

Title: LS on Request for DNS server address by SM procedure
Source: CN1
Agenda item: 5.1
Document for: INFORMATION

3GPP TSG-CN1 Meeting #25
Helsinki, Finland, 29 July – 2 August

Tdoc N1-021834

Title: LS on Request for DNS server address by SM procedure
Response to: -
Release: REL-5
Work Item: IMS-CCR

Source: CN1
To: SA2, TSG CN
Cc: CN3

Contact Person:

Name: Atle Monrad
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E-mail Address: atle.monrad@ericsson.com

Attachments: N1-021678 (CR 669 revision – for 24.008 v 5.4.0)
N1-021833 (CR 177 revision 2 for 24.229 v 5.1.0)
N3-020669 (CR 054 revision 2 for 27.060 v 5.1.0)
N3-020688 (CR 061 revision 2 for 29.061 v 5.2.0)

1. Overall Description:

There is currently no support for dynamic configuration of Domain Name System (DNS) server IPv6 addresses in a UE not supporting the DHCPv6 protocol, as the necessary internet-drafts are not ready.

As a “back-up” solution to the internet-drafts that most likely will be late for Rel-5, a mechanism is introduced in CN1 and CN3 specifications to allow the possibility of dynamic configuration of Domain Name System (DNS) server IPv6 addresses via the Session Management procedures.

The solution proposes to use the PCO-IE to request the IPv6 address for DNS servers. This will be a generic solution for 3GPP and described in 27.060 and 29.061.

The coding within the PCO-IE is outlined in 24.008.

As IMS may use the IPv6 address for DNS servers, this solution is also mentioned in 24.229.

2. Actions:

To SA2 group.

ACTION: CN1 asks SA2 to consider the outlined solution and respond to CN1 if the solution cannot be accepted in Rel-5. The package with the above mentioned CRs are agreed in CN1 and CN3 and will be submitted to CN#17 for final approval if SA2 does not have any objections.

3. Date of Next TSG-CN1 Meetings:

CN1_26	23 rd – 27 th September 2002	Miami, USA
CN1_27	11 th – 15 th November 2002	Bangkok, Thailand

CR-Form-v7

CHANGE REQUEST

⌘ **24.008 CR 669** ⌘ rev **-** ⌘ Current version: **5.4.0** ⌘

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:	⌘ Request for DNS IPv6 server address		
Source:	⌘ Ericsson		
Work item code:	⌘ IMS-CCR	Date:	⌘ 22/07/2002
Category:	⌘ F	Release:	⌘ REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)

Reason for change:	⌘ As the progress of draft-ietf-ipv6-dns-discovery-05.txt and draft-ietf-pppext-ipv6-dns-addr-00.txt are not predictable, it may be a risk that these drafts do not reach RFC status in REL-5 timeframe.
Summary of change:	⌘ As an alternative to internet-drafts, it is proposed to allow the use of the PCO IE to request DNS IPv6 server address(es).
Consequences if not approved:	⌘ IPv6 stateless DNS discovery will not be possible.

Clauses affected:	⌘ 2, 10.5.6.3										
Other specs Affected:	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ 24.229, 27.060, 29.061
Y	N										
X											
	X										
	X										
		Test specifications									
		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** *****

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] Void.
- [2] Void.
- [2a] 3GPP TR 21.905 "Vocabulary for 3GPP Specifications"
- [3] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [4] 3GPP TS 22.003: "Teleservices supported by a Public Land Mobile Network (PLMN)".
- [5] 3GPP TS 42.009: " Digital cellular telecommunications system (Phase 2+); Security aspects".
- [6] 3GPP TS 22.011: " Digital cellular telecommunications system (Phase 2+); Service accessibility".
- [7] 3GPP TS 42.017: " Digital cellular telecommunications system (Phase 2+); Subscriber Identity Modules (SIM); Functional characteristics".
- [8] 3GPP TS 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".
- [9] 3GPP TS 03.01: "Digital cellular telecommunications system (Phase 2+); Network functions".
- [10] 3GPP TS 23.003: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".
- [11] 3GPP TS 43.013: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".
- [12] 3GPP TS 23.014: "Digital cellular telecommunications system (Phase 2+); Support of Dual Tone Multi-Frequency (DTMF) signalling".
- [12a] Void.
- [13] 3GPP TS 43.020: "Digital cellular telecommunications system (Phase 2+); Security-related network functions".
- [14] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".
- [15] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".
- [16] 3GPP TS 44.003: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".
- [17] 3GPP TS 44.004: "Digital cellular telecommunications system (Phase 2+); Layer 1; General requirements".

- [18] 3GPP TS 44.005: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer; General aspects".
- [19] 3GPP TS 44.006: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".
- [20] 3GPP TS 24.007: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".
- [21] 3GPP TS 24.010: "Digital cellular telecommunications system ; Mobile radio interface layer 3; Supplementary services specification; General aspects".
- [22] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [23] 3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".
- [23a] 3GPP TS 24.071: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 location services specification."
- [23b] 3GPP TS 44.031 "Digital cellular telecommunication system (Phase 2+); Location Services LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".
- [23c] 3GPP TS 25.331: "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC) protocol specification"
- [24] 3GPP TS 24.080: "Digital cellular telecommunications system (Phase 2+); Mobile radio Layer 3 supplementary service specification; Formats and coding".
- [25] 3GPP TS 24.081: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services; Stage 3".
- [26] 3GPP TS 24.082: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services; Stage 3".
- [27] 3GPP TS 24.083: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".
- [28] 3GPP TS 24.084: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services; Stage 3".
- [29] 3GPP TS 24.085: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services; Stage 3".
- [30] 3GPP TS 24.086: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services; Stage 3".
- [31] 3GPP TS 24.088: "Call Barring (CB) supplementary services; Stage 3".
- [32] 3GPP TS 45.002: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".
- [33] 3GPP TS 45.005: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".
- [34] 3GPP TS 45.008: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".
- [35] 3GPP TS 45.010: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".
- [36] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [36a] 3GPP TS 27.060: " Mobile Station (MS) supporting Packet Switched Services ".

- [37] 3GPP TS 29.002: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".
- [38] 3GPP TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [39] 3GPP TS 51.010: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification".
- [40] 3GPP TS 51.021: "Digital cellular telecommunications system (Phase 2); GSM radio aspects base station system equipment specification".
- [41] ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".
- [42] ISO/IEC 6429: "Information technology - Control functions for coded character sets".
- [43] ISO 8348 (1987): "Information technology -- Open Systems Interconnection -- Network Service Definition".
- [44] ITU-T Recommendation E.163: "Numbering plan for the international telephone service".
- [45] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [46] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".
- [47] ITU-T Recommendation F.69 (1993): "The international telex service - Service and operational provisions of telex destination codes and telex network identification codes".
- [48] ITU-T Recommendation I.330: "ISDN numbering and addressing principles".
- [49] ITU-T Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".
- [50] ITU-T Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".
- [51] ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".
- [52] ITU-T Recommendation T.50: "International Alphabet No. 5".
- [53] ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".
- [54] ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".
- [55] ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [56] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [57] Void.
- [58] ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [59] ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".
- [60] ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".

- [61] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".
- [62] ITU-T Recommendation X.21: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for synchronous operation on public data networks".
- [63] Void.
- [64] Void.
- [65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)".
- [66] ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".
- [67] Void.
- [68] Void.
- [69] ITU-T Recommendation X.121: "International numbering plan for public data networks".
- [70] ETSI ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".
- [71] ETSI ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".
- [72] ISO/IEC 10646: "Information technology -- Universal Multiple-Octet Coded Character Set (UCS)".
- [73] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".
- [74] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [75] 3GPP TS 43.064: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [76] 3GPP TS 44.060: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
- [77] IETF RFC 1034: "Domain names - concepts and facilities".
- [78] 3GPP TS 44.065: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCCP)".
- [79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".
- [80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".
- [81] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".
- [82] 3GPP TS 43.022: " Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [83] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [84] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".
- [85] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".
- [86] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

- [87] 3GPP TS 43.055: "Dual Transfer Mode (DTM); Stage 2".
- [88] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2"
- [89] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ), Stage 1".
- [90] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".
- [91] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), (Phase 1) CTS Radio Interface Layer 3 Specification".
- [92] 3GPP TS 23.226: "Global Text Telephony; Stage 2 "
- [93] 3GPP TS 26.226: "Cellular Text Telephone Modem (CTM), General Description "
- [94] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"
- [95] 3GPP TS 24.229: "3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia Call Control Protocol based on SIP and SDP"
- [96] 3GPP TS 23.205: "3rd Generation Partnership Project; Technical Specification Group Core Network; Bearer-independent circuit-switched core network; Stage 2".
- [97] 3GPP TS 23.172: "UDI/RDI Fallback and Service Modification; Stage 2".
- [98] 3GPP TS 25.304: "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode"
- [99] RFC 2373 (July 1998): " IP Version 6 Addressing Architecture".

***** **Second change** *****

10.5.6.3 Protocol configuration options

The purpose of the *protocol configuration options* information element is to:

- transfer external network protocol options associated with a PDP context activation, and
- transfer additional parameters and/or requests (such as, P-CSCF Address Request; 3GPP TS 24.229 [95]) that may serve any purpose other than defining network protocol options.

The *protocol configuration options* is a type 4 information element with a minimum length of 2 octets and a maximum length of 253 octets.

The *protocol configuration options* information element is coded as shown in figure 10.5.136/3GPP TS 24.008 and table 10.5.154/3GPP TS 24.008.

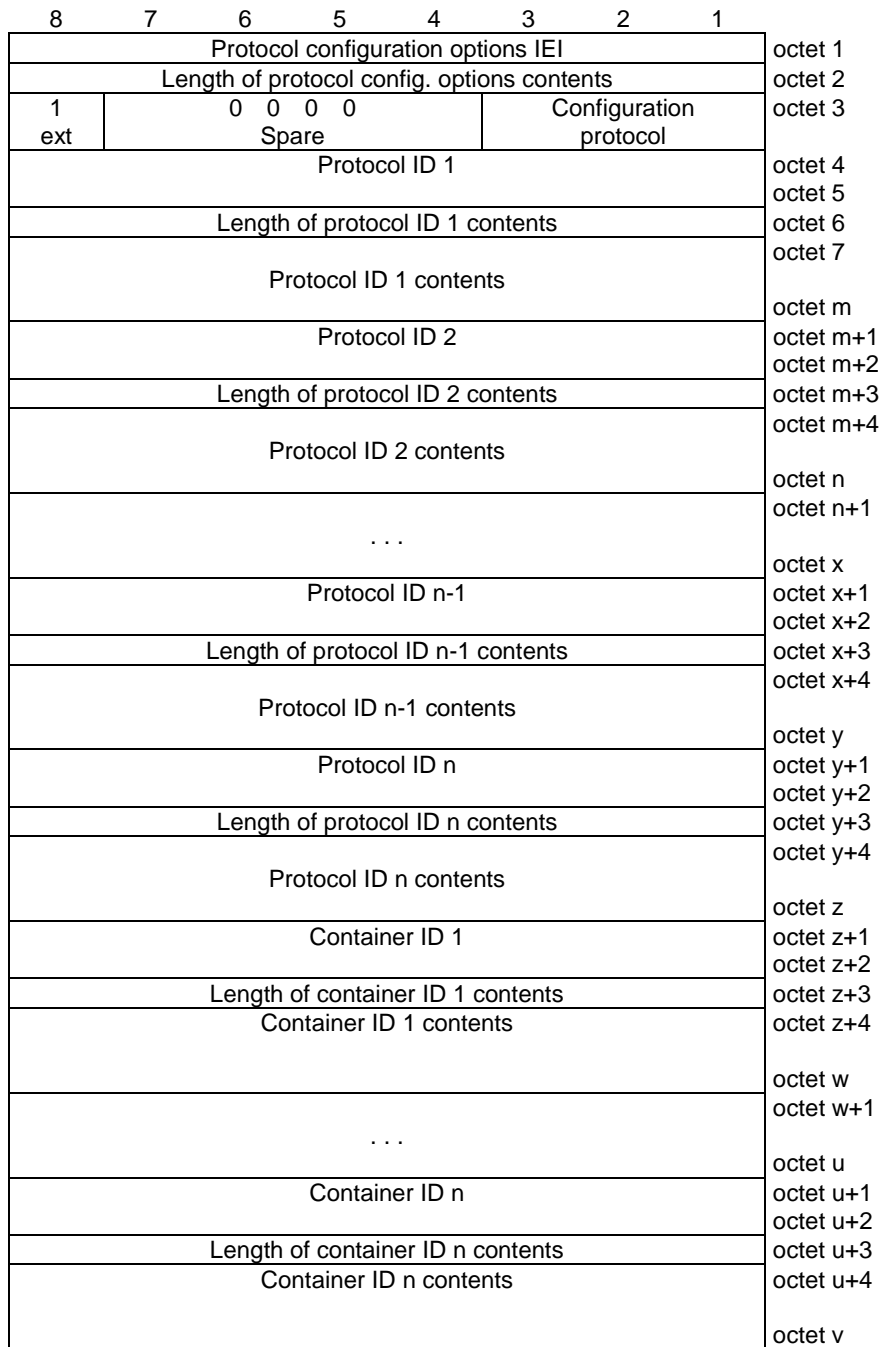


Figure 10.5.136/3GPP TS 24.008: *Protocol configuration options* information element

Table 10.5.154/3GPP TS 24.008: Protocol configuration options information element

<p>Configuration protocol (octet 3)</p> <p>Bits 3 2 1 0 0 0 PPP for use with IP PDP type</p> <p>All other values are interpreted as PPP in this version of the protocol.</p> <p>After octet 3, i.e. from octet 4 to octet v, two logical lists are defined:</p> <ul style="list-style-type: none"> - the Configuration protocol options list (octets 4 to z), and - the Additional parameters list (octets z+1 to v). <p>Configuration protocol options list (octets 4 to z)</p> <p>The <i>configuration protocol options list</i> contains a variable number of logical units, the may occur in an arbitrary order within the <i>configuration protocol options list</i>.</p> <p>Each unit is of variable length and consists of a:</p> <ul style="list-style-type: none"> - protocol identifier (2 octets); - the length of the protocol identifier contents of the unit (1 octet); and - the protocol identifier contents itself (n octets). <p>The <i>protocol identifier</i> field contains the hexadecimal coding of the configuration protocol identifier. Bit 8 of the first octet of the <i>protocol identifier</i> field contains the most significant bit and bit 1 of the second octet of the <i>protocol identifier</i> field contains the least significant bit.</p> <p>If the <i>configuration protocol options list</i> contains a protocol identifier that is not supported by the receiving entity the corresponding unit shall be discarded.</p> <p>The <i>length of the protocol identifier contents</i> field contains the binary coded representation of the length of the <i>protocol identifier contents</i> field of a unit. The first bit in transmission order is the most significant bit.</p> <p>The <i>protocol identifier contents</i> field of each unit contains information specific to the configuration protocol specified by the <i>protocol identifier</i>.</p> <p>PPP</p> <p>At least the following protocol identifiers (as defined in RFC 1700) shall be supported in this version of the protocol:</p> <ul style="list-style-type: none"> - C021H (LCP); - C023H (PAP); - C223H (CHAP);and - 8021H (IPCP). <p>The support of other protocol identifiers is implementation dependent and outside the scope of the present document.</p> <p>The <i>protocol identifier contents</i> field of each unit corresponds to a "Packet" as defined in RFC 1661 that is stripped off the "Protocol" and the "Padding" octets.</p> <p>The detailed coding of the <i>protocol identifier contents</i> field is specified in the RFC that is associated with the protocol identifier of that unit.</p> <p>Additional parameters list (octets z+1 to v)</p> <p>The <i>additional parameters list</i> is included when special parameters and/or requests (associated with a PDP context) need to be transferred between the MS and the network. These parameters and/or requests are not related to a specific configuration protocol (e.g. PPP), and therefore are not encoded as the "Packets" contained in the <i>configuration protocol options list</i>.</p> <p>The <i>additional parameters list</i> contains a list of special parameters, each one in a separate container. The type of the parameter carried in a container is identified by</p>
--

a specific *container identifier*. In this version of the protocol, the following container identifiers are specified:

MS to network direction:

- 0001H (P-CSCF Address Request);
- 0002H (IM CN Subsystem Signaling Flag)
- 0003H (DNS Server Address Request).

Network to MS direction:

- 0001H (P-CSCF Address)
- 0002H (DNS Server Address).

If the *additional parameters list* contains a container identifier that is not supported by the receiving entity the corresponding unit shall be discarded.

The *container identifier* field is encoded as the *protocol identifier* field and the *length of container identifier contents* field is encoded as the *length of the protocol identifier contents* field.

When the *container identifier* indicates P-CSCF Address, the *container identifier contents* field contains one IPv6 address corresponding to a P-CSCF address (see 3GPP TS 24.229 [95]). This IPv6 address is encoded as an 128-bit address according to RFC 2373 [99] (~~IP version 6 addressing architecture~~). When there is need to include more than one P-CSCF address, then more logical units with *container identifier* indicating P-CSCF Address are used.

When the *container identifier* indicates DNS Server Address, the *container identifier contents* field contains one IPv6 DNS server address (see 3GPP TS 27.060 [36a]). This IPv6 address is encoded as an 128-bit address according to RFC 2373 [99]. When there is need to include more than one DNS server address, then more logical units with *container identifier* indicating DNS Server Address are used.

When the *container identifier* indicates P-CSCF Address Request or DNS Server Address Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates IM CN Subsystem Signaling Flag (see 3GPP TS 24.229 [95]), the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

NOTE 1: The *additional parameters list* and the *configuration protocol options list* are logically separated since they carry different type of information. The beginning of the *additional parameters list* is marked by a logical unit, which has an identifier (i.e. the first two octets) equal to a *container identifier* (i.e. it is not a *protocol identifier*).

NOTE 2: The *additional parameters list* is discarded by a receiver, which does not support this list (e.g. a R99 GGSN).

CHANGE REQUEST

⌘ **24.229 CR 177** ⌘ rev **2** ⌘ Current version: **5.1.0** ⌘

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:	⌘ Request for DNS IPv6 server address		
Source:	⌘ Ericsson		
Work item code:	⌘ IMS-CCR	Date:	⌘ 01/08/2002
Category:	⌘ F	Release:	⌘ REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
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	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ For stateless autoconfiguration, the UE should use RFC 2462 and draft-ietf-ipv6-dns-discovery-05.txt or draft-ietf-pppext-ipv6-dns-addr-00.txt to acquire the IPv6 address(es) for DNS server(s). As the ready date of the mentioned internet-drafts are not defined, it may be a risk that these drafts do not reach RFC status in REL-5 timeframe.
Summary of change:	⌘ As an alternative to draft-ietf-ipv6-dns-discovery-05.txt or draft-ietf-pppext-ipv6-dns-addr-00.txt, it is proposed to allow the use of the PCO IE to request DNS server address(es).
Consequences if not approved:	⌘ IPv6 stateless DNS discovery for IMS will not be possible.

Clauses affected:	⌘ 2, 9.2.1										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ 24.008, 27.060, 29.061
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
Other comments:	⌘										

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***** First modification *****

2 References

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- [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".
- [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".
- [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".
- [20] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".
- [21] RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".

- [22] RFC 2806: "URLs for Telephone Calls".
- [23] RFC 2833 (May 2000): "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".
- [24] RFC 2916: "E.164 number and DNS".
- [25] RFC 2976 (October 2000): "The SIP INFO method".
- [26] RFC 3261 (March 2002): "SIP: Session Initiation Protocol".
- [27] RFC 3262 (March 2002): "Reliability of provisional responses in Session Initiation Protocol".
- [28] RFC 3265 (March 2002): "Session Initiation Protocol Specific Event Notification".
- [29] RFC 3311 (April 2002): "The SIP UPDATE method".
- [30] RFC 3312 (May 2002): "Integration of resource management and SIP".
- [31] RFC 3313 (February 2002): "SIP extensions for media authorization".
- [32] RFC 3320 (March 2002): "Signaling Compression (SigComp)".
- [33] RFC 3323 (May 2002): "A Privacy Mechanism for the Session Initiation Protocol (SIP)".
- [34] RFC 3325 (May 2002): "Private Extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks".
- [35] RFC 3327 (May 2002): "SIP Extension for Registering Non-Adjacent Contacts".
- [36] draft-sparks-sip-refer-split-00 (April 2002): "The REFER method".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [37] draft-sparks-sip-mimetypes (April 2002): "Internet Media Type message/sipfrag".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [38] draft-willis-scvrtdisco-03 (May 2002): "SIP Extension Header for Service Route Discovery in Private Networks".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [39] draft-ietf-mmusic-sdp-new-04 (November 2001): "SDP: Session Description Protocol".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [40] draft-ietf-dhc-dhcpv6-263 (June ~~February~~ 2002): "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [41] draft-ietf-sip-dhcpv6-00 (April 2002): "DHCPv6 options for SIP servers".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [42] draft-ietf-sipping-sigcomp-sip-dictionary-00.txt (May 2002): "The SIP/SDP static dictionary for Signaling Compression".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [43] draft-beckmann-sip-reg-event-01 (May 2002): "Registration event package".
- Editor's note: The above document cannot be formally referenced until it is published as an RFC.
- [44] draft-garcia-sip-visited-network-id-00 (March 2002): "Private SIP extension for Visited Network Identifier".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[45] draft-henrikson-sip-charging-information-01 (May 2002): "Private SIP Extension for Mobile Charging Information".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[46] draft-henrikson-sip-original-dialog-id-01 (May 2002): "Private SIP Extension for Original Dialog Identifier".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[47] draft-mills-sip-access-network-info-01.txt (April 2002): "SIP Access Network Information header"

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

***** Second modification *****

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] and 3GPP TS 27.060 [10A]. 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) acquire 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.

The UE may request a DNS Server IPv6 address(es) via draft-ietf-dhc-dhcpv6-26 [40] or by the Protocol Configuration Options IE when activating a PDP context according to 3GPP TS 27.060 [10A].

Detailed description of how the request and response for IPv6 address(es) for DNS server(s) and list of P-CSCF address(es) are carried in the Protocol Configuration Options IE is provided in 3GPP TS 24.008 [8].

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

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].

CR-Form-v7

CHANGE REQUEST

27.060 CR 054 # rev 2 # Current version: 5.1.0

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:	# Configuration of Domain Name System (DNS) server IPV6 addresses		
Source:	# Ericsson		
Work item code:	# TEI [GPRS]	Date:	# 22/06/2002
Category:	# F	Release:	# REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	# There is currently no support for dynamic configuration of Domain Name System (DNS) server IPV6 addresses in a MS not supporting the DHCPv6 protocol.
Summary of change:	# Introduces the possibility of dynamic configuration of Domain Name System (DNS) server IPV6 addresses via existing Session Management procedures by use of the protocol Configuration Options IE.
Consequences if not approved:	# No support for dynamic configuration of Domain Name System (DNS) server IPV6 addresses in a MS not supporting the optional DHCPv6 protocol.

Clauses affected:	# 2, 3.2, 9.1.2								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;">N</td> </tr> </table>	Y	N	Y	N	N	N	Other core specifications	# 24.008, 24.229, 29.061
Y	N								
Y	N								
N	N								
		Test specifications							
		O&M Specifications							
Other comments:	#								

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- 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 modified section

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.

- [1] Void.
- [2] Void.
- [3] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description Stage 1".
- [4] Void.
- [5] Void.
- [6] Void.
- [7] Void.
- [8] Void.
- [9] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service Description Stage 2".
- [10] Void.
- [11] Void.
- [12] Void.
- [13] Void.
- [14] Void.
- [15] Void.
- [16] 3GPP TS 27.007: "AT command set for 3GPP User Equipment (UE)".
- [17] 3GPP TS 29.061: "Packet Domain; Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)".
- [18] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".
- [19] ITU-T Recommendation V.42 bis: "Data communication over the telephone network – Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures".
- [20] Void.
- [21] Void.
- [22] Void.
- [23] Void.
- [24] Void.

- [25] Void.
- [26] IETF RFC 768 (1980): "User Datagram Protocol" (STD 6).
- [27] IETF RFC 791 (1981): "Internet Protocol" (STD 5).
- [28] IETF RFC 792 (1981): "Internet Control Message Protocol" (STD 5).
- [29] IETF RFC 793 (1981): "Transmission Control Protocol" (STD 7).
- [30] ITU-T Recommendation V.250 (ex V.25ter): "Serial asynchronous automatic dialling and control".
- [31] ITU-T Recommendation V.24: "List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)".
- [32] ITU-T Recommendation V.28: "Electrical Characteristics for unbalanced double-current interchange circuits".
- [33] ITU-T Recommendation V.80: "In-band DCE control and synchronous data modes for asynchronous DTE".
- [34] IETF RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).
- [35] IETF RFC 1662 (1994): "PPP in HDLC-like framing" (STD 51).
- [36] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).
- [37] IETF RFC 1570 (1994): "PPP LCP Extensions".
- [38] IETF RFC 1989 (1996): "PPP Link Quality Monitoring".
- [39] IETF RFC 1332 (1992): "The PPP Internet Protocol Control Protocol (IPCP)".
- [40] IETF RFC 1877 (1995): "PPP IPCP Extensions for Name Server Addresses".
- [41] IETF RFC 2153 (1997): "PPP Vendor Extensions".
- [42] IETF RFC 1334 (1992): "PPP Authentication Protocols".
- [43] IETF RFC 1994 (1996): "PPP Challenge Handshake Authentication Protocol".
- [44] IETF RFC 2686 (1999): "The Multi-Class Extension to Multi-Link PPP".
- [45] IETF RFC 1990 (1996): "The PPP Multilink Protocol (MP)".
- [46] IETF RFC 2472 (1998): "IP Version 6 over PPP".
- [47] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [48] 3GPP TS 23.221: "Architectural requirements".
- [49] IETF RFC 2373 (1998): "IP version 6 Addressing Architecture".
- [50] [IETF RFC 1034 \(1987\): "Domain Names - Concepts and Facilities" \(STD 13\).](#)
- [51] [IETF RFC 1035 \(1987\): "Domain Names - Implementation and Specification" \(STD 13\).](#)
- [52] [IETF RFC 1886 \(1995\): "DNS Extensions to support IP version 6".](#)

Next modified section

3.2 Abbreviations

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

APN	Access Point Name
DNS	Domain Name System
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSN	GPRS Support Node
GTP-U	GPRS Tunnelling Protocol for user plane
HDLC	High Level Data Link Control
ICMP	Internet Control Message Protocol
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IPV6CP	IPv6 Control Protocol
LA	Location Area
LCP	Link Control Protocol
LLC	Logical Link Control
MAC	Medium Access Control
MCML	Multi-Class Multi-Link PPP
ME	Mobile Equipment
MP	Multilink PPP
MS	Mobile Station
MT	Mobile Termination
NCP	Network Control Protocol
PDCP	Packet Data Convergence Protocol
PDN	Packet Data Network
PDP	Packet Data Protocol , e.g., IP or PPP
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
PS	Packet Switched
PTM	Point To Multipoint
PTP	Point To Point
PVC	Permanent Virtual Circuit
RA	Routing Area
SGSN	Serving GPRS Support Node
SNDCP	SubNetwork Dependent Convergence Protocol
TCP	Transmission Control Protocol
TE	Terminal Equipment
TFT	Traffic Flow Template
UDP	User Datagram Protocol

Next modified section

9.1.2 IPv6 over PPP

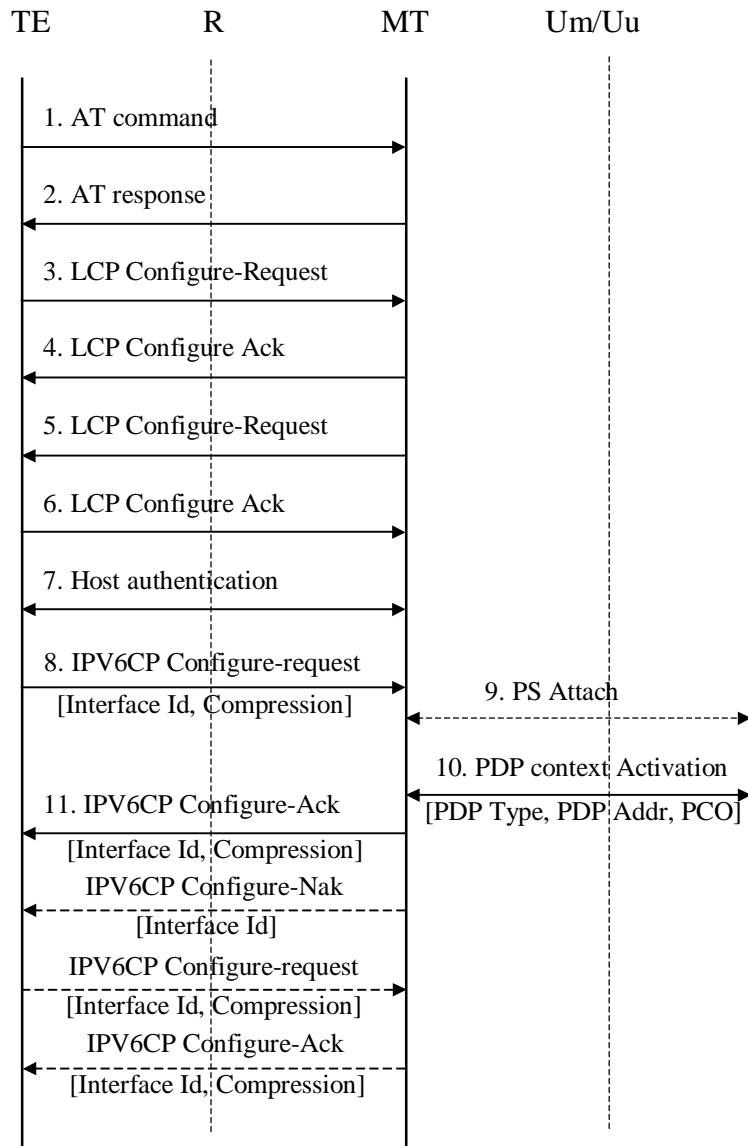


Figure 7b: PDP Context Activation for the IPv6 over PPP based services

- 1) The TE issues AT commands to set up parameters and enter PPP mode (refer to subclause on- AT commands for further details).
- 2) The MT sends AT responses to the TE.
- 3) The PPP protocol in the TE sends a LCP Configure-Request. This command is to establish a PPP link between the TE and the MT.
- 4) The MT returns LCP Configure-Ack to the TE to confirm that the PPP link has been established. The MT might previously have sent a LCP Configure-Nak in order to reject some options proposed by the TE. This in turn might have triggered a retransmission of the LCP Configure-Request with different options.
- 5) The PPP protocol in the MT sends a LCP Configure-Request in order to negotiate for the authentication protocol used for authentication of the host TE towards the MT. The MT shall initially negotiate for CHAP, and if this is unsuccessful, for PAP.

- 6) The TE returns a LCP Configure-Ack to the MT to confirm the use of the specified authentication protocol. The MT might previously have sent a LCP Configure-Nak in order to reject the protocol proposed by the TE. This in turn might have triggered a retransmission of the LCP Configure-Request with different options.
- 7) If the negotiated authentication protocol is either of CHAP or PAP, the TE authenticates itself towards the MT by means of that protocol. The MT stores the necessary authentication data and sends a locally generated positive acknowledgement of the authentication to the TE. If none of the protocols is supported by the host TE no authentication shall be performed. Refer to 3GPP TS 29.061 for further details on the authentication.
- 8) The TE requests IPv6 Interface-Identifier negotiation by sending the IPV6CP Configure-Request message to the MT indicating the tentative Interface-Identifier chosen by the TE. The tentative Interface-Identifier has only local significance in the MT and shall not be forwarded to the GGSN.
- 9) If the MS is not yet PS attached, the MT performs the PS Attach procedure as described in 3GPP TS 23.060.
- 10) The MT sends the Activate PDP context request message to the network, including the PDP Type, PDP Address and Protocol Configuration Options. The Protocol Configuration Options [IE](#) may contain negotiated LCP options such as negotiated Authentication Protocol as well as any authentication data previously stored in the MT. [It may also contain a request for dynamic configuration of DNS server IPv6 addresses as described in 3GPP TS 29.061 \[17\].](#) The MS shall leave PDP Address empty and set PDP Type to 'IPv6'.

Note: The protocol between the TE and MT may not support the same set of information as the interface from the MT to the network (eg. DNS).

The network responds with an Activate PDP Context Accept or an Activate PDP Context Reject, to the MS. [The Protocol Configuration Options IE may contain configuration data such as a list of DNS server IPv6 addresses as described in 3GPP TS 29.061 \[17\]. In cases where the MS receives more than one server address, the MS shall adhere to the explicit prioritisation order of the list.](#) The PDP Address shall contain an IPv6 address composed of a -Prefix and an Interface-Identifier. The size of the Prefix shall be according to the maximum prefix length for a global IPv6 address as specified in the IPv6 Addressing Architecture, see RFC 2373 [49]. The Interface-Identifier shall be used to create a link-local IPv6 address, to be used in continued MS – GGSN user-plane signalling. The Prefix in the PDP Address shall be ignored by the MS.

- 11) In case a PDP Context Accept was sent to the MS, the MT extracts the Interface-Identifier from the address received in the PDP Address IE and ignores the Prefix part. If this Interface-Identifier is identical to the tentative Interface-Identifier indicated in the IPV6CP Configure-Request message sent from the TE, the MT sends an IPV6CP Configure Ack packet, indicating this Interface-Identifier, to the TE.

If the Interface-Identifier extracted from the address contained in the PDP Address IE is not identical to the tentative Interface-Identifier indicated in the IPV6CP Configure-Request message sent from the TE, the MT sends an IPV6CP Configure Nak packet, indicating the Interface-Identifier extracted from the address contained in the PDP Address IE, to the TE. The TE then sends a new IPV6CP Configure-Request message to the MT, indicating the same Interface-Identifier as was indicated in the received IPV6CP Configure Nak. Finally the MT responds with an IPV6CP Configure Ack packet. The negotiated Interface-Identifier shall be used in the TE to create a link-local address.

After finalisation of the IPV6CP negotiations between TE and MT, the user plane link is established. Before the MS can communicate with other hosts on the Intranet/ISP it shall obtain an IPv6 Global or a Site-Local Unicast address. Given that exactly one Prefix is included in the Router Advertisement, depending upon whether the advertised Prefix is globally unique or Site-local unique, the MS can only generate either IPv6 Global address(es) or Site-local address(es) using this Prefix during the lifetime of a particular PDP Context. This is done using either Stateless or Stateful Address Autoconfiguration as described in 3GPP TS 29.061 [17].

When creating a Global or Site-Local Unicast Address, the MS may use the Interface-Identifier received during the PDP Context Activation phase or it may generate a new Interface-Identifier. There is no restriction on the uniqueness of the Interface-Identifier of the Global or Site-Local Unicast Address, since the Prefix itself is unique. Interface-Identifiers shall in any case be 64-bit long and follow standard interface-identifier guidelines as per IETF RFC 2373 [49] and RFC 2472 [46].

In case a PDP Context Reject was sent to the MS the MT sends an LCP Terminate-Request to the TE, the TE and MT negotiate for link termination. The MT may then send a final AT-response to inform the TE about the rejected PDP Context activation.

~~Note. When this version of this specification was released, work was still in progress within IETF for how to provide DNS configuration for MS not supporting Stateful Autoconfiguration, i.e. MS not supporting DHCP DNS configuration.~~

End of modified sections

CR-Form-v7

CHANGE REQUEST

29.061 CR 061 # rev 2 # Current version: 5.2.0

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

Title:	# Configuration of Domain Name System (DNS) server IPV6 addresses		
Source:	# Ericsson		
Work item code:	# TEI [GPRS]	Date:	# 22/06/2002
Category:	# F	Release:	# REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	# There is currently no support for dynamic configuration of Domain Name System (DNS) server IPV6 addresses in a MS not supporting the DHCPv6 protocol.
Summary of change:	# Introduces the possibility of dynamic configuration of Domain Name System (DNS) server IPV6 addresses via existing Session Management procedures by use of the protocol Configuration Options IE.
Consequences if not approved:	# No support for dynamic configuration of Domain Name System (DNS) server IPV6 addresses in a MS not supporting the optional DHCPv6 protocol.

Clauses affected:	# 2, 11.2.1.3.1								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;">N</td> </tr> </table>	Y	N	Y	N	N	N	Other core specifications	# 24.008, 24.229, 27.060
Y	N								
Y	N								
N	N								
		Test specifications							
		O&M Specifications							
Other comments:	#								

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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 modified section

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.

- [1] Void.
- [2] 3GPP TS 22.060: "General Packet Radio Service (GPRS): Stage 1 Service Description".
- [3] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description Stage 2".
- [4] Void.
- [5] Void.
- [6] Void.
- [7] Void.
- [8] Void.
- [9] Void.
- [10] 3GPP TS 27.060: "Packet Domain; Mobile Station (MS) supporting Packet Switched Services".
- [11] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".
- [12] <VOID>
- [13] <VOID>
- [14] <VOID>
- [15] IETF RFC 768 (1980): "User Datagram Protocol" (STD 6).
- [16] IETF RFC 791 (1981): "Internet Protocol" (STD 5).
- [17] IETF RFC 792 (1981): "Internet Control Message Protocol" (STD 5).
- [18] IETF RFC 793 (1981): "Transmission Control Protocol" (STD 7).
- [19] IETF RFC 1034 (1987): "Domain Names - Concepts and Facilities" (STD 7).
- [20] <VOID>
- [21] IETF RFC 1661 and 1662 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).
- [22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).3.
- [23] 3GPP TS 44.008: "Mobile radio interface layer 3 specification; Core Network Protocols – Stage 3".
- [24] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

- [25] IETF RFC2794 (2000), Pat R. Calhoun and Charles E. Perkins: "Mobile IP Network Address Identifier Extension for IPv4", March 2000.
- [26] IETF RFC 2131 (1997): "Dynamic Host Configuration Protocol".
- [27] IETF RFC 1542 (1993): "Clarification and Extensions for the Bootstrap Protocol".
- [28] IETF RFC2373 (1998): "IP version 6 Addressing Architecture".
- [29] IETF RFC 2462 (1998): "IPv6 Stateless Address Autoconfiguration".
- [30] IETF RFC 2002 (1996), C. Perkins: "IP Mobility Support".
- [31] IETF RFC 2486 (1999), B. Aboba and M. Beadles: "The Network Access Identifier".
- [32] IETF RFC1112 (1989), S.E. Deering: "Host extensions for IP multicasting".
- [33] IETF RFC2236 (1997), W. Fenner: "Internet Group Management Protocol, Version 2".
- [34] IETF RFC2362 (1998), D. Estrin and al: "Protocol Independent Multicast-Sparse Mode (PIM-SM)".
- [35] IETF RFC1075 (1988), D. Waitzman and al: "Distance Vector Multicast Routing Protocol".
- [36] IETF RFC1585 (1994), J. Moy: "MOSPF"..
- [37] IETF RFC2290 (1998), J. Solomon, S. Glass: "Mobile-IPv4 Configuration Option for PPP IPCP "
- [38] IETF RFC2865 (2000), C. Rigney, S. Willens, A. Rubens, W. Simpson: "Remote Authentication Dial In User Service (RADIUS)".
- [39] IETF RFC2866 (2000), C. Rigney, Livingston: " RADIUS Accounting ".
- [40] 3GPP TS 23.003: "3rd Generation Partnership Project; Technical Specification Group Core Network; Numbering, addressing and identification".
- [41] IETF RFC2882 (2000), D. Mitton: "Extended RADIUS Practices".
- [42] 3GPP TR 21.905: " Vocabulary for 3GPP Specifications".
- [43] IETF RFC 2472 (1998), D. Haskins, E. Allen: "IP Version 6 over PPP"
- [44] IETF RFC 2461 (1998), T. Narten, E. Nordmark, W. Simpson: "Neighbor Discovery for IP Version 6"
- [45] IETF RFC 3118 (2001), R. Droms, W. Arbaugh: "Authentication for DHCP Messages"
- [46] IETF Internet-Draft: "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", draft-ietf-dhc-dhcpv6-24.txt, work in progress.
- [47] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP"
- [48] IETF RFC 2710 (1999), S. Deering, W. Fenner, B. Haberman: "Multicast Listener Discovery (MLD) for IPv6"
- [49] IETF RFC 2460 (1998), S.Deering,, R.Hinden: "Internet Protocol, Version 6 (IPv6) Specification"
- [50] IETF RFC 3162 (2001), B. Adoba, G. Zorn, D. Mitton: "RADIUS and IPv6"
- [51] IETF RFC 2548 (1999), G.Zorn: "Microsoft Vendor-specific RADIUS Attributes"
- [52] IETF RFC 1034 (1987): "Domain Names - Concepts and Facilities" (STD 13).
- [53] IETF RFC 1035 (1987): "Domain Names - Implementation and Specification" (STD 13).
- [54] IETF RFC 1886 (1995): "DNS Extensions to support IP version 6".

[55] 3GPP TS 24.008: “Mobile radio interface layer 3 specification; Core Network Protocols - Stage 3”.

Next modified section

11.2.1.3.1 IPv6 PDP Context Activation

In this case:

- The GGSN provides the MS with an IPv6 Prefix belonging to the Intranet/ISP addressing space. A dynamic IPv6 address shall be given using either stateless or stateful address autoconfiguration. This IPv6 address is used for packet forwarding within the packet domain and for packet forwarding on the Intranet/ISP;
- the MS may send an authentication request at PDP context activation and the GGSN may request user authentication from a server, e.g. AAA, ..., belonging to the Intranet/ISP;
- the protocol configuration options are retrieved (if requested by the MS at PDP context activation) from some server, e.g. AAA, ..., belonging to the Intranet/ISP;
- in order to avoid any conflict between the link-local address of the MS and that of the GGSN, the Interface-Identifier used by the MS to build its link-local address shall be assigned by the GGSN. The GGSN ensures the uniqueness of this interface-identifier. The MT shall then enforce the use of this Interface-Identifier by the TE. This is valid for both stateless and stateful address autoconfiguration.
- the communication between the Packet Domain and the Intranet/ISP may be performed over any network, even an insecure e.g. the Internet. In case of an insecure connection between the GGSN and the Intranet/ISP there may be a specific security protocol over the insecure connection. This security protocol is defined by mutual agreement between PLMN operator and Intranet/ISP administrator.
- the MS may request for DNS server IPv6 addresses using the PCO IE in e.g. the PDP Context Request message. In that case the GGSN may return the IP address of one or more DNS servers in the PCO in the PDP Context Response message. The DNS address(es) shall be coded in the PCO as specified in 3GPP TS 24.008 [55]. If a list of servers is received, the MS shall adhere to the explicit prioritisation order of the list.

In the following signalling flow example, PPP is used as layer 2 protocol over the R reference point. The MT behaves as a PPP server and translates Protocol Configuration Options into SM message IEs. GTP-C carries this information unchanged to the GGSN which uses the information e.g. for RADIUS authentication. The result of the host authentication is carried via GTP-C back to the SGSN, which then relays the result to the MT. The MT finalises the IPV6CP negotiation by sending an IPV6CP Configure-Ack message to the TE with the appropriate options included, e.g. Interface-Identifier. The Interface-Identifier shall be used in the TE to create a link-local address to be able to perform the IPv6 address autoconfiguration (see subclauses 11.2.1.3.2 and 11.2.1.3.3).

- 1) The TE sends an AT-command to the MT to set up parameters and enter PPP mode. The MT responds with an AT-response.
- 2) LCP negotiates Maximum-Receive-Unit and authentication protocol. The negotiated authentication protocol is either CHAP, PAP or 'none'. The MT shall try to negotiate for CHAP as first priority.
- 3) If the negotiated authentication protocol is either of CHAP or PAP, the TE authenticates itself towards the MT by means of that protocol. The MT stores the necessary authentication data and sends a forced positive acknowledgement of the authentication to the TE.
- 4) The TE requests IPv6 Interface-Identifier negotiation by sending the IPV6CP Configure-Request message to the MT.
- 5) The MT sends the Activate PDP Context Request message to the SGSN, including the Protocol Configuration Options. The Protocol Configuration Options IE may contain negotiated LCP options such as negotiated

Authentication Protocol as well as any authentication data previously stored in the MT. It may also contain a request for dynamic configuration of DNS server IPv6 addresses. The MS shall for dynamic address allocation leave PDP Address empty and set PDP Type to IPv6. The SGSN sends the Create PDP context request message to the chosen GGSN including the unmodified Protocol Configuration Options.

6) The GGSN deduces from local configuration data associated with the APN:

- IPv6 address allocation type (stateless or stateful);
- the source of IPv6 Prefixes in the stateless case (GGSN internal prefix pool, or external address allocation server);
- any server(s) to be used for address allocation, authentication and/or protocol configuration options retrieval (e.g. IMS related configuration, see [47]);
- the protocol e.g. RADIUS, to be used with the server(s);
- the communication and security feature needed to communicate with the server(s);

As an example the GGSN may use one of the following options:

- GGSN internal Prefix pool for IPv6 prefix allocation and no authentication;
- GGSN internal Prefix pool for IPv6 prefix allocation and RADIUS for authentication. The AAA server responds with either an Access-Accept or an Access-Reject to the RADIUS client in the GGSN;
- RADIUS for authentication and IPv6 prefix allocation. The AAA server responds with either an Access-Accept or an Access-Reject to the RADIUS client in the GGSN;

NOTE: DHCPv6 may be used for IPv6 prefix allocation when an appropriate RFC becomes available.

IPv6 Prefixes in a GGSN internal Prefix pool shall be configurable and structured per APN.

The GGSN shall in the PDP Address IE in the Create PDP Context Response return an IPv6 address composed of a Prefix and an Interface-Identifier. The Interface-Identifier may have any value and it does not need to be unique within or across APNs. It shall however not conflict with the Interface-Identifier the GGSN has selected for its own side of the MS-GGSN link. The Prefix assigned by the GGSN or the external AAA server shall be globally or site-local unique, if stateless address autoconfiguration is configured on this APN. If, on the other hand, stateful address autoconfiguration is configured on the APN, the Prefix part of the IPv6 address returned in the PDP Address IE shall be set to the link-local prefix (FE80::/64).

The GGSN shall analyse the requested values of all the protocol options contained in the received Protocol Configurations Options IE. The contents of the Protocol Configurations Options IE sent in the GGSN response shall be in accordance with the relevant standards e.g. the PPP or IPCPv6 standards [21]-and [43].

- 7) The GGSN sends back to the SGSN a Create PDP Context Response message, containing the PDP Address IE and the Protocol Configuration Options IE. The Protocol Configuration Options IE may contain configuration data such as a list of DNS server IPv6 addresses. The cause value shall be set according to the outcome of the host authentication and configuration.
- 8) Depending on the cause value received in the Create PDP Context Response, the SGSN either stores the PDP Address and sends an Activate PDP Context Accept to the MS or, sends an Activate PDP Context Reject, to the MS.

If Protocol Configuration Options are received from the GGSN, the SGSN shall relay those to the MS.

- 9) The MT extracts the Interface-Identifier from the address received in the PDP Address IE and ignores the Prefix part. If this Interface-Identifier is identical to the tentative Interface-Identifier indicated in the IPV6CP Configure-Request message sent from the TE-, the MT sends an IPV6CP Configure Ack packet, indicating this Interface-Identifier, to the TE.

If the Interface-Identifier extracted from the address contained in the PDP Address IE is not identical to the tentative Interface-Identifier indicated in the IPV6CP Configure-Request message sent from the TE, the MT sends an IPV6CP Configure-Nak packet, indicating the Interface-Identifier extracted from the address contained in the PDP Address IE, to the TE. The TE then sends a new IPV6CP Configure-Request message to the MT,

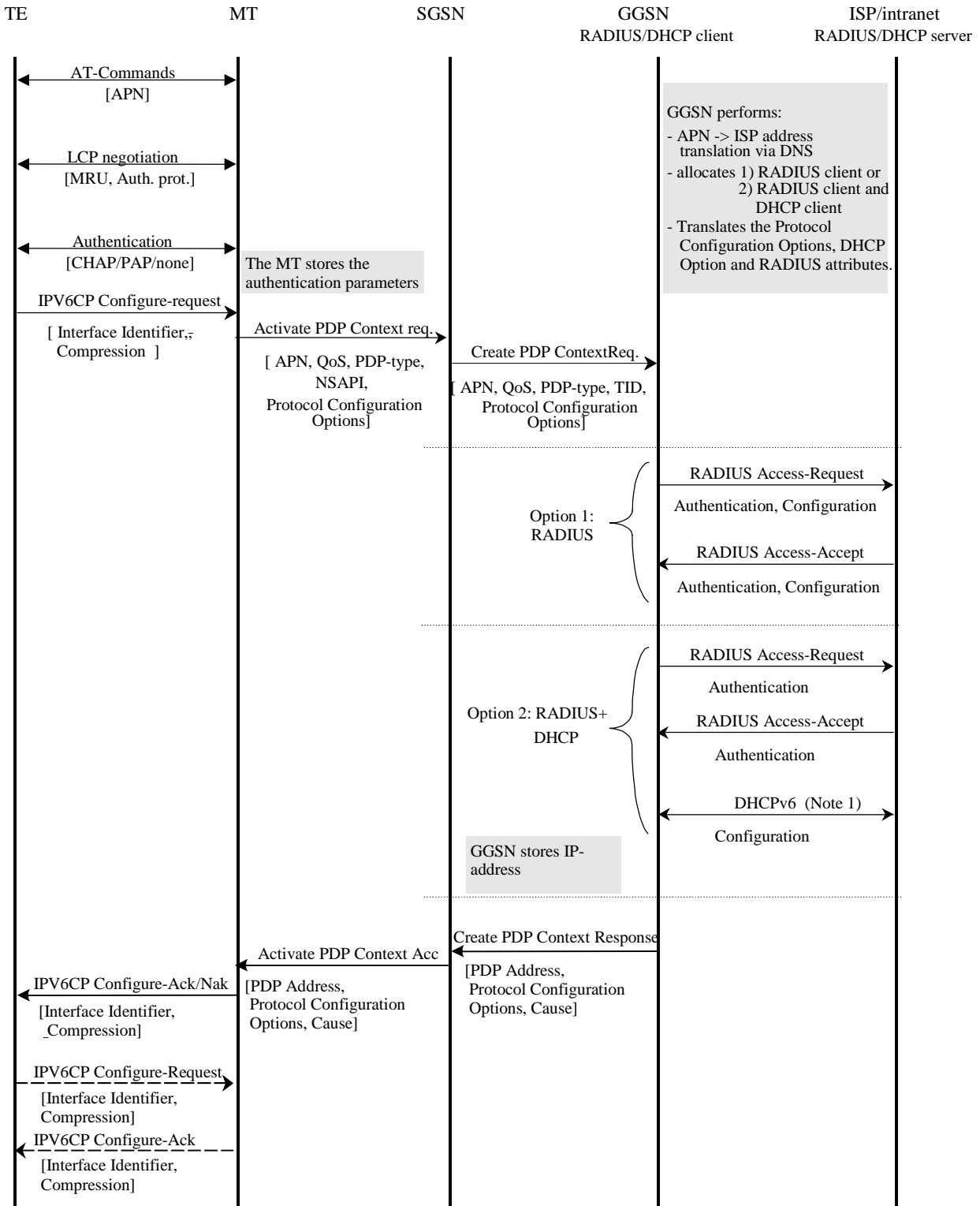
indicating the same Interface-Identifier as was indicated in the received IPV6CP Configure Nak (as indicated by the dotted IPV6CP Configure-Request and Configure-Ack in the figure below). Finally the MT responds with a IPV6CP Configure Ack packet.

In case a PDP Context Reject was sent to the MS the MT sends an LCP Terminate-Request to the TE.

- 10) When the TE has accepted the Interface-Identifier given by the MT, the user plane link from the TE to the GGSN and the external ISP/Intranet is established and the IPv6 address autoconfiguration may proceed.

In case a link terminate request packet was sent to the TE, the TE and MT negotiates for link termination. The MT may then send a final AT-response to inform the TE about the rejected PDP Context activation.

An LCP Terminate-request causes a PDP context deactivation.



Note 1: DHCPv6 may be used for IPv6 prefix allocation when an appropriate RFC becomes available.

Figure 11ba: PDP Context Activation for the IPv6 Non-transparent case

Figure 11ba above is valid for both Stateless and Stateful Address Autoconfiguration case. In the Stateful case though, option 2 does not apply and option 1 may only be used for authentication. The use of DHCPv6 above is different and used in a different context than when used for Stateful Address Autoconfiguration as in subclause 11.2.1.3.3.