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CR-Form-v7

CHANGE REQUEST

✍ **TS 24.229** **CR** ~~140~~ ✍ **rev** ~~1~~ ✍ Current version: **5.1.0** ✍

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

Title:	✍	Support of non-IMS forking
Source:	✍	Ericsson?, Lucent Technologies
Work item code:	✍	IMS-CCR
Date:	✍	31/07/2002
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:	✍	Align with SA2 which documented in 23.228 how IMS should support forking done externally to the IMS network. In particular, then handling of the PDP contexts in this case is specified.
Summary of change:	✍	Changes to UE, P-CSCF, I-CSCF and S-CSCF procedures to handle forking.
Consequences if not approved:	✍	Misalignment with SA2

Clauses affected:	✍	4.1, ~~new clause 5.1.x~~5.1.3.1, 5.1.4.1, 9.2.5, A.2.2.2

Other specs affected:	✍	Y	N		✍
		X		Other core specifications	29.207, 27.060
			X	Test specifications	
			X	O&M Specifications	

Other comments: ✍

Changes made since r1 of this CR are as follows:
?? the proposed text for clause 4.1 specifically relating to forking has been replaced by a general note drawing particular attention to the major capabilities tables in annex A, where the forking support/non-support is explicitly stated. Clause 4.1 is meant to be a binding of clause 5 (and subsequent clauses) with annex A, rather than going into specific delails of support of individual parts of the protocol, and therefore specific mention of forking is inappropriate to this clause;
?? proposed text within clause 5.1 that duplicates procedures of RFC 3261 has

	been deleted. Note that one of these new requirements was in error, in that it required an ACK and a BYE to be sent to final responses to INVITE, thereby rejecting all forked INVITE requests. This material has been replaced by a NOTE within the appropriate clauses dealing with INVITE requests referencing annex A tables. ?? the substantive text within clause 5.1 has been moved to a new subclause within clause 9.2.5. The material essentially modifies usage existing clause 9.2.5 in the presence of forking, and therefore it makes sense that the two subclauses appear together. Changes made to this material are one of format, and changing round the requirements to make clear that they are UE requirements. Requirements not relating to PDP contexts have not been included (and in fact these duplicate the RFC 3261). ?? the proxy major capability in annex A has been changed from "n/a" to "x", therefore this should now be understood as "It is not allowed to use the capability" rather than "it is impossible to use the capability", as defined by the key to the tables.

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 proposed change

4.1 Conformance of IM CN subsystem entities to SIP

SIP defines a number of roles which entities can implement in order to support capabilities. These roles are defined in annex A.

Each IM CN subsytem functional entity using an interface at the Gm reference point, the Mg reference point, the Mi reference point, the Mj reference point, the Mk reference point, the Mm reference point, the Mr reference point and the Mw reference point, and also using the IP multimedia Subsystem Service Control (ISC) Interface, shall implement SIP, as defined by the referenced specifications in Annex A, and in accordance with the constraints and provisions specified in annex A, according to the following roles.

The Gm reference point, the Mg reference point, the Mi reference point, the Mj reference point, the Mk reference point, the Mm reference point and the Mw reference point are defined in 3GPP TS 23.002 [2].

The Mr reference point is defined in 3GPP TS 23.228 [7].

The ISC interface is defined in 3GPP TS 23.228 [7] subclause 4.2.4.

NOTE 1: Annex A can change the status of requirements in referenced specifications. Particular attention is drawn to table A.4 and table A.162 for capabilities within referenced SIP specifications, and to table A.317 and table A.328 for capabilities within referenced SDP specifications. The remaining tables build on these initial tables.

~~3GPP IM CN subsystem SIP proxies (i.e., P-CSCF, I-CSCF, S-CSCF, BGCF and AS) of this specification do not initiate forking of SIP requests, but shall be prepared to react to non-IMS upstream or downstream forking.~~

- The User Equipment (UE) shall provide the User Agent (UA) rolewith the exceptions and additional capabilities as described in subclause 5.1.
- The P-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.2. When acting as the subscriber to or the recipient of event information, the P-CSCF shall provide the UA role, again with the exceptions and additional capabilities as described in subclause 5.2.
- The I-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.3.
- The S-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.4. Under certain circumstances as described in subclause 5.4, the S-CSCF shall provide the UA role with the additional capabilities, as follows:

  a) the S-CSCF shall also act as a registrar. When acting as a registrar, or for the purposes of executing a third-party registration, the S-CSCF shall provide the UA role;

  b) as the notifier of event information the S-CSCF shall provide the UA role; and

  c) when performing S-CSCF initiated release the S-CSCF shall provide the UA role, even when acting as a proxy for the remainder of the dialog.

- The BGCF shall provided the proxy role, with the exceptions and additional capabilities as described in subclause 5.5.
- The MGCF shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.6.
- The AS, acting as terminating UA, or redirect server (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.1), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.2.
- The AS, acting as originating UA (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.2), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.3.
- The AS, acting as a SIP proxy (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.3), shall provided the proxy role, with the exceptions and additional capabilities as described in subclause 5.7.4.
- The AS, performing 3rd party call control (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.4), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.5.
- The AS, receiving third-party registration requests, shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.
- The MRFC shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.8.

NOTE 2: The allocated roles defined in this clause are the starting point of the requirements from the IETF SIP specifications, and are then the basis for the description of further requirements. Some of these extra requirements formally change the proxy role into a B2BUA. Thus, for example, a P-CSCF is a B2BUA in that it inspects and may modify SDP message bodies, and terminates Record-Route headers on behalf of the UA, but in all other respects other than those more completely described in subclause 5.2 it implements proxy requirements. Despite being a B2BUA a P-CSCF does not implement UA requirements from the IETF RFCs, except as indicated in this specification, e.g., relating to registration event subscription.

Next proposed change

5 Application usage of SIP

5.1 Procedures at the UE

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~~5.1.x Support for forking~~

~~This subclause describes the actions required at the UE in order to support non-IMS forking. Forking affects the UE when it acts as a UAC or as a UAS.~~

5.1.4 Call initiation - mobile terminating case

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.

~~5.1.x.1 UE acting as UAS~~

NOTE: ~~When the UE is acting as a UAS, t~~Table A.4 specifies that UE support of forking is required in accordance with RFC 3261. While proxy support of forking is precluded in the IM CN subsystem, proxies external to the system may initiate forking, such that ~~T~~the UE ~~shall be~~ is able to receive several forked requests for the same transaction. ~~These request are similar, except for the branch parameter value present in the Via header value. If the first forked request was accepted and answered with a 200 (OK) response, then the subsequent requests shall be answered with a 482 (Loop detected) response.~~

Next proposed change

5 Application usage of SIP

5.1 Procedures at the UE

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5.1.3 Call initiation - mobile originating case

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.

5.1.x.1 UE acting as UAC

NOTE: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261. While proxy support of forking is precluded in the IM CN subsystem, proxies external to the system may initiate forking, such that ~~When the UE is acting as a UAC, t~~The UE ~~shall be~~ is able to receive several forked provisional or final responses from different terminations. The UE may accept or reject any of the forked responses ~~.~~, ~~F~~for example, if the UE is capable of supporting a limited number of simultaneous transactions or early dialogs~~, when the number of provisional responses exceeds the limit, it can may reject newer ones by sending a BYE request.~~.

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.

~~Since the UE does not know that forking has occurred until a second provisional response arrives, the UE sets up the PDP context(s) as required by the initial response received. If a subsequent provisional response is received, different alternative actions may be performed depending on the requirements in the SDP answer:~~

~~1) Tthe bearer requirements of the subsequent SDP can be accommodated by the existing PDP context(s). No activation/modification of PDP contexts is performed.~~

~~2) Tthe subsequent SDP introducesrequires increased different QoS requirements or additional IP flows. These that are accommodated by modification of the existing PDP context(s) according to subclause 9.2.5.~~

~~3) Tthe subsequent SDP introduces one or more additional IP flows. These that are accommodated by establishing additional PDP context(s) according to subclause 9.2.5.~~

~~4) the subsequent SDP introduces requirements to separate in different PDP contexts some media streams that were previously allowed to be combined in a single PDP context. In this case, the UE shall separate the media streams, unless separate PDP contexts are already in place, as indicated by the P-CSCF. This may require a modification of the existing PDP contexts and/or establishment of additional PDP contexts according to subclause 9.2.5.The P-CSCF indicates to the UE in the subsequent provisional response that an IP flow(s) already combined with other flows in an existing PDP context must use a dedicated PDP context. The flow(s)~~

must be removed from the existing PDP context to avoid double booking of resources for the actual flow according to the procedures for revoke decision in [12]. A new PDP context is established for the separated flow. The UE may rearrange the flows to PDP contexts according to subclause 9.2.5 for other reasons also.

NOTE 1: When several forked responses are received, the resources requested by the UE is are the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE.

NOTE 2: When service-based local policy is applied, the UE receives the same authorization token for all forked requests/responses related to the same SIP session.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. Any further provisional or final answers received by the UE shall not progress the early dialogues to established dialogs. All the remaining early dialogues shall be terminated and the related radio/bearer resources are released.

Upon the reception of a first final 200 (OK) response for INVITE, the UE shall:

1) acknowledge the response with an ACK request;

2) keep the early dialogues alived for 64*T1 seconds, in the event a new 200 (OK) response arrives, according to the procedures described in RFC 3261 [26] section 13.2.2.4, and;

3) in case PDP context(s) were established or modified as a consequence of the INVITE and forked provisional responses that are not related to the accepted 200 (OK) response, the PDP context(s) shall be deleted or modified back to their original state;

delete the PDP contexts established as a consequence of the INVITE and forked provisional responses that are not related to the accepted 200 (OK) response;

Upon the reception of a subsequent final 200 (OK) response for INVITE, 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

received by the UE shall not progress the early dialogues to established dialogsAll the remaining;

Next proposed change

9 GPRS aspects when connected to the IM CN subsystem

9.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by GPRS to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the UE on the use of these packet-mode services are specified in this clause. Requirements for the GGSN in support of this communication are specified in 3GPP TS 29.061 [11] and 3GPP TS 29.207 [12].

9.2 Procedures at the UE

9.2.1 PDP context activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) perform a GPRS attach procedure;

b) establish a PDP context used for SIP signalling according to the APN and GGSN selection criteria described in 3GPP TS 23.060 [4]. This PDP context shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration. As a result, the PDP context provides the UE with information that makes the UE able to construct an IPv6 address;

The UE shall choose one of the following options when performing establishment of this PDP context:

I. A dedicated PDP context for SIP signalling:

The UE shall indicate to the GGSN that this is a PDP context intended to carry IM CN subsystem-related signalling only by setting the IM CN Subsystem Signalling Flag within the Protocol Configuration Options IE at PDP Context activation. The UE may also use this PDP context for DNS and DHCP signalling according to the static packet filters described in 3GPP TS 29.207 [12];

II. A general-purpose PDP context:

The UE may decide to use a general purpose PDP Context to carry IM CN subsystem-related signaling. The UE shall indicate to the GGSN that this is a general-purpose PDP context by not setting the IM CN Subsystem Signalling Flag within the Protocol Configuration Options IE;

NOTE 1: A general purpose PDP Context is completely IM CN subsystem-unaware, and as such, it does not have any IM CN subsystem-specific mechanisms applied to it.

NOTE 2: A general purpose PDP Context may carry both IM CN subsystem signaling and media, in case the media does not need to be authorized by Service Based Local Policy mechanisms defined in 3GPP TS 29.207 [12] and the media component is not mandated by the P-CSCF to be carried in a separate PDP Context.

c) aquire a P-CSCF address(es).

The methods for P-CSCF discovery are:

I. Employ Dynamic Host Configuration Protocol for IPv6 (DHCPv6) draft-ietf-dhc-dhcpv6 [40], the DHCPv6 options for SIP servers draft-ietf-sip-dhcpv6 [41] and if needed DNS after PDP context activation.

The UE shall either:

- in the DHCP query, request a list of SIP server domain names of P-CSCF(s) and the list of Domain Name Servers (DNS); or
- request a list of SIP server IPv6 addresses of P-CSCF(s).

II. Transfer P-CSCF address(es) within The PDP context activation procedure.

The UE shall indicate the request for a P-CSCF address to the GGSN within the Protocol Configuration Options IE of the ACTIVATE PDP CONTEXT REQUEST message or ACTIVATE SECONDARY PDP CONTEXT REQUEST message.

If the GGSN provides the UE with a list of P-CSCF IPv6 addresses in the ACTIVATE PDP CONTEXT ACCEPT message or ACTIVATE SECONDARY PDP CONTEXT ACCEPT message, the UE shall assume that the list is prioritised with the first address within the Protocol Configuration Options IE as the P-CSCF address with the highest priority.

The UE can freely select method I or II for P-CSCF discovery. In case several P-CSCF addresses are provided to the UE, the selection of P-CSCF address shall be performed according to the resolution of host name as indicated in RFC 3261 [26]. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the UE is implementation specific.

If the UE is designed to use I above, but receives P-CSCF address(es) according to II, then the UE shall either ignore the received address(es), or use the address(es) in accordance with II, and not proceed with the DHCP request according to I.

9.2.2 Session management procedures

The existing procedures for session management as described in 3GPP TS 24.008 [8] shall apply while the UE is connected to the IM CN subsystem.

9.2.3 Mobility management procedures

The existing procedures for mobility management as described in 3GPP TS 24.008 [8] shall apply while the UE is connected to the IM CN subsystem.

9.2.4 Cell selection and lack of coverage

The existing mechanisms and criteria for cell selection as described in 3GPP TS 25.304 [9] and 3GPP TS 44.018 [20] shall apply while the UE is connected to the IM CN subsystem.

9.2.5 PDP contexts for media

9.2.5.1 General requirements

During establishment of a session, the UE establishes data streams(s) for media related to the session. Such data stream(s) may result in activation of additional PDP context(s). Such additional PDP context(s) shall be established as secondary PDP contexts associated to the PDP context used for signalling.

The P-CSCF shall indicate to the UE in SIP/SDP if a separate PDP Context is required for a media component as per procedures defined in 3GPP TS 23.228 [7]. The UE shall establish an additional PDP context for a media component if so indicated by the P-CSCF.

The UE shall pass the authorisation token received from the P-CSCF in the 183 (Session Progress) response to an INVITE request at originating setup or in the INVITE request at terminating setup to the GGSN by inserting it within the Traffic Flow Template IE at PDP Context activation/modification.

In order to identify to the GGSN which flow(s) (identified by m-lines within the SDP) are to be transferred within a particular PDP context, the UE shall set the flow identifier(s) within the Traffic Flow Template IE at PDP Context activation modification. Detailed description of how the flow identifiers are constructed is provided in 3GPP TS 29.207 [12].

Detailed description of how the authorization token and flow identifiers are carried in the Traffic Flow Template IE is provided in 3GPP TS 24.008 [8].

9.2.5.2 Special requirements applying to forked responses

Since the UE does not know that forking has occurred until a second, provisional response arrives, the UE sets up the PDP context(s) as required by the initial response received. If a subsequent provisional response is received, different alternative actions may be performed depending on the requirements in the SDP answer:

1) **the bearer requirements of the subsequent SDP can be accommodated by the existing PDP context(s).** The UE performs no activation/modification of PDP contexts.

2) **The subsequent SDP introduces different QoS requirements or additional IP flows.** The UE modifies the existing PDP context(s) according to subclause 9.2.5.1

3) **the subsequent SDP introduces one or more additional IP flows.** The UE establishes additional PDP context(s) according to subclause 9.2.5.1.

4) **the subsequent SDP introduces requirements to separate in different PDP contexts some media streams that were previously allowed to be combined in a single PDP context.** The UE shall separate the media streams, unless separate PDP contexts are already in place, as indicated by the P-CSCF. This may require a modification of the existing PDP contexts and/or establishment of additional PDP contexts according to subclause 9.2.5.1.

NOTE 1: When several forked responses are received, the resources requested by the UE is are the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE request.

NOTE 2: When service-based local policy is applied, the UE receives the same authorization token for all forked requests/responses related to the same SIP session.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. Any further provisional or final answers received by the UE shall not progress the early dialogues to established dialogs. All the remaining early dialogues shall be terminated and the related radio/bearer resources are released.

Upon the reception of a first final 200 (OK) response for the INVITE request (in addition to the procedures defined in RFC 3261 [26] clause 13.2.2.4), the UE shall:

1) in case PDP context(s) were established or modified as a consequence of the INVITE request and forked provisional responses that are not related to the accepted 200 (OK) response, delete the PDP context(s) or modify the delete the PDP context(s) back to their original state.

Next proposed change

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			
1	client behaviour for session requests?	[26] 16	m	m
2	server behaviour for session requests?	[26] 16	m	m
3	session release?	[26] 16	m	m
4	Stateless proxy behaviour?	[26] 16.11	o.1	
5	Stateful proxy behaviour?	[26] 16.2	o.1	
6	forking of initial requests	[26] 16.1	c1	x~~n/a~~
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
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	the requirement to be able to insert itself in the subsequent transactions in a dialog	[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
	Extensions			
20	The SIP INFO method?	[25]	o	o
21	Reliability of provisional responses in SIP?	[27]	o	m
22	the REFER method?	[36]	o	o
23	Integration of resource management and SIP?	[30]	o	m
24	the SIP UPDATE method	[29]	c4	m
25	SIP extensions for caller identity and privacy?	[34]	o	m
26	SIP extensions for media authorization?	[31]	o	m
27	SIP specific event notification	[28]	o	o
28	the use of NOTIFY to establish a dialog	[28] 4.2	o	n/a
29	Path Extension Header for Establishing Service Route with SIP REGISTER	[35]	o	c5
30	extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks	[34]	o	m

31	a Privacy Mechanism for the Session Initiation Protocol (SIP)	[33]	o	m
c1:	IF A.162/5 THEN o ELSE n/a			
c2:	IF A.3/4 OR A.3/7 THEN m ELSE IF A.3/3 THEN o ELSE n/a - - S-CSCF or AS else I-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.3/2 OR A.3/3 THEN m ELSE n/a. - - P-CSCF or I-CSCF.			
o.1:	It is mandatory to support at least one of these items.			