3GPP TSG CN Plenary Meeting #21 **NP-030418**
17th - 19th September 2003. Frankfurt, Germany.

Source: **TSG CN WG 1**

Title: **CRs to Rel-6 on Work Item IMS2 towards 24.229**

Agenda item: **9.1**

Document for: **APPROVAL**

Introduction:

This document contains **3** CRs, **Rel-6 to** Work Item **"IMS2"**, that have been agreed by **TSG CN WG1 in CN1#31 meeting**, and are forwarded to TSG CN Plenary meeting #21 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Version	Rel
N1-031267	Alignment with TS for policy control over Gq interface	24.229	465	1	F	5.5.0	Rel-6
N1-031304	I-CSCF procedures for openness	24.229	472	1	B	5.5.0	Rel-6
N1-031300	Registration from multiple terminals and forking	24.229	473	1	B	5.5.0	Rel-6

3GPP TSG-CN1 Meeting #31
Sophia Antipolis, 25-29 August, 2003

Tdoc N1-~~031047~~031267

CR-Form-v7

CHANGE REQUEST

⌘ **24.229** **CR** **465** ⌘ **rev** **-1** ⌘ Current version: **5.5.0** ⌘

*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:	⌘	Alignment with TS regarding policy control over Gq interface
Source:	⌘	NEC Corporation
Work item code:	⌘	IMS-~~ph~~2 ***Date:*** ⌘ 18/08/2003
Category:	⌘	**F** ***Release:*** ⌘ Rel-6

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:	⌘	Since TS regarding policy control over Gq interface is already starting to develop in Rel 6 within CN3 group, it is appropriate time to change the PDF/P-CSCF related sentences in 24.229.
Summary of change:	⌘	In Rel 6, interface between P-CSCF and PDF is specified as Gq interface. In the light of this change, relevant sentences are modified accordingly.
Consequences if not approved:	⌘	24.229 remains misalighed with 29.207 and may be wrongly implemented.

Clauses affected:	⌘	4.5.1, 4.5.2, 4.5.3.2, 7.2A.5.2

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

Start of first Change

4.5 Charging correlation principles for IM CN subsystems

4.5.1 Overview

This subclause describes charging correlation principles to aid with the readability of charging related procedures in clause 5. See 3GPP TS 32.200 [16] and 3GPP TS 32.225 [17] for further information on charging. ~~The interface between the PDF and P-CSCF is not defined in this release .~~

The IM CN subsystem generates and retrieves the following charging correlation information for later use with offline and online charging:

1. IM CN subsystem Charging Identifier (ICID);
2. Access network charging information:
   a. GPRS Charging Information;
3. Inter Operator Identifier (IOI);
4. Charging function addresses:
   a. Charging Collection Function (CCF);
   b. Event Charging Function (ECF).

How to use and where to generate the parameters in IM CN subsystems are described further in the subclauses that follow. The charging correlation information is encoded in the P-Charging-Vector header as defined in subclause 7.2A.5. The P-Charging-Vector header contains the following parameters: icid, access network charging information and ioi.

The offline and online charging function addresses are encoded in the P-Charging-Function-Addresses as defined in RFC 3455 [52]. The P-Charging-Function-Addresses header contains the following parameters: CCF and ECF.

4.5.2 IM CN subsystem charging identifier (ICID)

The ICID is the session level data shared among the IM CN subsystem entities including ASs in both the calling and called IM CN subsystems.

The first IM CN subsystem entity involved in a dialog (session) or standalone (non-session) method will generate the ICID and include it in the icid parameter of the P-Charging-Vector header in the SIP request. See 3GPP TS 32.225 [17] for requirements on the format of ICID. The P-CSCF will generate an ICID for mobile-originated calls. The I-CSCF will generate an ICID for mobile-terminated calls if there is no ICID received in the initial request (e.g. the calling party network does not behave as an IM CN subsystem). The AS will generate an ICID when acting as an originating UA. The MGCF will generate an ICID for PSTN/PLMN originated calls. Each entity that processes the SIP request will extract the ICID for possible later use in a CDR. The I-CSCF and S-CSCF are also allowed to generate a new ICID for mobile terminated calls received from another network.

There is also an ICID generated by the P-CSCF with a REGISTER request that is passed in a unique instance of P-Charging-Vector header. This ICID is valid for the duration of the registration and is associated with the signalling PDP context.

The icid parameter is included in any requests that include the P-Charging-Vector header. However, the P-Charging-Vector (and ICID) is not passed to the UE.

The ICID is also passed from the P-CSCF~~/PDF~~ to the GGSN via PDF, but the ICID is not passed to the SGSN. The interface supporting this operation is outside the scope of this document.

4.5.3 Access network charging information

4.5.3.1 General

The access network charging information are the media flow level data shared among the IM CN subsystem entities for one side of the session (either the calling or called side). GPRS charging information (GGSN identifier and PDP context information) is an example of access network charging information.

4.5.3.2 GPRS charging information

The GGSN provides the GPRS charging information to the IM CN subsystem, which is the common information used to correlate GGSN CDRs with IM CN subsystem CDRs. The GPRS charging information is used to correlate the bearer level (i.e. PDP context) with session level.

The GPRS charging information is generated at the first opportunity after the resources are allocated at the GGSN. The GPRS charging ingormation is passed from GGSN to P-CSCF~~/PDF~~ via PDF. GPRS charging information will be updated with new information during the session as media flows are added or removed. The P-CSCF provides the GPRS charging information to the S-CSCF. The S-CSCF may also pass the information to an AS, which may be needed for online pre-pay applications. The GPRS charging information for the originating network is used only within that network, and similarly the GPRS charging information for the terminating network is used only within that network. Thus the GPRS charging information are not shared between the calling and called networks. The GPRS charging information is not passed towards the external ASs from its own network.

The GPRS charging information is populated in the P-Charging-Vector using the gprs-charging-info parameter. The details of the gprs-charging-info parameter is described in subclause 7.2A.5.

4.5.4 Inter operator identifier (IOI)

The Inter Operator Identifier (IOI) is a globally unique identifier to share between operator networks/service providers/content providers. There are two possible instances of an IOI to be exchanged between networks/service providers/content providers: one for the originating side, orig-ioi, and one for the terminating side, term-ioi.

The S-CSCF in the originating network populates the orig-ioi parameter of the P-Charging-Vector header in the initial request, which identifies the operator network from which the request originated. Also in the initial request, the term-ioi parameter is left out of the P-Charging-Vector header. The S-CSCF in the originating network retrieves the term-ioi parameter from the P-Charging-Vector header within the message sent in response to the initial request, which identifies the operator network from which the response was sent.

The S-CSCF in the terminating network retrieves the orig-ioi parameter from the P-Charging-Vector header in the initial request, which identifies the operator network from which the request originated. The S-CSCF in the terminating network populates the term-ioi parameter of the P-Charging-Vector header in the response to the initial request, which identifies the operator network from which the response was sent.

The MGCF takes responsibility for populating the orig-ioi parameter when a call/session is originated from the PSTN/PLMN. The MGCF takes responsibility for populating the term-ioi parameter when a call/session is terminated at the PSTN/PLMN.

IOIs will not be passed along within the network, except when proxied by BGCF and I-CSCF to get to MGCF and S-CSCF. However, IOIs will be sent to the AS for accounting purposes.

End of first Change

Start of second Change

7.2A.5 P-Charging-Vector header

7.2A.5.1 Introduction

The P-Charging-Vector header is is extended to include specific charging correlation information needed for IM CN subsystem functional entities.

7. 2A.5.2 Syntax

The P-Charging-Vector header field has the syntax described in RFC 3455 [52]. Table 7.3 describes extensions required for 3GPP to that syntax.

Table 7.3: Syntax of extensions to P-Charging-Vector header

```
access-network-charging-info = (gprs-charging-info / generic-param)
gprs-charging-info = ggsn *(SEMI pdp-info) [SEMI extension-param]
ggsn = "ggsn" EQUAL gen-value
pdp-info = pdp-sig SEMI gcid SEMI auth-token *(SEMI flow-id)
pdp-sig = "pdp-sig" EQUAL ("yes" / "no")
gcid = "gcid" EQUAL gen-value
auth-token = "auth-token" EQUAL gen-value
flow-id = "flow-id" EQUAL gen-value
extension-param = token [EQUAL (token | quoted-string)]
```

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header

The access-network-charging-info parameter includes alternative definitions for different types access networks.

GPRS is the initially supported access network (gprs-charging-info parameter). For GPRS there are the following components to track: GGSN address (ggsn parameter) and one or more PDP contexts (pdp-info parameter). Each PDP context has an indicator if it is an IM CN subsystem signalling PDP context (pdp-sig parameter), an associated GPRS Charging Identifier (gcid parameter), a media authorization token (auth-token parameter) and one or more flow identifiers (flow-id parameter) that identify associated m-lines within the SDP from the SIP signalling. These parameters are transferred from the GGSN to the P-CSCF ~~(PDF)~~via the PDF over the Go and Gq interface, see 3GPP TS 29.207[12].

For a dedicated PDP context for SIP signalling, i.e. no media stream requested for a session, then there is no authorisation activity or information exchange over the Go and Gq interface. Since there are no GCID, media authorization token or flow identifiers in this case, the GCID and media authorization token are set to zero and no flow identifier parameters are constructed by the ~~P-CSCF/~~PDF.

7. 2A.5.3 Operation

The operation of this header is described in subclauses 5.2, 5.3, 5.4, 5.5, 5.6, 5.7 and 5.8.

End of second Change

3GPP TSG-CN1 Meeting #31
Sophia, France, 24-31 August 2003

Tdoc ⌘N1-031304

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CHANGE REQUEST

⌘ **24.229** **CR** **CR472** ⌘ **rev** **1** ⌘ Current version: **5.5.0** ⌘

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

Title:	⌘	I-CSCF procedures for openness
Source:	⌘	Nokia
Work item code:	⌘	IMS2-~~CCR~~
Date:	⌘	18/08/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
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C *(functional modification of feature)*
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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:	⌘	I-CSCF is the entry point into IMS network, therefore it has to verify whether the incoming request arrived from a trusted domain or not, and in case it arrived from non trusted domain, the P-Asserted-Identity header shall be removed from the request.
Summary of change:	⌘	Procedures were added to the I-CSCF.
Consequences if not approved:	⌘	Interworking with non-IMS networks can not be handled.

Clauses affected:	⌘	5.3.2.1

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

⌘

Other comments: ⌘

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.002: "Network architecture".

[3] 3GPP TS 23.003: "Numbering, addressing and identification".

[4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[4A] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

[5] 3GPP TS 23.218: "IP Multimedia (IM) Session Handling; IM call model".

[6] 3GPP TS 23.221: "Architectural requirements".

[7] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".

[8] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[9] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[9A] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".

[10] 3GPP TS 26.235: "Packet switched conversational multimedia applications; Default codecs".

[10A] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".

[11] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)".

[12] 3GPP TS 29.207: "Policy control over Go interface".

[13] 3GPP TS 29.208: "End to end Quality of Service (QoS) signalling flows".

[14] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

[15] 3GPP TS 29.229: "Cx and Dx Interfaces based on the Diameter protocol, Protocol details".

[16] 3GPP TS 32.200: "Telecommunication management; Charging management; Charging principles".

[17] 3GPP TS 32.225: "Telecommunication management; Charging management; Charging data description for the IP Multimedia subsystem".

[18] 3GPP TS 33.102: "3G Security; Security architecture".

[19] 3GPP TS 33.203: "Access security for IP based services".

[19A] 3GPP TS 33.210: "IP Network Layer Security".

[20] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".

5.3.2.1 Normal procedures

The I-CSCF may behave as a stateful proxy for initial requests.

The I-CSCF shall verify for all requests whether they arrived from a trusted domain or not. If the request arrived from a non trusted domain, then the I-CSCF shall:

1) respond with 403 (Forbidden) response if the request is a REGISTER request; ~~, the I-CSCF shall respond with 403 (Forbidden) response~~.

2) ~~if the request is other than REGISTER request, the I-CSCF shall~~ remove all P-Asserted-Identity headers, all P-Access-Network-ID headers, all P-Charging-Vector headers and all P-Charging-Function-Addresses headers the request may contain, if the request is other than REGISTER request; and

3) continue with the procedures below~~.~~

If the request arrived from a trusted domain, the I-CSCF shall perform the procedures below.

NOTE: the I-CSCF may find out whether the request arrived from a trusted domain or not, ~~from the transport addresses and the Security Policy Database configuration of the Security Gateway running IPSec, as~~ from the procedures described in 3GPP TS 33.210 [19A].

When the I-CSCF receives an initial request for a dialog or standalone transaction, that does not contain a Route header, the I-CSCF shall start the user location query procedure to the HSS as specified in 3GPP TS 29.228 [14] for the called user, indicated in the Request-URI. Prior to performing the user location query procedure to the HSS, the I-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14].

Upon successful user location query, when the response contains the URI of the assigned S-CSCF, the I-CSCF shall:

1) insert the URI received from the HSS as the topmost Route header;

2) store the value of the icid parameter received in the P-Charging-Vector header and retain the icid parameter in the P-Charging-Vector header. If no icid parameter was found, then create a new, globally unique value for the icid parameter and insert it into the P-Charging-Vector header;

3) apply the procedures as described in subclause 5.3.3 if topology hiding is required; and

4) forward the request based on the topmost Route header.

Upon successful user location query, when the response contains information about the required S-CSCF capabilities, the I-CSCF shall:

1) select a S-CSCF according to the method described in 3GPP TS 29.228 [14];

2) insert the URI of the selected S-CSCF as the topmost Route header field value;

3) execute the procedure described in step 2 and 3 in the above paragraph (upon successful user location query, when the response contains the URI of the assigned S-CSCF); and

4) forward the request to the selected S-CSCF.

Upon an unsuccessful user location query when the response from the HSS indicates that the user does not exist, the I-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 404 (Not found) or 604 (Does not exist anywhere) in the case the user is not a user of the home network.

Upon an unsuccessful user location query when the response from the HSS indicates that the user is not registered and no services are provided for such a user, the I-CSCF shall return an appropriate unsuccessful SIP response. This

response may be a 480 (Temporarily unavailable) if the user is recognized as a valid user, but is not registered at the moment and it does not have services for unregistered users.

When the I-CSCF receives an initial request for a dialog or standalone transaction, that contains a single Route header pointing to itself, the I-CSCF shall determine from the entry in the Route header whether it needs to do HSS query or hiding. In case HSS query is needed, then the I-CSCF shall perform the procedures described for the case when there is no Route header present. If the I-CSCF determines that hiding must be performed, then the THIG functionality in I-CSCF received an outgoing initial request for which topology hiding has to be applied, and the I-CSCF shall:

1) remove its own SIP URI from the topmost Route header;

2) perform the procedures described in subclause 5.3.3; and

3) route the request based on the Request-URI header field.

When the I-CSCF receives an initial request for a dialog or standalone transaction containing more than one Route header, the I-CSCF shall:

1) remove its own SIP URI from the topmost Route header;

2) apply the procedures as described in subclause 5.3.3; and

3) forward the request based on the topmost Route header.

NOTE: In accordance with SIP the I-CSCF can add its own routeable SIP URI to the top of the Record-Route header to any request, independently of whether it is an initial request, or whether topology hiding is performed. The P-CSCF will ignore any Record-Route header that is not in the initial request of a dialog.

When the I-CSCF receives a response to an initial request (e.g. 183 or 2xx), the I-CSCF shall store the values from the P-Charging-Function-Addresses header, if present. If the next hop is outside of the current network, then the I-CSCF shall remove the P-Charging-Function-Addresses header prior to forwarding the message.

3GPP TSG-CN1 Meeting #31
Sophia Antipolis, France, 24-31 August 2003

Tdoc ⌘N1-031300

CR-Form-v7

CHANGE REQUEST

⌘ **24.229** **CR** **473** ⌘ **rev** **1** ⌘ Current version: **5.5.0** ⌘

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Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Registration from multiple terminals and forking
Source:	⌘	Nokia
Work item code:	⌘	IMS2
Date:	⌘	18/08/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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

Reason for change:	⌘	To allow registrations from multiple terminals and forking the following changes are introduced.
Summary of change:	⌘	According to stage 2 requirements the S-CSCF shall support the ability for a public user identity to be registered from multiple contact addresses, as defined in RFC 3261. The multiple contacts are to be registered to the same S-CSCF. The S-CSCF shall support forking so that an incoming SIP request addressed to this Public User Identity is proxied to multiple registered contact addresses. This allows forking across multiple contact addresses of the same Public User Identity.
Consequences if not approved:	⌘	Not working procedures for forking.

Clauses affected:	⌘	5.1.3.1, 5.1.4.1, 5.3.1.2, 5.4.1,1, 5.4.3.3

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

Other comments:	⌘	

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****** First change ******

5.1.3.1 Initial INVITE

Upon generating an initial INVITE request, the UE shall:

- indicate the support for reliable provisional responses and specify it using the Supported header mechanism;
- indicate the requirement of precondition and specify it using the Require header mechanism.

NOTE: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26]. ~~While proxies in the IM CN subsystem do not fork requests, proxies external to the system may initiate forking, such that the UE is able to receive several forked provisional or final responses from different terminations.~~The UE may accept or reject any of the forked responses, for example, if the UE is capable of supporting a limited number of simultaneous transactions or early dialogs.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall not progress any further early dialogues to established dialogs. Therefore, upon the reception of a subsequent final 200 (OK) response for an INVITE request (e.g., due to forking), the UE shall:

1) acknowledge the response with an ACK request; and
2) send a BYE request to this dialog in order to terminate it.

If the UA receives a 503 (Service Unavailable) response to an initial INVITE request containing a Retry-After header, then the UE shall not automatically reattempt the request until after the period indicated by the Retry-After header contents.

If the UE receives a 488 (Not Acceptable Here) response to an initial INVITE request, the UE should send a new INVITE request containing SDP according to the procedures defined in subclause 6.1.

NOTE: An example of where a new request would not be built is where knowledge exists within the UE, or interaction occurs with the user, such that it is known that the resultant SDP would describe a session that did not meet the user requirements.

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

5.1.4.1 Initial INVITE

Upon receiving an initial INVITE request without containing either Supported: precondition or Require: precondition header values, the UE shall generate a 421 (Extension Required) response indicating the required extension in the Require header field.

Upon generating the first response to the initial INVITE request, the UE shall indicate the requirement for reliable provisional responses and specify it using the Require header mechanism.The UE shall send the 200 (OK) response to the initial INVITE request only after the local resource reservation has been completed.

NOTE: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26]. ~~While proxy support of forking is precluded in the IM CN subsystem, proxies external to the system may initiate forking, such that the UE is able to receive several forked requests for the same transaction.~~

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

5.3.1.2 Normal procedures

When I-CSCF receives a REGISTER request, the I-CSCF starts the user registration status query procedure to the HSS as specified in 3GPP TS 29.228 [14].

NOTE: One IMS user may register the same IMS public user identity from different terminals. These registrations from the same user are directed to the same S-CSCF as described in 3GPP TS 29.228 [14].

Prior to performing the user registration query procedure to the HSS, the I-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14].

If the user registration status query response from the HSS includes a valid SIP URI, the I-CSCF shall:

1) replace the Request-URI of the received REGISTER request with the SIP URL received from the HSS in the Server-Name AVP;

2) apply the procedures as described in subclause 5.3.3 if topology hiding is required; and

3) forward the REGISTER request to the indicated S-CSCF.

If the user registration status query response from the HSS includes a list of capabilities, the I-CSCF shall:

1) select a S-CSCF that fulfils the indicated mandatory capabilities – if more then one S-CSCFs fulfils the indicated mandatory capabilities the S-CSCF which fulfils most of the possibly additionally indicated optional capabilities;

2) replace the Request-URI of the received REGISTER request with the URI of the S-CSCF;

3) apply the procedures as described in subclause 5.3.3 if topology hiding is required; and

4) forward the REGISTER request to the selected S-CSCF.

When the I-CSCF receives a 2xx response to a REGISTER request, the I-CSCF shall proxy the 2xx response to the P-CSCF.

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

5.4.3.3 Requests terminated at the served user

When the S-CSCF receives, destined for a registered served user, an initial request for a dialog or a request for a standalone transaction, prior to forwarding the request, the S-CSCF shall:

1) determine whether the request contains a barred public user identity in the Request-URI of the request or not. In case the Request URI contains a barred public user identity for the user, then the S-CSCF shall reject the request by generating a 404 (Not Found) response. Otherwise, continue with the rest of the steps;

2) remove its own URL from the topmost Route header;

3) check if an original dialog identifier that the S-CSCF previously placed in a Route header is present in the topmost Route header of the incoming request. If present, it indicates an association with an existing dialog, the request has been sent from an Application Server in response to a previously sent request;

4) check whether the initial request matches the initial filter criteria based on the public user identity in the Request-URI, the S-CSCF shall forward this request to that application server, then check for matching of the next following filter criteria of lower priority, and apply the filter criteria on the SIP method received from the previously contacted application server as described in 3GPP TS 23.218 [5] subclause 6.5. Depending on the result of the previous process, the S-CSCF may contact one or more application server(s) before processing the outgoing Request-URI. In case of contacting one or more application server(s) the S-CSCF shall:

   insert the AS URL to be contacted into the Route header as the topmost entry followed by its own URL populated as specified in the subclause 5.4.3.4;

5) insert a P-Charging-Function-Addresses header populated with values received from the HSS if the message is forwarded within the S-CSCF home network, including towards AS;

6) store the value of the icid parameter received in the P-Charging-Vector header and retain the icid parameter in the P-Charging-Vector header;

7) store the value of the orig-ioi parameter received in the P-Charging-Vector header, if present. The orig-ioi parameter identifies the sending network of the request message. The orig-ioi parameter shall only be retained in the P-Charging-Vector header if the next hop is to an AS;

8) in case there are no Route headers in the request, then determine, from the destination public user identity, the list of preloaded routes saved during registration or re-registration, as described in subclause 5.4.1.2;

9) build the Route header field with the values determined in the previous step;

10) determine, from the destination public user identity, the saved Contact URL where the user is reachable saved at registration or reregistration, as described in subclause 5.4.1.2; if there is more than one contact address saved for the destination public user identity, the S-CSCF shall either fork the request or perform sequential search based on the relative preference indicated by the q value, as described in RFC3261 [26]. In case no q parameter was provided, the S-CSCF shall look into the user profile of the user to find indication about the default handling of the request.

11) build a Request-URI with the contents of the saved Contact URL determined in the previous step;

12) insert a P-Called-Party-ID SIP header field including the Request-URI received in the INVITE;

13) in case of an initial request for a dialog create a Record-Route header containing its own SIP URL and save the necessary Record-Route header fields and the Contact header from the request in order to release the dialog when needed; and

14) optionally, apply any privacy required by RFC 3323 [33] to the P-Asserted-Identity header; and

NOTE: The optional procedure above is in addition to any procedure for the application of privacy at the edge of the trust domain specified by RFC 3323 [33].

15) forward the request based on the topmost Route header.

When the S-CSCF receives, destined for an unregistered user, an initial request for a dialog or a request for a standalone transaction, the S-CSCF shall:

1) execute the procedures described in the steps 1, 2 and 3 in the above paragraph (when the S-CSCF receives, destined for the registered served user, an initial request for a dialog or a request for a standalone transaction);

2) if the S-CSCF does not have the user profile, then initiate the S-CSCF Registration/deregistration notification with the purpose of downloading the relevant user profile (i.e. for unregistered user) and informing the HSS that the user is unregistered, but this S-CSCF will assess triggering of services for the unregistered user, as described in 3GPP TS 29.228 [14];

3) keep the user registration status as unregistered for the duration of the dialog. When the dialog expires, the S-CSCF shall inform appropriately the HSS according to the procedures described in 3GPP TS 29.228 [14];

4) execute the procedure described in step 4 and 5 in the above paragraph (when the S-CSCF receives, destined for the registered served user, an initial request for a dialog or a request for a standalone transaction).

   In case that no AS needs to be contacted, then S-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 480 (Temporarily unavailable) and terminate these procedures; and

5) execute the procedures described in the steps 6, 7, 12, 13, 14 and 15 in the above paragraph (when the S-CSCF receives, destined for the registered served user, an initial request for a dialog or a request for a standalone transaction).

When the S-CSCF receives a response to the initial request for a dialog (whether the user is registered or not), it shall save the necessary Record-Route header fields and the Contact header field from the response in order to release the dialog if needed. In the case where the S-CSCF has knowledge of an associated tel-URI for a SIP URL contained in the received P-Asserted-Identity header, the S-CSCF shall add a second P-Asserted-Identity header containing this tel-URI. In case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the P-Access-Network-Info header; otherwise, the S-CSCF shall remove the P-Access-Network-Info header.

When the S-CSCF receives a response to a request for a standalone transaction (whether the user is registered or not), in the case where the S-CSCF has knowledge of an associated tel-URI for a SIP URL contained in the received P-Asserted-Identity header, the S-CSCF shall add a second P-Asserted-Identity header containing this tel-URI. In case the

response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the P-Access-Network-Info header; otherwise, the S-CSCF shall remove the P-Access-Network-Info header.

When the S-CSCF receives the 200 (OK) response for a standalone transaction request, the S-CSCF shall insert a P-Charging-Function-Addresses header populated with values received from the HSS if the message is forwarded within the S-CSCF home network, including towards an AS.

When the S-CSCF receives, destined for a served user, a target refresh request for a dialog, prior to forwarding the request, the S-CSCF shall:

1) remove its own URL from the topmost Route header;

2) create a Record-Route header containing its own SIP URL and save the Contact header from the target refresh request in order to release the dialog when needed; and

3) forward the request based on the topmost Route header.

When the S-CSCF receives a response to the target refresh request for a dialog (whether the user is registered or not), it shall save the necessary Record-Route header fields and the Contact header field from the response in order to release the dialog if needed. In case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the P-Access-Network-Info header; otherwise, the S-CSCF shall remove the P-Access-Network-Info header.

When the S-CSCF receives, destined for the served user, a subsequent request other than target refresh request for a dialog, prior to forwarding the request, the S-CSCF shall:

1) remove its own URL from the topmost Route header; and

2) forward the request based on the topmost Route header.

When the S-CSCF receives a response to a a subsequent request other than target refresh request for a dialog, in case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the P-Access-Network-Info header; otherwise, the S-CSCF shall remove the P-Access-Network-Info header.

A.2.2.2 Major capabilities

Table A.162: Major capabilities

Item	Does the implementation support	Reference	RFC status	Profile status
	Capabilities within main protocol			
3	initiate session release?	[26] 16	x	c27
4	stateless proxy behaviour?	[26] 16.11	o.1	c28
5	stateful proxy behaviour?	[26] 16.2	o.1	c29
6	forking of initial requests?	[26] 16.1	c1	~~X~~c31
7	support of TLS connections on the upstream side?	[26] 16.7	o	n/a
8	support of TLS connections on the downstream side?	[26] 16.7	o	n/a
8A	authentication between UA and proxy?	[26] 20.28, 22.3	o	x
9	insertion of date in requests and responses?	[26] 20.17	o	o
10	suppression or modification of alerting information data?	[26] 20.4	o	o
11	reading the contents of the Require header before proxying the request or response?	[26] 20.32	o	o
12	adding or modifying the contents of the Require header before proxying the REGISTER request or response	[26] 20.32	o	m
13	adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER?	[26] 20.32	o	o
14	being able to insert itself in the subsequent transactions in a dialog (record-routing)?	[26] 16.6	o	c2
15	the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing?	[26] 16.7	c3	c3
16	reading the contents of the Supported header before proxying the response?	[26] 20.37	o	o
17	reading the contents of the Unsupported header before proxying the 420 response to a REGISTER?	[26] 20.40	o	m
18	reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER?	[26] 20.40	o	o
19	the inclusion of the Error-Info header in 3xx - 6xx responses?	[26] 20.18	o	o
19A	reading the contents of the Organization header before proxying the request or response?	[26] 20.25	o	o
19B	adding or concatenating the Organization header before proxying the request or response?	[26] 20.25	o	o
19C	reading the contents of the Call-Info header before proxying the request or response?	[26] 20.25	o	o
19D	adding or concatenating the Call-Info header before proxying the request or response?	[26] 20.25	o	o
19E	delete Contact headers from 3xx responses prior to relaying the response?	[26] 20	o	o
	Extensions			
20	the SIP INFO method?	[25]	o	o
21	reliability of provisional responses in	[27]	o	i

	SIP?			
22	the REFER method?	[36]	o	o
23	integration of resource management and SIP?	[30]	o	i
24	the SIP UPDATE method?	[29]	c4	i
26	SIP extensions for media authorization?	[31]	o	c7
27	SIP specific event notification	[28]	o	i
28	the use of NOTIFY to establish a dialog	[28] 4.2	o	n/a
29	Session Initiation Protocol Extension Header Field for Registering Non-Adjacent Contacts	[35]	o	c6
30	extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks	[34]	o	m
30A	act as first entity within the trust domain for asserted identity	[34]	c5	c8
30B	act as subsequent entity within trust network that can route outside the trust network	[34]	c5	c9
31	a privacy mechanism for the Session Initiation Protocol (SIP)	[33]	o	m
31A	request of privacy by the inclusion of a Privacy header	[33]	n/a	
31B	application of privacy based on the received Privacy header	[33]	c10	
31C	passing on of the Privacy header transparently	[33]	c10	
31D	application of the privacy option "header" such that those headers which cannot be completely expunged of identifying information without the assistance of intermediaries are obscured?	[33] 5.1	x	
31E	application of the privacy option "session" such that anonymization for the session(s) initiated by this message occurs?	[33] 5.2	n/a	n/a
31F	application of the privacy option "user" such that user level privacy functions are provided by the network?	[33] 5.3	n/a	n/a
31G	application of the privacy option "id" such that privacy of the network asserted identity is provided by the network?	[34] 7	c11	c12
32	Session Initiation Protocol Extension Header Field for Service Route Discovery During Registration	[38]	o	c30
33	a messaging mechanism for the Session Initiation Protocol (SIP)	[50]	o	m
34	Compressing the Session Initiation Protocol	[55]	o	c7
35	private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP)?	[52]	o	m
36	the P-Associated-URI header extension?	[52] 4.1	c14	c15
37	the P-Called-Party-ID header extension?	[52] 4.2	c14	c16
38	the P-Visited-Network-ID header extension?	[52] 4.3	c14	c17
39	reading, or deleting the P-Visited-Network-ID header before proxying the request or response?	[52] 4.3	c18	n/a
41	the P-Access-Network-Info header extension?	[52] 4.4	c14	c19
42	act as first entity within the trust domain	[52] 4.4	c20	c21

	for access network information?			
43	act as subsequent entity within trust network for access network information that can route outside the trust network?	[52] 4.4	c20	c22
44	the P-Charging-Function-Addresses header extension?	[52] 4.5	c14	m
44A	adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response?	[52] 4.6	c25	c26
45	the P-Charging-Vector header extension?	[52] 4.6	c14	m
46	adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response?	[52] 4.6	c23	c24
47	security mechanism agreement for the session initiation protocol?	[48]	o	c7

c1:	IF A.162/5 THEN o ELSE n/a - - stateful proxy behaviour.
c2:	IF A.3/2 OR A.3/3A OR A.3/4 THEN m ELSE o - - P-CSCF, I-CSCF(THIG) or S-CSCF.
c3:	IF (A.162/7 AND NOT A.162/8) OR (NOT A.162/7 AND A.162/8) THEN m ELSE IF A.162/14 THEN o ELSE n/a - - TLS interworking with non-TLS else proxy insertion.
c4:	IF A.162/23 THEN m ELSE o - - integration of resource management and SIP.
c5:	IF A.162/30 THEN o ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c6:	IF A.3/2 OR A.3/3A THEN m ELSE n/a - - P-CSCF or I-CSCF (THIG).
c7:	IF A.3/2 THEN m ELSE n/a - - P-CSCF.
c8:	IF A.3/2 AND A.162/30 THEN m ELSE n/a - - P-CSCF and extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c9:	
c10:	IF A.162/31 THEN o.2 ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c11:	IF A.162/31B THEN o ELSE x - - application of privacy based on the received Privacy header.
c12:	
c13:	
c14:	IF A.162/35 THEN o.3 ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP).
c15:	IF A.162/35 AND (A.3/2 OR A.3/3) THEN m THEN o ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF.
c16:	IF A.162/35 AND (A.3/2 OR A.3/3 OR A.3/4) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF or S-CSCF.
c17:	IF A.162/35 AND (A.3/2 OR A.3/3) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF.
c18:	IF A.162/38 THEN o ELSE n/a - - the P-Visited-Network-ID header extension.
c19:	IF A.162/35 AND (A.3/2 OR A.3.3 OR A.3/4 OR A.3/7 THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF, I-CSCF, S-CSCF, AS acting as a proxy.
c20:	IF A.162/41 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c21:	IF A.162/41 AND A.3/2 THEN m ELSE n/a - - the P-Access-Network-Info header extension and P-CSCF.
c22:	IF A.162/41 AND A.3/4 THEN m ELSE n/a - - the P-Access-Network-Info header extension and S-CSCF.
c23:	IF A.162/45 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c24:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c25:	IF A.162/44 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c26:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function Addresses header extension.
c27:	IF A.3/2 OR A.3/4 THEN m ELSE x - - P-CSCF or S-CSCF.
c28:	IF A.3/2 OR A.3/4 OR A.3/6 then m ELSE o - - P-CSCF or S-CSCF of MGCF.
c29:	IF A.3/2 OR A.3/4 OR A.3/6 then o ELSE m - - P-CSCF or S-CSCF of MGCF.
c30:	IF A.3/2 o ELSE i - - P-CSCF.
C31:	IF A.3/4 THEN m ELSE x – S-CSCF
o.1:	It is mandatory to support at least one of these items.
o.2:	It is mandatory to support at least one of these items.
o.3:	It is mandatory to support at least one of these items.
NOTE:	An AS acting as a proxy may be outside the trust domain, and therefore not able to support the capability for that reason; in this case it is perfectly reasonable for the header to be passed on transparently, as specified in the PDU parts of the profile.