Source: **TSG SA WG2**
Title: **CRs on 23.221 (Architecture Requirements)**
Agenda Item: **7.2.3**

The following Change Requests have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #24.
Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

S2 doc #	Title	Spec	CR #	cat	Version in	REL	WI	S2 meeting	Affected clauses
S2-042252	IPv4 based IMS	23.221	049r1	C	5.9.0	5	IPv4IMS	S2 #40	3.3, 5.1
S2-042108	Handling of PDP Contexts	23.221	047r2	F	6.2.0	6	IMS2	S2 #40	8.1
S2-042251	IPv4 based IMS	23.221	048r1	C	6.2.0	6	IPv4IMS	S2 #40	2, 3.3, 5.1

3GPP TSG-SA WG2 Meeting #39
Shenzhen, China, 19th – 23rd April

Tdoc ⌘S2-042108

CR-Form-v7

CHANGE REQUEST

⌘ **23.221** **CR** **047** ⌘**rev** **2** ⌘ Current version: **6.2.0** ⌘

*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 **X**

Title:	⌘	Handling of PDP Contexts
Source:	⌘	SA2 (Ericsson)
Work item code:	⌘	IMS2
Date:	⌘	12/05/2004
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:	⌘	TS 23.221 uses the concept of primary PDP context, but the concept is not defined anywhere. There is an obvious risk of confusion e.g. the following text was found in 27.007 3.9.0 (it was corrected in v3.10.0): "An active secondary context can exist if and only if the corresponding active primary context exists. If the primary PDP context associated with a PDP address is deactivated, all the associated secondary contexts are deactivated too and the data transfer for that PDP address is disabled."
Summary of change:	⌘	Terminology of "Primary" and "Secondary" PDP Context is removed and some general cleanup of subclause 8.1 is perfomed.
Consequences if not approved:	⌘	If the terminology "Primary PDP Context" is used without defining it there is a risk that a PDP context activated with the PDP Context Activation Procedure will have a special priority over a PDP Context activated using the Secondary PDP Context Activation Procedure

Clauses affected:	⌘	8.1

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

⌘

Other comments:	⌘	

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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.

8 Support of IM CN Subsystem services

8.1 Context activation and registration

The IP address is allocated to UE either by GPRS specific signalling when a PDP context is activated using the PDP Context Activation Procedure, or some other means e.g. by DHCP. The UE shall use IP addresses assigned to it for, but not limited to, the following:

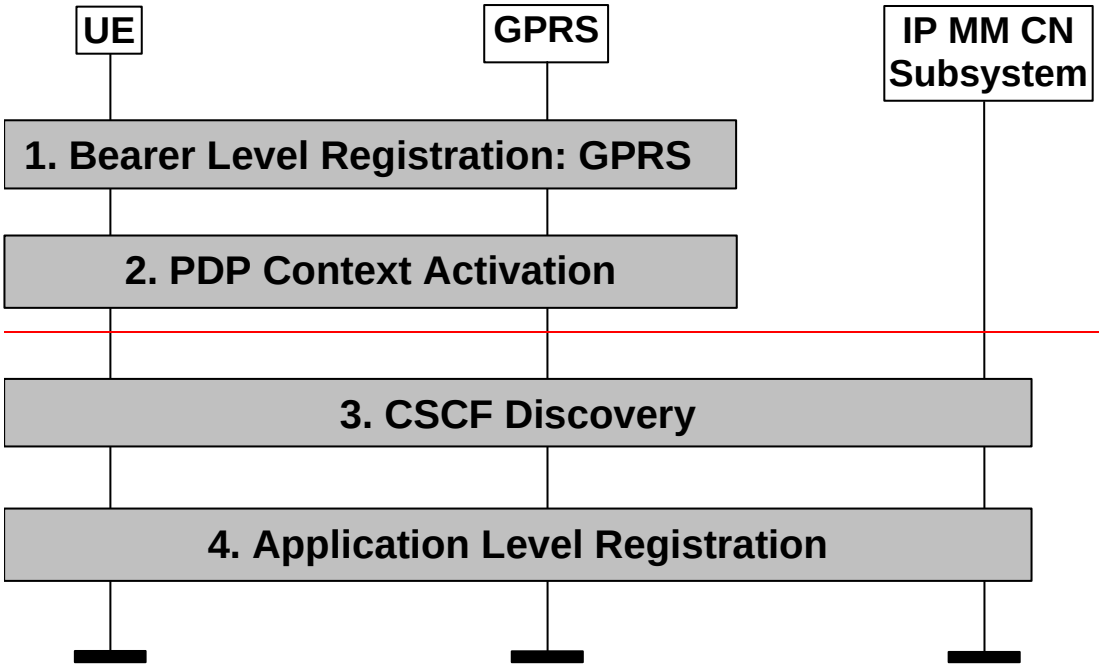
- the exchange of application level signalling (e.g., registration, CC) with the S-~~serving~~ CSCF from the access network currently used,
- application level registration to IM CN subsystem as an address used to reach the UE
- an address used to reach the UE for multimedia sessions~~calls~~.

~~In GPRS, the terminal is associated with an IP address when the primary PDP context is activated. The IP address used for the purpose described above can be:~~

- ~~the IP address obtained by the UE during the activation of a primary PDP context (e.g. if the UE does not have any existing PDP context active or desires to use a different IP address)~~
- ~~the IP address of one of the already active PDP contexts.~~

The P-~~roxy~~ CSCF is located in the same network as the GGSN.

In the following flow, a description of the order in which the registration procedure is executed ~~need~~ and how the IP address is allocated is shown. Figure 8.1 shows ~~what~~ the procedures ~~and in which order they are~~ performed during the GPRS and application level registration.



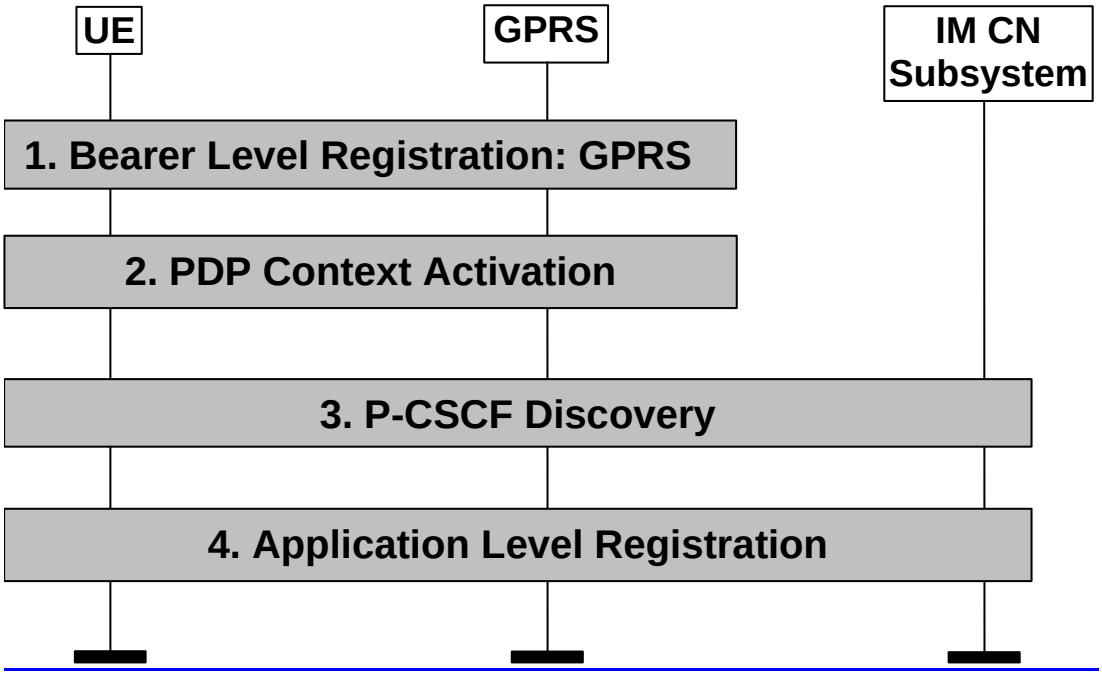


Figure 8.1: Registration

The following steps are performed:

1. the bearer level registration is performed (e.g. when the terminal is switched on or upon explicit indication from the user).

2. the PDP context activation is done. The UE has two options:

   - activate a ~~primary~~ PDP context using the PDP Context Activation Procedure and obtain a new IP address (e.g. if the UE does not have any existing PDP context active or desires to use a different IP address)

   - activate an additional PDP context using the ~~s~~Secondary PDP Ceontext Activation Procedure and re-usinge the IP address of ~~one of~~ the linked already active PDP contexts.

3. UE performs the P-CSCF discovery procedure, where the UE discovers a P-~~proxy~~ CSCF [11].

There can be time gaps between these procedures and the following one. For instance, the UE may perform PDP context activation and the P-CSCF discovery, but not the application level registration. The UE may use the activated PDP context for other types of signalling, e.g. for P-CSCF discovery.

4. UE performs application level registration by providing the IP address obtained at step 2 to the P-CSCF selected at step 3. The IP address used for signalling purposes is allocated in association with PDP context activation and not on an incoming call basis.

   The discovered P-CSCF forwards the registration on to the UE's home network where a S-CSCF [11] is assigned and the registration takes place. This registration associates the P-CSCF with the UE.

   From the S-CSCF point of view, the P-CSCF is where the UE is reachable for mobile-terminated session~~call~~ control signalling and any other type of mobile terminated IMS signaling.

Whether the procedures are activated individually by the UE or some of them are performed automatically depends on implementation of the terminal and on the UE's configuration. For instance, the multimedia application in the UE could start the application level registration and steps 2-4 would have to be executed in response to support the operation initiated by the application. Interaction with the UE may happen during these steps.

3GPP TSG-SA WG2 Meeting #40 **Tdoc ⌘S2-042251**
Sophia Antipolis, France, 17-21 May 2004

CR-Form-v7

CHANGE REQUEST

⌘ **23.221** **CR** **048** ⌘**rev** **1** ⌘ Current version: **6.2.0** ⌘

*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 [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	IPv4 based IMS
Source:	⌘	SA2 (Alcatel, Cisco, Ericsson, Lucent, Nokia, Nortel Networks, Siemens, T-Mobile)
Work item code:	⌘	IPv4IMS
Date:	⌘	20/05/2004
Category:	⌘	**C**
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)*
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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:	⌘	While IMS has been specified to support IPv6 only, most early IMS deployments use IPv4. The issue has been studied in TR 23.981, and some conclusions and recommendations have been achieved.
Summary of change:	⌘	Clearify that while IMS is designed for exclusive use of IPv6, early IMS implementations and deployments may use IPv4. If IPv4 is used, the guidelines and recommendations in TR 23.981 should be followed.
Consequences if not approved:	⌘	No specification of IPv4 support. Increased risk that recommendations in TR 23.981 are not followed.

Clauses affected:	⌘	2, 3.3, 5.1

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

Other comments: ⌘

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*** FIRST CHANGE***

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 TS 23.002: "Network Architecture".

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

[3] 3GPP TS 23.012: " Location management procedures"

[5] 3GPP TS 25.331: " Radio Resource Control (RRC) Protocol Specification"

[6] 3G TS 25.301: "Radio interface protocol architecture"

[7] 3G TS 25.303: "UE functions and inter-layer procedures in connected mode"

[8] 3GPP TR 21.905: "3G Vocabulary".

[9] 3GPP TS 25.413: " UTRAN Iu interface RANAP signalling"

[10] 3GPP TS 25.410: " UTRAN Iu Interface: General Aspects and Principles"

[11] 3G TS 23.228 "IP Multimedia Subsystem – Stage 2"

[12] 3G TS 43.051 "GERAN Overall Description"

[13] 3G TS 23.153 ,"Out of Band Transcoder Control - Stage 2".

[14] 3G TS 23.205, "Bearer Independent CS Core Network – Stage 2"

[15] 3G TR 25.931: " UTRAN Functions, examples on signalling procedures"

[16] RFC2766 "Network Address Translation - Protocol Translation (NAT-PT)", G. Tsirtsis, P. Srisuresh. February 2000.

[17] RFC2893 "Transition Mechanisms for IPv6 Hosts and Routers", R. Gilligan, E. Nordmark, August 2000.

[17a] RFC 3041: "Privacy Extensions for Stateless Address Autoconfiguration in IPv6", T. Narten, R. Daves, January 2001.

[18] 3G TS 25.401 "UTRAN Overall Description"

[19] 3G TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode"

[20] 3G TS 45.008: "Radio subsystem link control"

[21] RFC3316 "IPv6 for Some Second and Third Generation Cellular Hosts", June 2002

[22] 3GPP TS 24.007: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".

[23] 3G TS 24.229 “IP Multimedia Call Control Protocol based on SIP and SDP”

[24] 3G TS 23.008 “Organisation of subscriber data”

[25] 3G TS 24.008 “Mobile radio interface Layer 3 specification; Core network protocols; Stage 3”

[26] 3G TR 23.981 "Interworking aspects and migration scenarios for IPv4 based IMS implementations"

*** NEXT CHANGE***

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ATM	Aysnchronous Transfer Mode
CM	Connection Management
CN	Core Network
CS	Circuit Switched
CSCF	Call/Session Control Function
CS-MGW	Circuit Switched Media Gateway
DHCP	Dynamic Host Configuration Protocol
GERAN	GSM/EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GTP	GPRS Tunnelling Protocol
HLR	Home Location Register
IM	IP Multimedia
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPSec	IP Security protocol
LA	Location Area
LAC	Location Area Code
LAN	Local Area Network
LLC	Logical Link Control
LM	Location Management
MAP	Mobile Application Part
MGCF	Media Gateway Control Function
MGW	Media Gateway
MM	Mobility Management
MRF	Media Resource Function
MSC	Mobile Switching Centre
NAT	Network Address Translator
NGN	Next Generation Networks
OoBTC	Out of Band Transcoder Control
PDA	Personal Digital Assistant
PDP	Packet Data Protocol
PLMN	Public Land Mobile Network
PS	Packet Switched
RA	Routing Area
RAC	Routing Area Code
RAI	Routing Area Identifier
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RLC	Radio Link Control
RNC	Radio Network Controller
RNTI	Radio Network Temporary Identifier

RRC	Radio Resource Control
SGSN	Serving GPRS Support Node
SIP	Session Initiation Protocol
SRNS	Serving Radio Network Subsystem
SS7	Signalling System No. 7
STM	Synchronous Transfer Mode
SGW	Signalling gateway
SRNS	Serving Radio Network Subsystem
TCP	Transmission Control Protocol
TMSI	Temporary Mobile Station Identifier
TrFO	Transcoder Free Operation
UDP	User Datagram Protocol
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
UTRAN	UMTS Terrestrial Radio Access Network
VHE	Virtual Home Environment
VLR	Visited Location Register

*** NEXT CHANGE***

5 IP addressing

5.1 IP version issues

The UMTS/GSM architecture shall support IPv4 / IPv6 based on the statements below.

- IP transport between network elements of the IP Connectivity services (between RNC, SGSN and GGSN) and IP transport for the CS Domain: both IPv4 ~~/~~ and IPv6 are options for IP Connectivity.
- IM CN subsystem elements (UE to CSCF and the other elements e.g. MRF):
  - The architecture shall make optimum use of IPv6.
  - 3GPP specifications design t~~T~~he IM CN subsystem elements and interfaces ~~shall~~ to exclusively support IPv6. However, early IMS implementations and deployments may use IPv4; if IPv4 is used, the guidelines and recommendations in TR 23.981 [26] should be followed.
  - 3GPP specifications design t~~T~~he UE to ~~shall~~ exclusively support IPv6 for the connection to ~~services provided by~~ the IM CN subsystem. The UE shall support IPv6 for the connection to the IM CN subsystem. However, UEs may in addition support IPv4, which allows for the connection to early IM CN subsystem implementations that use IPv4 only; in this case the guidelines and recommendations in TR 23.981 [26] should be followed.
  - According to the procedures defined in TS 23.060 [23], when a UE is assigned an IPv6 prefix, it can change the global IPv6 address it is currently using via the mechanism defined in RFC 3041 [16a], or similar means.
- Access to existing data services (Intranet, Internet,…):
- The UE can access IPv4 and IPv6 based services.

3GPP TSG-SA WG2 Meeting #40 **Tdoc ⌘S2-042252**
Sophia Antipolis, France, 17-21 May 2004

CR-Form-v7

CHANGE REQUEST

⌘ **23.221** **CR** **049** ⌘**rev** **1** ⌘ Current version: **5.9.0** ⌘

*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 [X] Radio Access Network [ ] Core Network [X]

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Source:	⌘	SA2 (Alcatel, Cisco, Ericsson, Lucent, Nokia, Nortel Networks, Siemens)
Work item code:	⌘	IPv4IMS
Date:	⌘	20/05/2004
Category:	⌘	**C**
Release:	⌘	Rel-5

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Consequences if not approved:	⌘	No specification of IPv4 support. Confusion on late introduction of IPv4 support for early IMS.

Clauses affected:	⌘	3.3, 5.1

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

Other comments: ⌘ IPv4 implementations should use the recommendations of TR 23.981, but it is unclear whether and how TR 23.981 could be referenced from a Release 5 specification. Hence, the reference was not added to the Rel-5 CR and the text is thus significantly different from the Rel-6 CR.

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*** NEXT CHANGE***

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- The UE can access IPv4 and IPv6 based services.