Technical Specification Group Services and System Aspects **TSGS#27(05)0115**
Meeting #27, 14 - 17 March 2005,Tokyo, Japan

Source: **TSG SA WG2**

Title: **CR(s) to 23.981**

Agenda item: **7.2.3**

Document for: **APPROVAL**

S2 Tdoc	Title	Spec	CR	Rev	Cat	C_Ver	Rel	WI
S2-050395	P-CSCF discovery	23.981	5	1	F	6.0.0	Rel-6	IPV4IMS

3GPP TSG-SA WG2 Meeting #45
Budapest, Hungary, 26th January – 2nd February 2005.

Tdoc ⌘S2-050395

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.981** **CR** **005** ⌘ **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:	⌘	P-CSCF discovery
Source:	⌘	3GPP TSG_SA WG2
Work item code:	⌘	IPv4IMS
Date:	⌘	31/01/2005
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:
Ph2 *(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)*
Rel-7 *(Release 7)*

Reason for change: ⌘

TR 23.981 contains an editor's note that is not resolved

Editor's Note: The use of an "IPv4-compatible" IPv6 address versus an "IPv4 mapped address" is for further study.

As there is no stage 3 to be developed the TR should resolve the issue highlighted by the note. As IPv4 compatible addresses normally are used for automatic tunnelling it is proposed to recommend usage of IPv4 mapped addresses.

The UE may have a P-CSCF address available before activating a PDP context for IMS signalling as provisioning using OMA DM may already have happened. The TR states that "It is assumed that a UE, which has a pre-configured P-CSCF address, would try to connect to the pre-configured P-CSCF before using any other P-CSCF discovery mechanism". However, as the P-CSCF discovery using PDP context activation procedures are more dynamic than using OMA DM, and it consumes no additional signalling over the air, there is no reason why the UE should not be able to request for a P-CSCF address during PDP context activation and use that address, if received.

Also, a reference is corrected in subclause 5.3.4.3.

Summary of change: ⌘

Editor's note is resolved and "IPv4 mapped addresses" is recommended when using PDP context activation procedure for P-CSCF discovery.

Clarified that if both provisioning and PDP context activation procedure is used

		for P-CSCF discovery the UE uses the P-CSCF address received during the PDP context activation procedure. A reference is corrected.
Consequences if not approved:	⌘	Options for P-CSCF discovery using PCO will be unresolved.

Clauses affected:	⌘	5.2.1, 5.3.4.3			
Other specs affected:	⌘	Y / N		⌘	
			X Other core specifications		
			X Test specifications		
			X O&M Specifications		
Other comments:	⌘				

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 change ******

5.2.1 Obtaining IP address and P-CSCF discovery

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

a) establishes a connection with the IP-CAN;

b) obtains an IP address using either the standard IETF protocols (e.g., DHCP) or a protocol that is particular to the IP-CAN technology that the UE is utilising;

c) acquires a P-CSCF address.

The existing P-CSCF discovery mechanism are either IPv6 specific or use Release 5 or later GPRS. For an IPv4 based IMS implementation, operators may need other mechanisms not currently defined as possible options in 3GPP IMS.

The following mechanisms need to be evaluated for P-CSCF discovery in IPv4:

a) the address of the P-CSCF can be requested by the UE and returned by the GGSN at PDP context establishment time. An IPv4 UE would need to obtain an IPv4 address as part of this exchange.

   If the PDP context established is of PDP type IPv4, then the GGSN may provide an IPv4 P-CSCF address. This does not preclude scenarios, where the GGSN returns an IPv6 P-CSCF address at IPv4 PDP context establishment, e.g. for the support of tunnelling (see subclause 5.3.4.3), or both IPv4 and IPv6 P-CSCF addresses. If the PDP type is IPv4 then it is recommended that the GGSN always return both IP versions, if it is capable, using the existing capabilities to send multiple P-CSCF addresses within the PCO IE.

   According to TS 24.008 [9], the P-CSCF address in the PCO field is an IPv6 address. Thus there are at least two possible approaches: The first approach would be to avoid any changes to or deviations from TS 24.008 [9] and use the existing methods to transfer an IPv4 address as an IPv6 address ("IPv6 address with embedded IPv4 address", as defined in RFC 2373 [10]). In such a case, the use of “IPv4 mapped addresses” as defined in RFC 2373 [10] is recommended.

~~Editor's Note: The use of an "IPv4-compatible" IPv6 address versus an "IPv4-mapped address" is for further study .~~

   The second approach would set the PCO field length to 4 and put the IP address in the content field. This would be a straightforward generalization of the specified method.

   In a migration period with a dual stack network, it may be useful for an operator to provide a common P-CSCF discovery mechanism for both the early IPv4 only UEs and the IPv6 Rel-5 (or later) UEs. In that case, the first approach using embedded addresses is recommended, as it does not require any changes to or deviations from TS 24.008.

b) based on DHCP. Currently the specifications limit this to the IPv6 methods for DHCP. In order for this method to be used by an IPv4 UE, it needs to be identified how IPv4 DHCP is used to obtain the P-CSCF address. A solution that provides access independence would be that an IPv4 P-CSCF and IPv4 UE support configuration of the appropriate P-CSCF information via DHCPv4. In this solution, use of DHCP provides the UE with the fully qualified domain name of a P-CSCF and the address of a Domain Name Server (DNS) that is capable of resolving the P-CSCF name. When using DHCP/DNS procedure for P-CSCF discovery with IPv4 GPRS-access, the GGSN acts as DHCP Relay agent relaying DHCP messages between UE and the DHCP server. This is necessary to allow the UE to properly interoperate with the GGSN. This solution however requires that a UE supporting early IPv4 implementations would support DHCPv4.

c) other mechanisms, such as SMS, OTA, OMA device management or other configuration schemes are already in use today by deployed UEs. Some of the provisioning mechanisms in use are vendor specific (such as pre-configuration mechanisms), but it is assumed that most of the early-deployed IPv4 UEs will support OMA specified provisioning mechanisms such as OMA Client Provisioning [12] and OMA Device Management (DM) [11]. It is recommended that provisioning parameters for IPv4 P-CSCF discovery be defined for OMA standardised provisioning mechanisms such as OMA DM [11].

The provisioning mechanism in c) does not require any support from the GPRS infrastructure and is thus expected to be used in early implementations from the beginning. The mechanism in a) may facilitate migration to one of the P-CSCF discovery mechanisms specified in TS 23.228.

It is assumed that a UE, which has a pre-configured P-CSCF address, may try to use the mechanism in a) when activating the PDP context to be used for IMS signalling. If a P-CSCF address is received the UE would use the received address and otherwise the UE would try to connect to the pre-configured P-CSCF before using any other P-CSCF discovery mechanism.

****** Last change ******

5.3.4.3 Roaming – IPv4 visited network, IPv6 IMS home network

The UE and the SGSN are in the IPv4 visited network. The GGSN, P-CSCF, I-CSCF and S-CSCF are in the IPv6 home network. The IMS home network is IPv6 only. The UE may be Ipv6 only or may be IMS dual stack UE. Subclause 5.2.2.1 applies to the dual stack UE accessing the visited and home network.

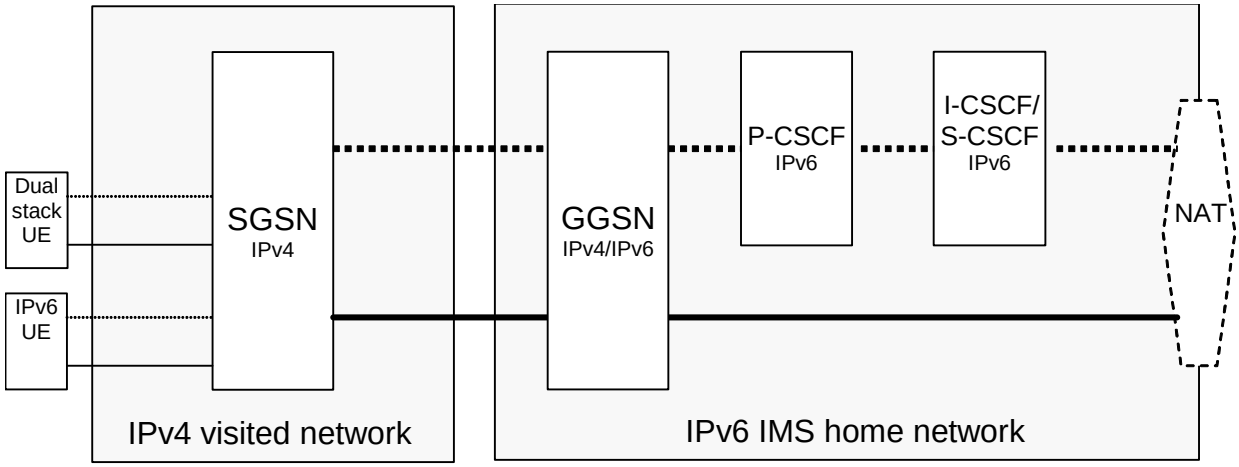

Figure 5-7: GPRS roaming – IPv4 visited network, IPv6 home network

In this scenario the requirement from subclause 4.2 is not met.

This is an attractive IMS deployment scenario for operators as it does not rely on the support of any explicit IMS functionality in the visited network; however problems arise through the lack of IPv6 PDP context support in the visited network. As such, operators should wherever possible seek agreements with their roaming partners for the support of IPv6 contexts where IMS roaming is to be supported (this should be the long term objective).

In the event that an IPv6 context is not available in the visited network, the only alternative for the operator deploying an IPv6 only IM CN subsystem is to use a tunneling method between the UE and home network in order to acquire an IPv6 address. When the UE is IPv6 only, it is assumed that the UE does not have the capability to use a tunneling method between the UE and the home network to acquire an IPv6 address. Tunneling of IPv6 packets over IPv4 from the UE to the IMS CN subsystem is a technically feasible, but there are various issues that would need to be addressed. There would be the need for an IPv4-IPv6 gateway acting as the tunnel end-point responsible for packing/unpacking the IPv6 packets. The UE would need to discover and address it. Also, the UE would need the ability to tunnel the packets. Further work would be needed on how the UE would address this entity, however existing IETF work (e.g. ISATAP [8~~6~~]) could be used. This implementation would require additional functionality in the UE compared to the minimum IPv6 functionality as stated in 3GPP TS 23.221 [3] and an additional ISATAP router functionality in the network. Header compression using e.g. RFC 2507 is able to compress both the IPv4 and the IPv6 header. The SBLP mechanisms at the Go interface could not be used between an IPv4 GGSN and an IPv6 P-CSCF, i.e. this solution is not possible if SBLP over Go is required.

Similar considerations like in subclause 5.2.2.1 apply: one approach is that the UE would initially attempt to establish an IPv6 context to its home GGSN and, if this fails, establish an IPv4 context and tunnel an IPv6 IMS session over IPv4.

It can be concluded that network operators, who introduce 3GPP IMS using IPv6, have a strong interest that their GPRS roaming partners provide support for PDP contexts of PDP type IPv6.