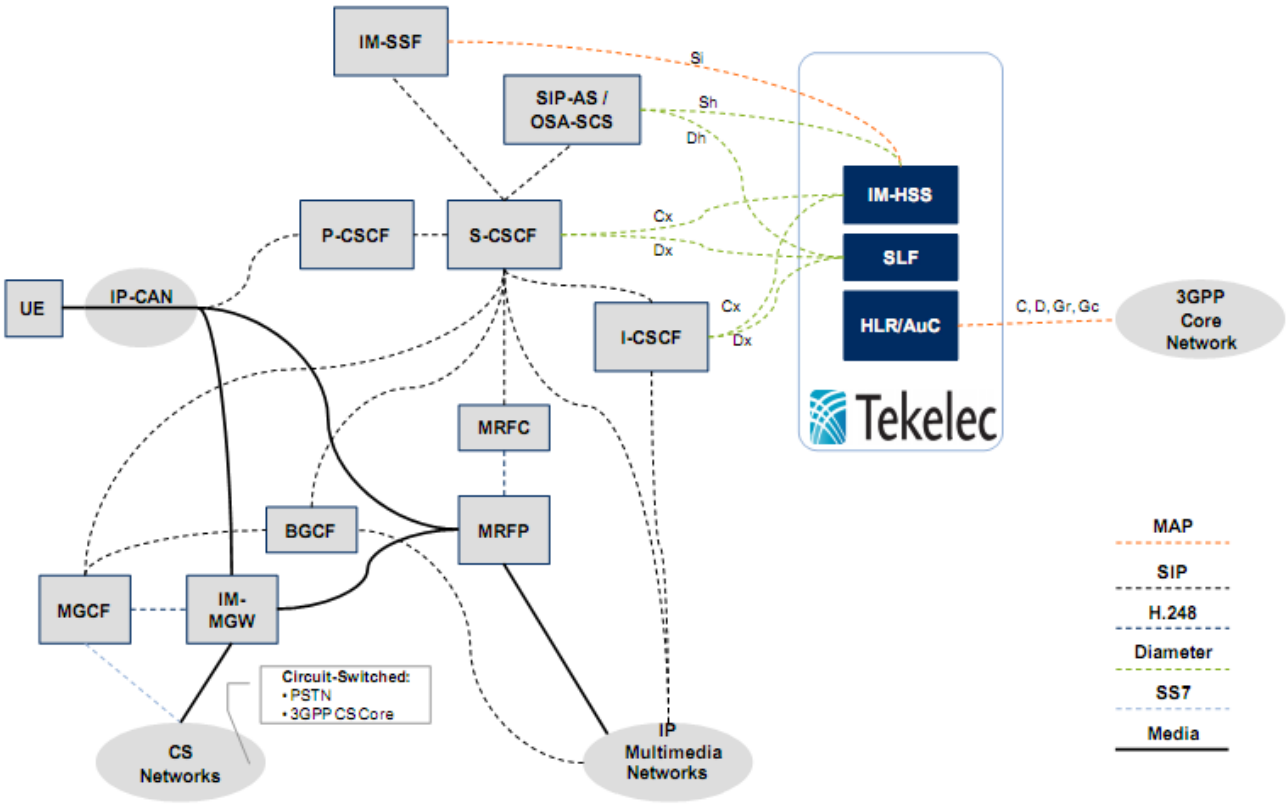
1. INTRODUCTION

1.1 General

This document aims to provide a description of the SDM Diameter-based Cx and Dx interfaces. The Cx interface is a basic functionality of the Tekelec HSS component of the Tekelec platform, while the Dx interface is part of the optional Subscription Locator Function package. The full set of functionality described in this document is available in Tekelec Release 4.0 onwards.

The document details technical compliance of the interface and provides example call flows of key messages exchanged between the SDM HSS/SLF and the external IMS Diameter peers.

1.2 Architecture



1.3 HSS and SLF implications

The Tekelec HSS implementation is scalable and distributed and therefore does not require the presence of SLF nodes. In the case where several HSS from different vendors are deployed, the SLF functionality can be added to redirect incoming Cx messages to the right HSS. Both the HSS and SLF are implemented in the same Software process on the SDM, but appear as different Diameter peers to external nodes. Both the HSS and SLF can co-reside or be activated independently.

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-Authoriztion-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

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

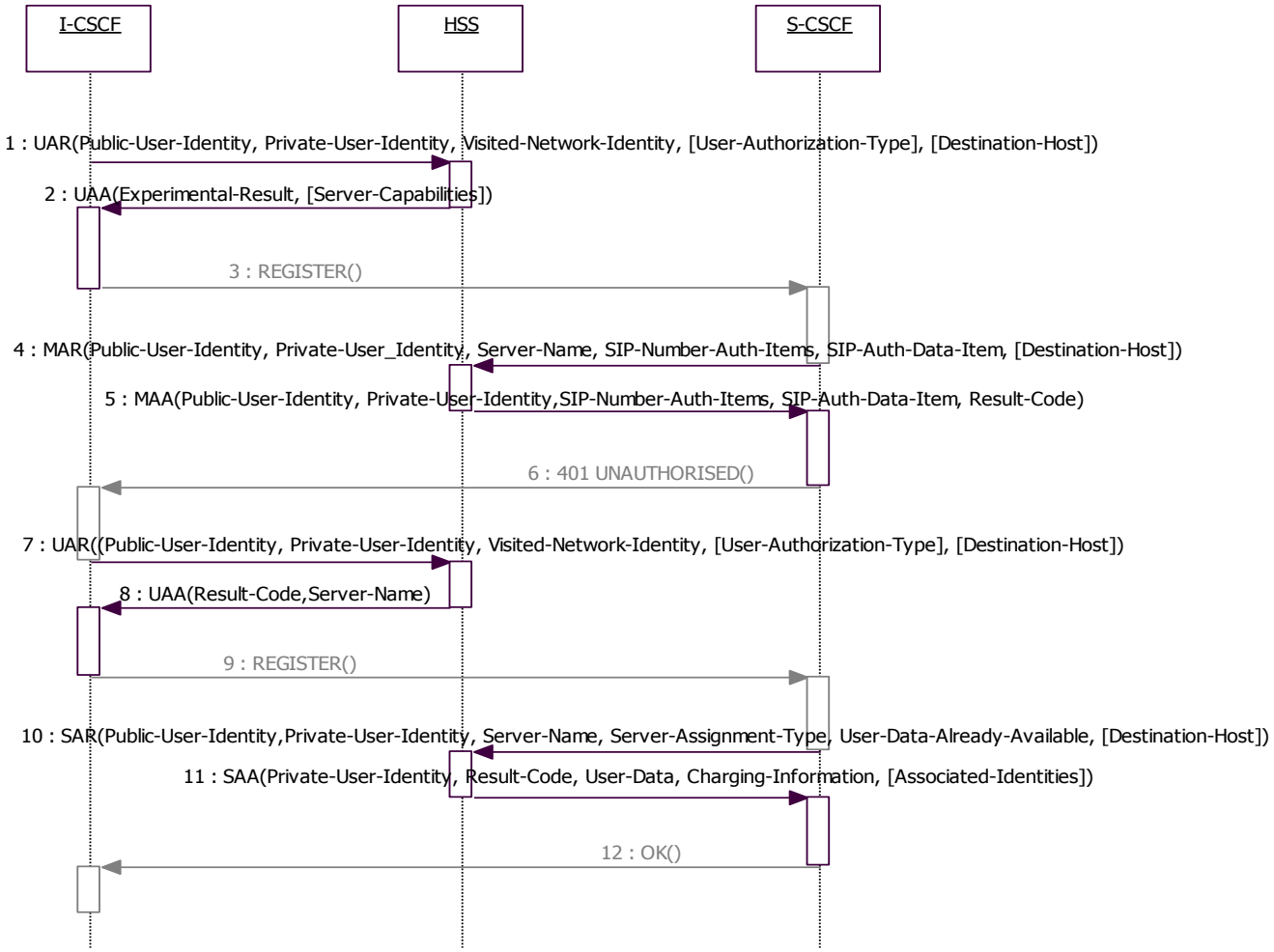
Cx/Dx message	Diameter Command-Name	Abbreviation
Cx-Query + Cx-Select-Pull	User-Authorization-Request	UAR
Cx-Query Resp + Cx-Select-Pull Resp	User-Authorization-Answer	UAA
Cx-Put + Cx-Pull	Server-Assignment-Request	SAR
Cx-Put Resp + Cx-Pull Resp	Server-Assignment-Answer	SAA
Cx-Location-Query	Location-Info-Request	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)

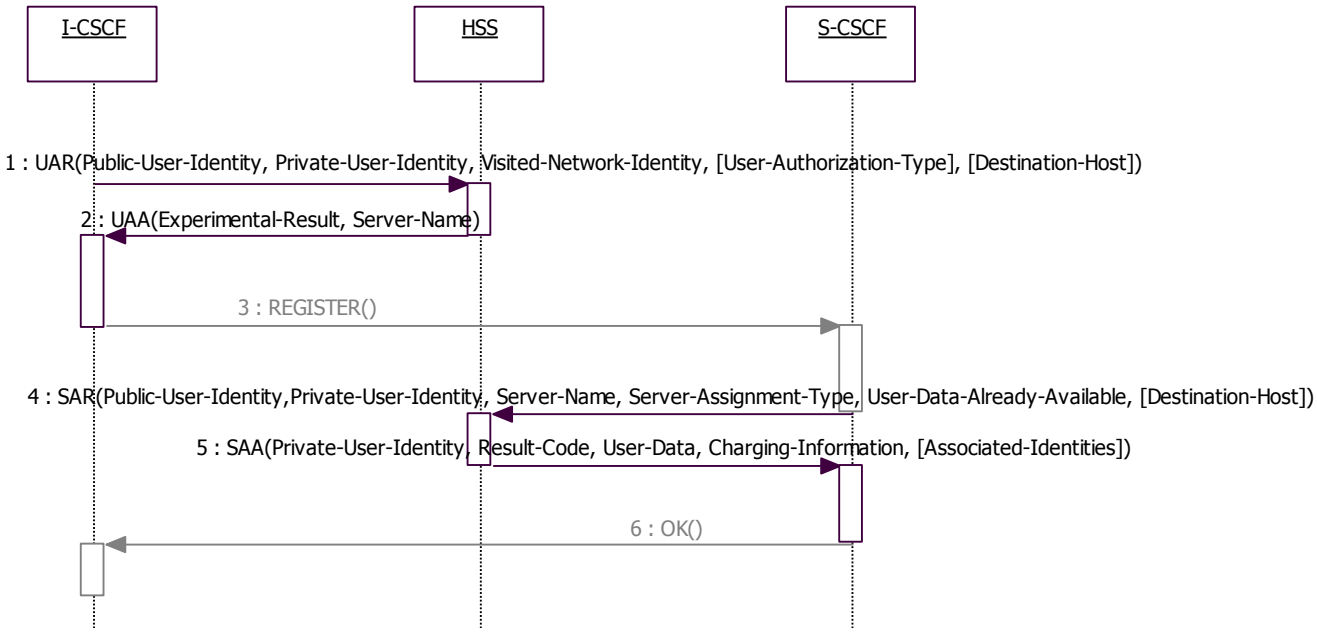
8: Experimental-Result-Code = {DIAMETER_FIRST_REGISTRATION (2001),
DIAMETER_ERROR_USER_UNKNOWN (5001),

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)

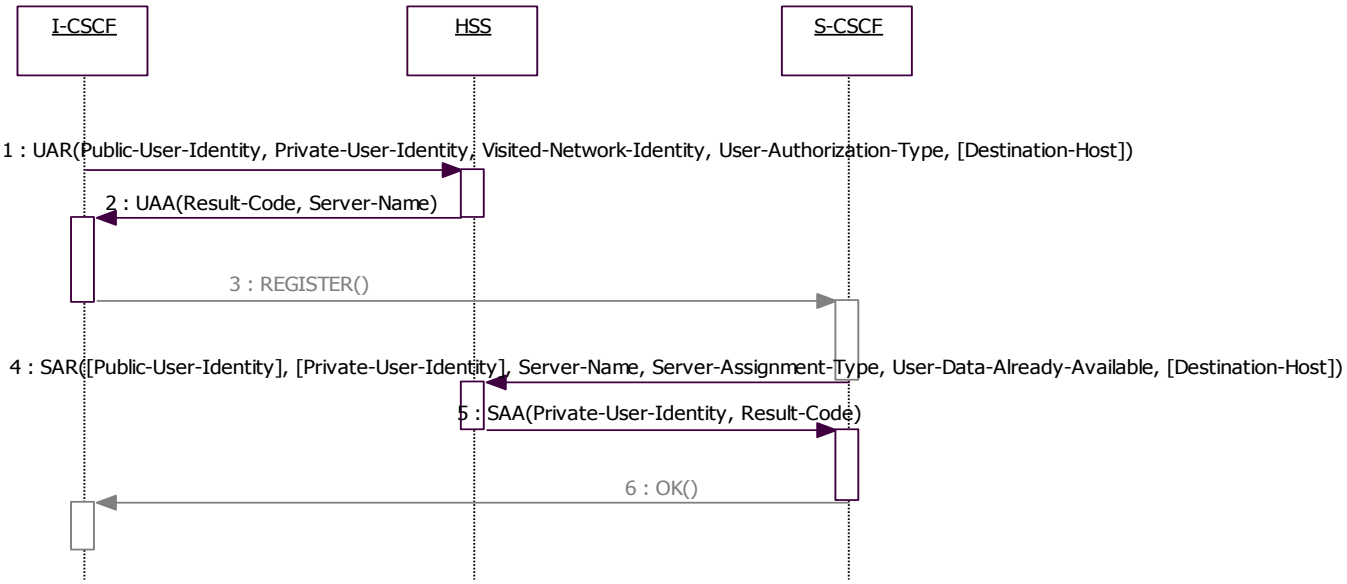
2: Experimental-Result-Code = {DIAMETER_SUBSEQUENT_REGISTRATION (2002),
DIAMETER_ERROR_USER_UNKNOWN (5001),
DIAMETER_ERROR_IDENTITIES_DONT_MATCH (5002),
DIAMETER_ERROR_ROAMING_NOT_ALLOWED (5004)}

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



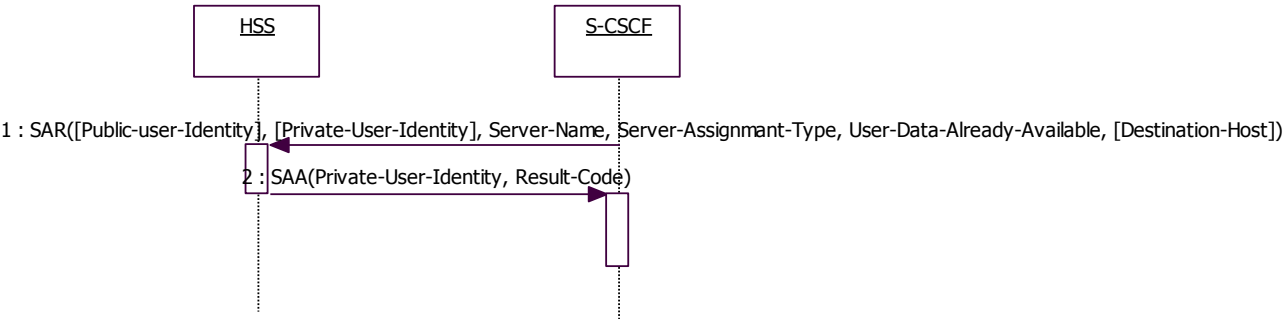
1: User-Authorization-Type = DE_REGISTRATION (1)

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)

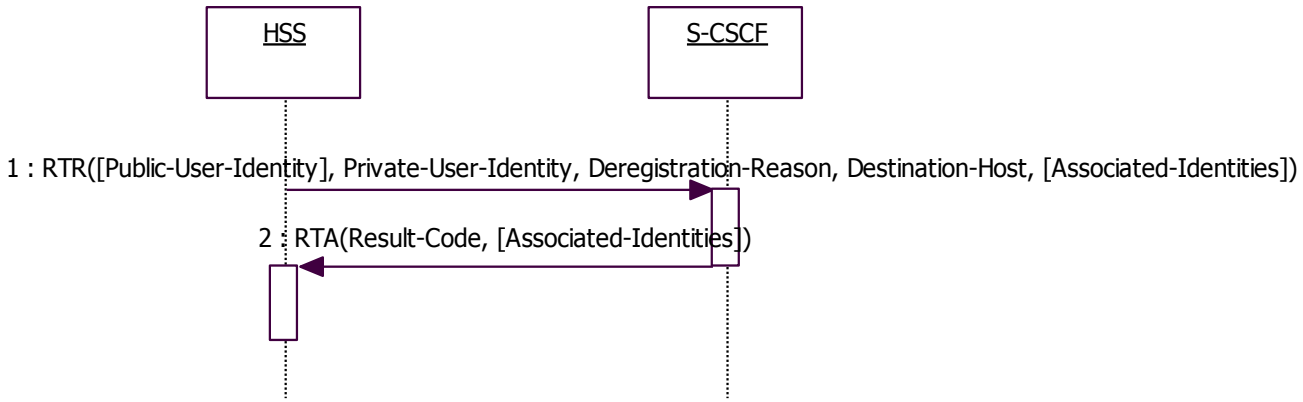
3.4 Registration timeout



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)

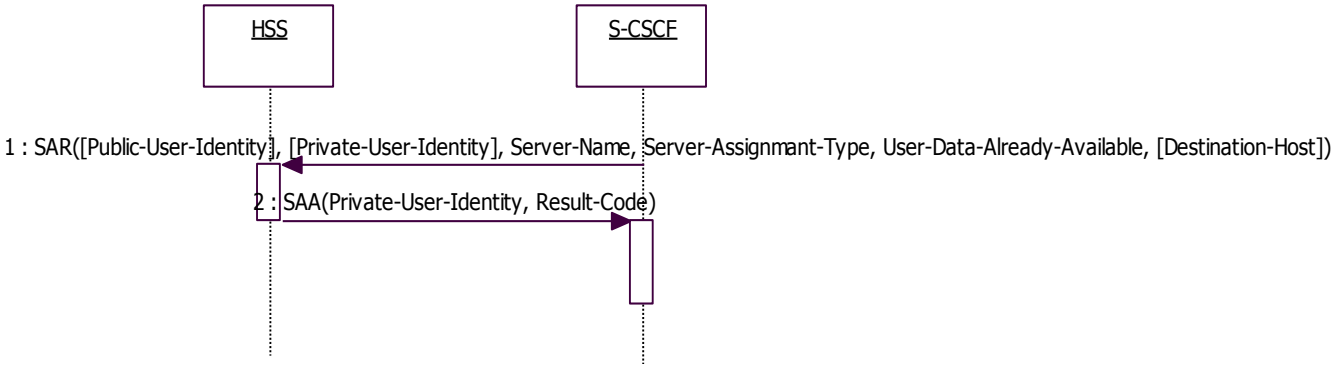
3.5 Administrative de-registration



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_IDENTITIES_DONT_MATCH (5002)}

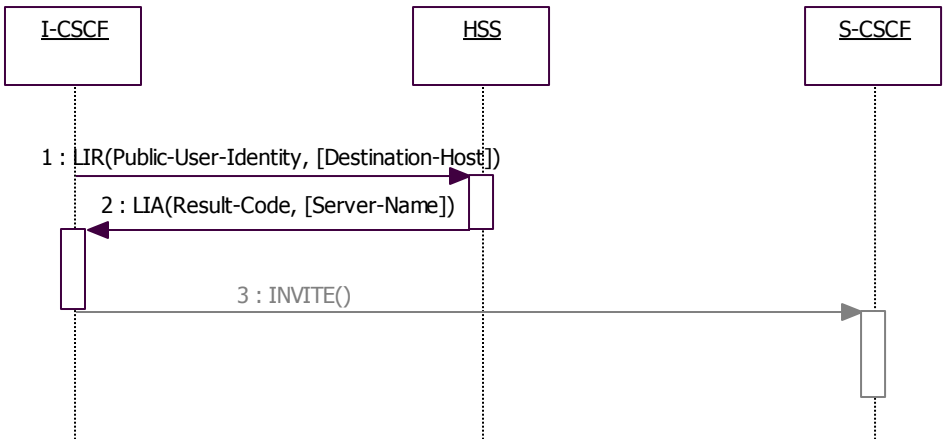
3.6 Service Platform initiated de-registration



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

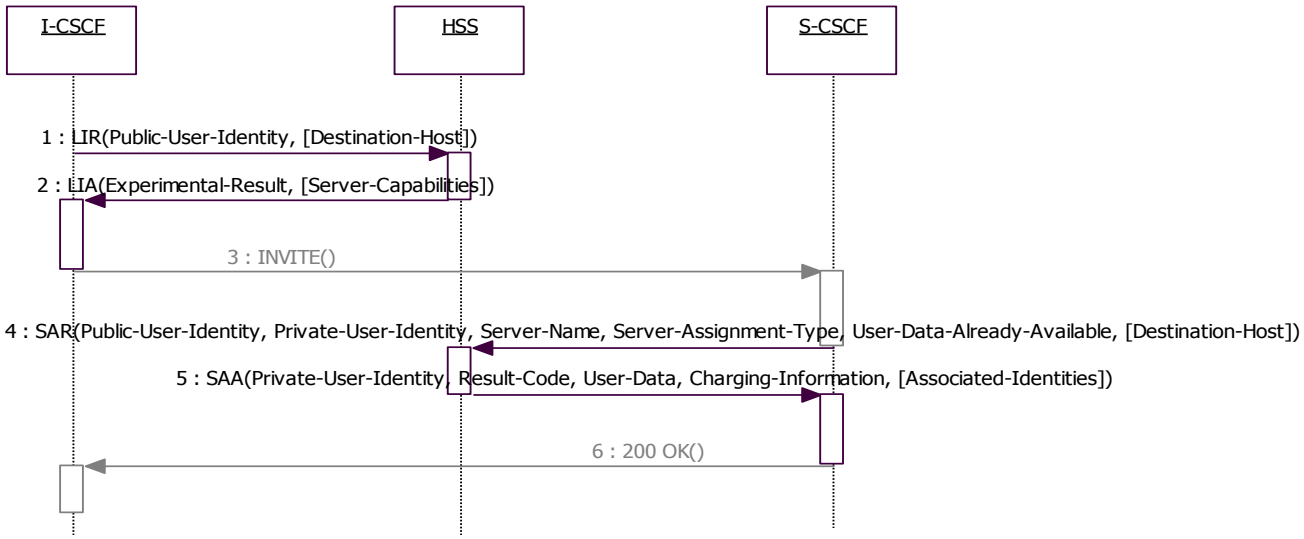
2: Result-Code = DIAMETER_SUCCESS (2001) or Experimental-Result-Code = {DIAMETER_ERROR_USER_UNKNOWN (5001), DIAMETER_ERROR_IDENTITIES_DONT_MATCH (5002)}

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

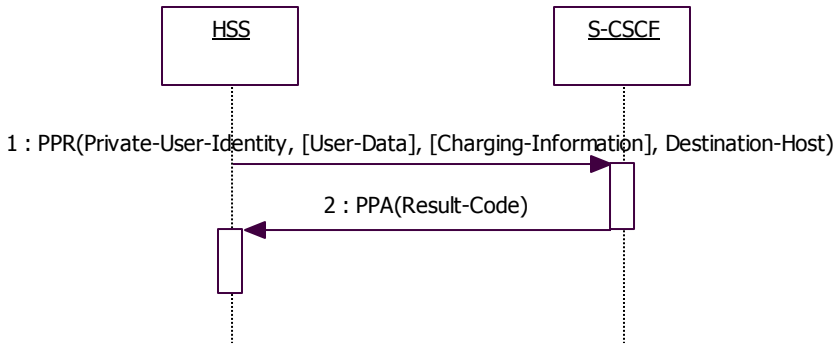


2: Experimental-Result-Code = {DIAMETER_UNREGISTERED_SERVICE (2003), DIAMETER_ERROR_USER_UNKNOWN (5001)}
If Experimental-Result-Code = 2003 then Server-Capabilities must be present

4: Server-Assignment-Type = UNREGISTERED_USER (3)

5: Result-Code = DIAMETER_SUCCESS (2001)

3.9 User profile update

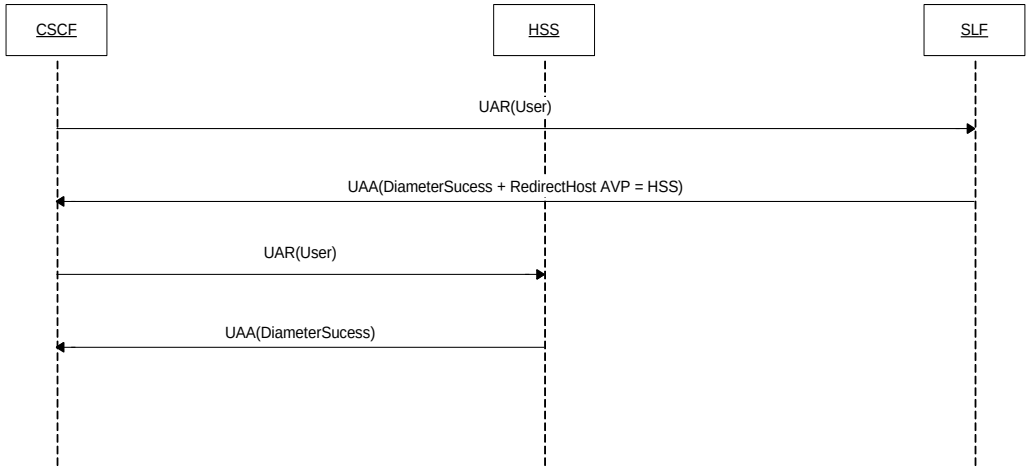


1: User-Data and/or Charging-Information must be present

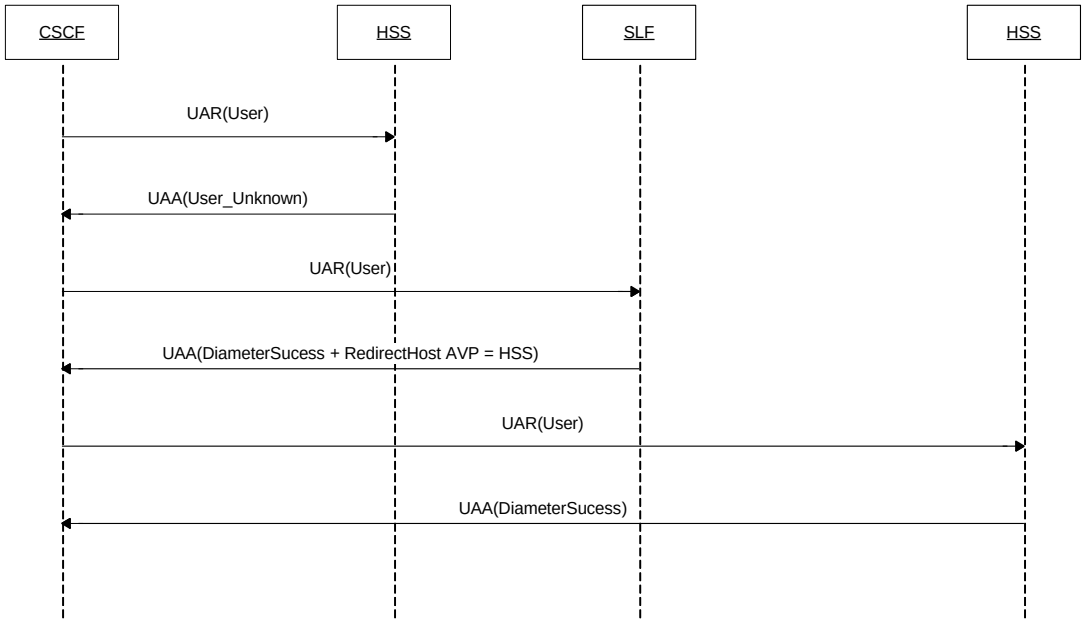
2: Result-Code = {DIAMETER_SUCCESS (2001), DIAMETER_UNABLE_TO_COMPLY (5012)}
or Experimental-Result-Code = DIAMETER_ERROR_USER_UNKNOWN (5001),
DIAMETER_ERROR_TOO_MUCH_DATA (5008),
DIAMETER_ERROR_NOT_SUPPORTED_USER_DATA (5009)}

4. Dx Message Flows

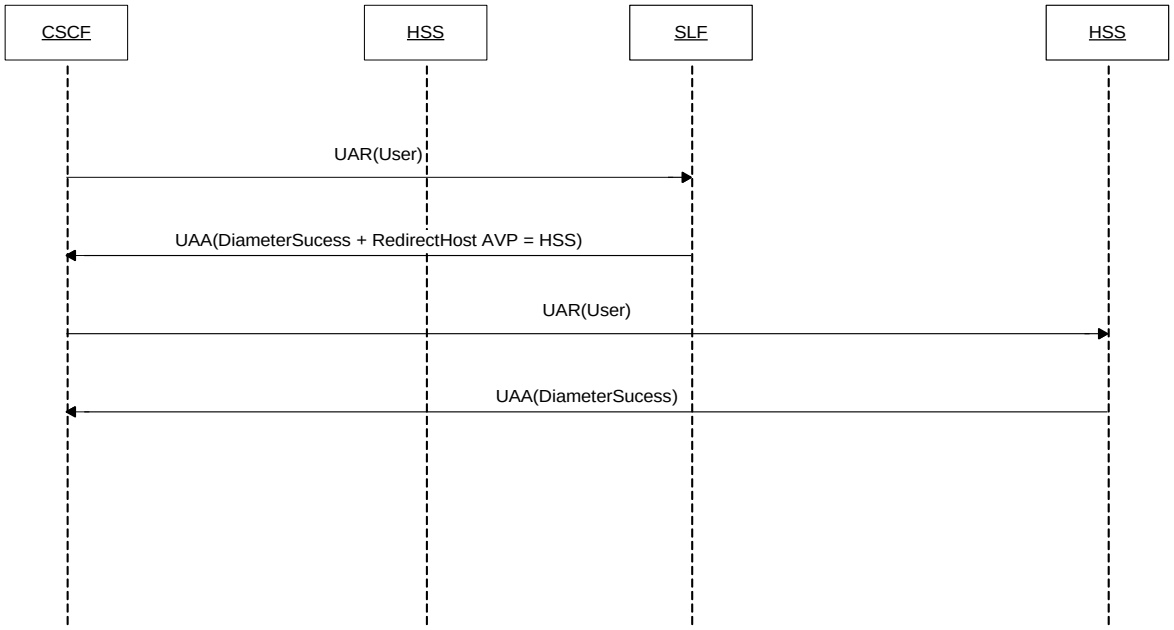
4.1 Dx message to SLF, redirected to Tekelec HSS



4.2 Cx message to HSS, user unknown



4.3 Dx message to SLF, redirected to external HSS



5. Cx Message Content

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

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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