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Signalling requirements at the interface between SUP-FE and I/S-CSC-FE

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Supplement 54 to ITU-T Q-series Recommendations

Signalling requirements at the interface between SUP-FE and I/S-CSC-FE

Summary

Supplement 54 to ITU-T Q-series Recommendations defines the signalling requirements at the interface between SUP-FE and I/S-CSC-FE.

Source

Supplement 54 to ITU-T Q-series Recommendations was agreed on 27 April 2007 by ITU-T Study Group 11 (2005-2008).

Keywords

Interface, NGN, signalling requirements.

FOREWORD

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Supplement 54 to ITU-T Q-series Recommendations

Signalling requirements at the interface between SUP-FE and I/S-CSC-FE

1 Scope

This Supplement defines signalling requirements and information flows at the interface between service user profile functional entity (SUP-FE) and I/S-CSC-FE.

The interface between I/S-CSC-FE and SUP-FE defined in [ITU-T Y.2012] can be mapped to the following interfaces:

- 1) the Cx interface between I/S-CSCF and SUP-FE (with SAA-FE) in IP Multimedia Subsystem, as identified in [ITU-T Y.2021];
- 2) the Cx interface between I/S-CSCF and SUP-FE (with SAA-FE) in IMS-based emulation architecture, as defined in [ITU-T Y.2031];
- 3) the I11 interface between CCF and SUP-FE in CS-based PSTN/ISDN emulation architecture, as defined in [ITU-T Y.2031].

This Supplement specifies the signalling requirements for the above three interfaces.

2 References

- [ITU-T G.964] ITU-T Recommendation G.964 (2001), *V-Interfaces at the digital local exchange (LE) – V5.1 interface (based on 2048 kbit/s) for the support of access network (AN)*.
- [ITU-T Q.1290] ITU-T Recommendation Q.1290 (1998), *Glossary of terms used in the definition of intelligent networks*.
- [ITU-T Q.2931] ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- [ITU-T Q.Sup56] ITU-T Q-series Supplement 56 (2007), *Organization of NGN service user data*.
- [ITU-T Y.2012] ITU-T Recommendation Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
- [ITU-T Y.2021] ITU-T Recommendation Y.2021 (2006), *IMS for Next Generation Networks*.
- [ITU-T Y.2031] ITU-T Recommendation Y.2031 (2006), *PSTN/ISDN emulation architecture*.
- [IETF RFC 2617] IETF RFC 2617 (1999), *HTTP Authentication: Basic and Digest Access Authentication*.
- [IETF RFC 3310] IETF RFC 3310 (2002), *Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA)*.
- [IETF RFC 4740] IETF RFC 4740 (2006), *Diameter Session Initiation Protocol (SIP) Application*.
- [ETSI TS 129 229] ETSI TS 129 229 V7.5.0 (2007), *Cx and Dx interfaces based on the Diameter protocol; Protocol details*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 information flow [ITU-T Q.1290]: An interaction between a communicating pair of functional entities.

3.1.2 information element [ITU-T Q.2931]: The components of a message are information elements. A particular information element type may be a component of more than one message type. An information element is composed of one or more octet groups.

3.1.3 conditional information element (C) [ITU-T G.964]: Conditional information element which is considered: a) mandatory if the presence conditions are fulfilled; or b) optional otherwise.

NOTE – In error-handling procedures, a conditional IE is handled as a mandatory or a conditional IE depending on the presence conditions. The absence of a conditional IE in a message is a protocol error only if the presence conditions of the IE are met.

3.1.4 optional information element (O) [ITU-T G.964]: An optional information element may be present in the message. The absence of an optional IE in a message is not a protocol error in any case.

3.2 Terms defined in this Supplement

This Supplement defines the following term:

3.2.1 mandatory information element (M): A mandatory information element must be present in the message. The absence of a mandatory IE in a message is a protocol error.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

AGCF	Access Gateway Control Function
AKA	Authentication and Key Agreement
AUTN	Authentication Token (128-bit value)
AUTS	Authentication Token (112-bit value)
CCF	Call Control Function
FE	Functional Entity
HSS	Home Subscriber Server
HTTP	Hyper Text Transfer Protocol
I-CSCF	Interrogating Call Session Control Function
I-CSC-FE	Interrogating Call Session Control Functional Entity
IE	Information Element
IMS	IP Multimedia Subsystem
ISDN	Integrated Services Digital Network
NAI	Network Access Identifier
NASS	Network Attachment Subsystem
NGN	Next Generation Network

P-CSCF	Proxy Call Session Control Function
PSTN	Public Switched Telephone Network
RAND	Random challenge
RFC	Request for Comments
SAA-FE	Service Authentication and Authorization Functional Entity
S-CSCF	Serving Call Session Control Function
S-CSC-FE	Serving Call Session Control Functional Entity
SCTP	Stream Control Transport Protocol
SIP	Session Initiation Protocol
SUP-FE	Service User Profile Functional Entity
URL	Uniform Resource Locator
XRES	Expected Authentication Response

5 Conventions

None.

6 General requirements

6.1 Functional requirements of related network entities

The interface between I/S-CSC-FE and SUP-FE defined in [ITU-T Y.2012] can be mapped into three interfaces identified in [ITU-T Y.2021] and [ITU-T Y.2031]. The functional requirements of the related functional entities are also specified in the related Recommendations.

Table 6-1 shows the interfaces and related FEs among NGN architectures specified in related Recommendations.

Table 6-1 – Related functional entities among NGN architectures

NGN architecture	Interfaces	Related functional entities	Recommendations which identify the functional requirements of the FEs
Functional architecture of the NGN	Interface between I/S-CSC-FE and SUP-FE	I/S-CSC-FE SUP-FE	All the FEs are specified in [ITU-T Y.2012].
IMS for next generation networks	Cx	I/S-CSCF SUP-FE (with SAA-FE)	I/S-CSCF is identified in [ITU-T Y.2021]. SUP-FE (with SAA-FE) is specified in [ITU-T Y.2012].
IMS-based PSTN/ISDN emulation architecture	Cx	I/S-CSCF SUP-FE (with SAA-FE)	I/S-CSCF is identified in [ITU-T Y.2031]. SUP-FE (with SAA-FE) is specified in [ITU-T Y.2012].
CS-based PSTN/ISDN emulation architecture	I11	CCF SUP-FE	CCF is specified in [ITU-T Y.2031]. SUP-FE is specified in [ITU-T Y.2012].

6.2 General requirements

General signalling requirements at the above three interfaces are classified in functional groups:

1) Location management

The Location management requirements include:

- a) the operations regarding registration and deregistration.
- b) Location retrieval operations which may be required to:
 - obtain the information of S-CSC-FE which serves the user or to obtain the list of capabilities that the S-CSC-FE has to support;
 - perform authorization and security check during the process of registration/deregistration on receipt of the registration message from P-CSC-FE or AGC-FE.

2) User-data handling

The user-data handling requirements include:

- the download of user information during registration and in support of recovery mechanisms;
- operations to support the updating of user data.

3) Authentication

The authentication requirements include operations regarding user authentication.

4) Error handling

The error-handling requirements include operations regarding error handling.

7 Procedure requirements

7.1 Procedure requirements for interface between I/S-CSCF and SUP-FE in IP multimedia subsystem

7.1.1 Location management procedures

The Cx interface shall implement the user registration/location-related procedures as follows.

7.1.1.1 User registration status query procedure

This procedure is used between the I-CSCF and the SUP-FE during SIP registrations. The procedure is invoked by the I-CSCF:

- to authorize the registration of the public user identity, checking multimedia subsystem access permissions and roaming agreements;
- to perform an initial security check, determining whether the public user identity in the message is associated with the private user identity sent in the message;
- to obtain either the S-CSCF where the public user identity is registered or unregistered (i.e., registered as a consequence of a terminating call or there is a S-CSCF keeping the user profile stored), or the list of capabilities that the S-CSCF has to support.

Information flow is shown in Figure 7-1.

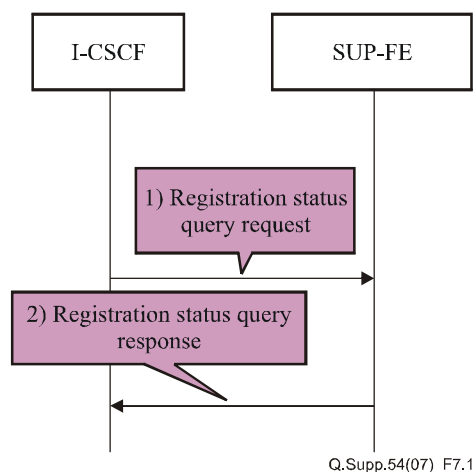


Figure 7-1 – Information flow for user registration status query procedure

- 1) On receiving the SIP register request from a user, the I-CSCF shall send the register status query information flow to the SUP-FE.
- 2) The SUP-FE shall return an assigned S-CSCF name or the list of capabilities that S-CSCF has to support.

Tables 7-1 and 7-2 detail the involved information elements.

Table 7-1 – User registration status query

Information element name	Cat.	Description
Public User Identity	M	Public user identity to be registered
Visited Network Identifier	M	Identifier that allows the home network to identify the visited network
Type of Authorization	C	Type of authorization requested by the I-CSCF
Private User Identity	M	Private user identity
Routing Information	C	Information to route requests

Table 7-2 – User registration status response

Information element name	Cat.	Description
Result	M	Result of the operation
S-CSCF capabilities	O	Required capabilities of the S-CSCF to be assigned to the IMS subscription
S-CSCF Name	C	Name of the assigned S-CSCF

7.1.1.2 S-CSCF-initiated registration/deregistration notification procedure

On registration or deregistration, the S-CSCF shall inform the SUP-FE. The SUP-FE holds the states of all identities under an IMS domain. The S-CSCF shall update these states by sending notification to SUP-FE.

This procedure is used between the S-CSCF and the SUP-FE. The procedure is invoked by the S-CSCF. SUP-FE associates the S-CSCF with the public user identity in the process of registration, or clears the name of the S-CSCF associated with one or more public user identities in the process of deregistration.