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

566

Configuration protocol (octet 3) Bits
0 0 0 PPP for use with IP PDP type or IP PDN type (see 3GPP TS 24.301 [120])
All other values are interpreted as PPP in this version of the protocol.
After octet 3, i.e. from octet 4 to octet z, two logical lists are defined:
- the Configuration protocol options list (octets 4 to w), and
- the Additional parameters list (octets w+1 to z).
Configuration protocol options list (octets 4 to w)
The <i>configuration protocol options list</i> contains a variable number of logical units, they may occur in an arbitrary order within the <i>configuration protocol options list</i> .
Each unit is of variable length and consists of a:
<ul> <li>protocol identifier (2 octets);</li> <li>the length of the protocol identifier contents of the unit (1 octet); and</li> <li>the protocol identifier contents itself (n octets).</li> </ul>
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.
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 ignored.
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.
The <i>protocol identifier contents</i> field of each unit contains information specific to the configuration protocol specified by the <i>protocol identifier</i> .
At least the following protocol identifiers (as defined in RFC 3232 [103]) shall be supported in this version of the protocol:
<ul> <li>C021H (LCP);</li> <li>C023H (PAP);</li> <li>C223H (CHAP); and</li> <li>8021H (IPCP).</li> </ul>
The support of other protocol identifiers is implementation dependent and outside the scope of the present document.
The <i>protocol identifier contents</i> field of each unit corresponds to a "Packet" as defined in RFC 1661 [102] that is stripped off the "Protocol" and the "Padding" octets.
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.
Additional parameters list (octets w+1 to z)
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> .
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 a specific <i>container identifier</i> . In this version of the protocol, the following container identifiers are specified:

MS to network direction	on:
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- 0001H (P-CSCF IPv6 Address Request);
- 0002H (IM CN Subsystem Signaling Flag);
- 0003H (DNS Server IPv6 Address Request);
- 0004H (Not Supported);
- 0005H (MS Support of Network Requested Bearer Control indicator);
- 0006H (Reserved);
- 0007H (DSMIPv6 Home Agent Address Request;
- 0008H (DSMIPv6 Home Network Prefix Request);
- 0009H (DSMIPv6 IPv4 Home Agent Address Request);
- 000AH (IP address allocation via NAS signalling);
- 000BH (IPv4 address allocation via DHCPv4);
- 000CH (P-CSCF IPv4 Address Request);
- 000DH (DNS Server IPv4 Address Request);
- 000EH (MSISDN Request);
- 000FH (IFOM-Support-Request);
- 0010H (IPv4 Link MTU Request);
- 0011H (MS support of Local address in TFT indicator); and
- FF00H to FFFFH reserved for operator specific use.

## Network to MS direction:

- 0001H (P-CSCF IPv6 Address);
- 0002H (IM CN Subsystem Signaling Flag);
- 0003H (DNS Server IPv6 Address);
- 0004H (Policy Control rejection code);
- 0005H (Selected Bearer Control Mode;
- 0006H (Reserved);
- 0007H (DSMIPv6 Home Agent Address);
- 0008H (DSMIPv6 Home Network Prefix);
- 0009H (DSMIPv6 IPv4 Home Agent Address);
- 000AH (Reserved);
- 000BH (Reserved);
- 000CH (P-CSCF IPv4 Address);
- 000DH (DNS Server IPv4 Address);
- 000EH (MSISDN);
- 000FH (IFOM-Support);

0010H (IPv4 Link MTU); 0011H (Network support of Local address in TFT indicator); and FF00H to FFFFH reserved for operator specific use. If the additional parameters list contains a container identifier that is not supported by the receiving entity the corresponding unit shall be ignored. 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 IPv6 Address Request, DNS Server IPv6 Address Request, or MSISDN 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. In Network to MS direction this information may be used by the MS to indicate to the user whether the requested dedicated signalling PDP context was successfully established. When the container identifier indicates P-CSCF IPv6 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 a 128-bit address according to IETF RFC 4291 [99]. When there is a need to include more than one P-CSCF IPv6 address, then more logical units with the container identifier indicating P-CSCF IPv6 Address are used. If more than 3 instances of the P-CSCF IPv6 Address logical unit are received by the MS then the MS may ignore all but the first 3 instances of the P-CSCF IPv6 Address logical unit received. When the container identifier indicates DNS Server IPv6 Address, the container identifier contents field contains one IPv6 DNS server address (see 3GPP TS 27.060 [36a]). This IPv6 address is encoded as a 128-bit address according to IETF RFC 4291 [99]. When there is a need to include more than one DNS Server IPv6 address, then more logical units with the container identifier indicating DNS Server IPv6 Address are used. When the container identifier indicates Policy Control rejection code, the container identifier contents field contains a Go interface related cause code from the GGSN to the MS (see 3GPP TS 29.207 [100]). The length of container identifier contents indicates a length equal to one. If the container identifier contents field is empty or its actual length is greater than one octect, then it shall be ignored by the receiver. When the container identifier indicates MS Support of Network Requested Bearer Control indicator, 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 Selected Bearer Control Mode, the container identifier contents field contains the selected bearer control mode, where '01H' indicates that 'MS only' mode has been selected and '02H' indicates that 'MS/NW' mode has been selected. The length of container identifier contents indicates a length equal to one. If the container identifier contents field is empty or its actual length is greater than one octect, then it shall be ignored by the receiver. When the container identifier indicates DSMIPv6 Home Agent 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 DSMIPv6 Home Network Prefix 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 DSMIPv6 IPv4 Home Agent 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 DSMIPv6 Home Agent Address, the *container identifier contents* field contains one IPv6 address corresponding to a DSMIPv6 HA address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 address is encoded as a 128-bit address according to IETF RFC 4291 [99].

When the *container identifier* indicates DSMIPv6 Home Network Prefix, the *container identifier contents* field contains one IPv6 Home Network Prefix (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 prefix is encoded as an IPv6 address according to IETF RFC 4291 [99] followed by 8 bits which specifies the prefix length.

When the *container identifier* indicates DSMIPv6 IPv4 Home Agent Address, the *container identifier contents* field contains one IPv4 address corresponding to a DSMIPv6 IPv4 Home Agent address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]).

When the *container identifier* indicates P-CSCF IPv4 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 DNS Server IPv4 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 P-CSCF IPv4 Address, the *container identifier contents* field contains one IPv4 address corresponding to the P-CSCF address to be used. When there is a need to include more than one P-CSCF IPv4 address, then more logical units with the *container identifier* indicating P-CSCF IPv4 Address are used. If more than 3 instances of the P-CSCF IPv4 Address logical unit are received by the MS then the MS may ignore all but the first 3 instances of the P-CSCF IPv4 Address logical unit received.

When the *container identifier* indicates DNS Server IPv4 Address, the *container identifier contents* field contains one IPv4 address corresponding to the DNS server address to be used. When there is a need to include more than one DNS Server IPv4 address, then more logical units with the *container identifier* indicating DNS Server IPv4 Address are used.

P-CSCF IPv4 Address Request, P-CSCF IPv4 Address, DNS Server IPv4 Address Request and DNS Server IPv4 Address are applicable only in S1-mode.

When the *container identifier* indicates IP address allocation via NAS signalling, 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 IP address allocation via DHCPv4, 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 MSISDN, the container identifier contents field contains the MSISDN (see 3GPP TS 23.003 [10]) assigned to the MS. Use of the MSISDN provided is defined in subclause 6.4.

When the *container identifier* indicates IFOM Support Request (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]), 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 IFOM Support, 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. This information indicates that the Home Agent supports IFOM.

When the *container identifier* indicates IPv4 Link MTU 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 IPv4 Link MTU, the *length of container identifier contents* indicates a length equal to two. The *container identifier contents* field contains the binary coded representation of the IPv4 link MTU size in octets. Bit 8 of the first octet of the *container identifier contents* field contains the most significant bit and bit 1 of the second octet of the *container identifier contents* field contains the least significant bit. If the *length of container identifier contents* is different from two octets, then it shall be ignored by the receiver.

When the *container identifier* indicates MS support of Local address in TFT, 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. This information indicates that the MS supports Local address in TFTs.

When the *container identifier* indicates Network support of Local address in TFT, 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. This information indicates that the network supports Local address in TFTs.

When the container identifier indicates operator specific use, the Container contents starts with MCC and MNC of the operator providing the relevant application and can be followed by further application specific information. The coding of MCC and MNC is as in octet 2 to 4 of the *Location Area Identification* information element in subclause 10.5.1.3.

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).

## 10.5.6.4 Packet data protocol address

The purpose of the *packet data protocol address* information element is to identify an address associated with a PDP.

The *packet data protocol address* is a type 4 information element with minimum length of 4 octets and a maximum length of 24 octets.

The *packet data protocol address* information element is coded as shown in figure 10.5.137/3GPP TS 24.008 and table 10.5.155/3GPP TS 24.008.

8	7		6		5	4	3	2	1	
	Packet data protocol address IEI								octet 1	
Length of PDP address contents							octet 2			
	0	0	0 (	)		PI	DP type o	organisatio	on	octet 3
		spa	re				-	-		
PDP type number								octet 4		
										octet 5
				Ac	dress i	nformatic	n			
										_octet n



## Table 10.5.155/3GPP TS 24.008: Packet data protocol address information element

572

Length of PDP address contents (octet 2)
If the value of octet 2 equals 0000 0010, then:
- No PDP address is included in this information element; and
- If the PDP type is IP, dynamic addressing is applicable.
NOTE: For PPP no address is required in this information element.
PDP type organisation (octet 3) Bits 4 3 2 1 In MS to network direction : 0 0 0 0 ETSI allocated address 0 0 0 1 IETF allocated address 1 1 1 1 Empty PDP type
All other values are reserved.
In network to MS direction : 0 0 0 0 ETSI allocated address 0 0 0 1 IETF allocated address
All other values are reserved.
If bits 4,3,2,1 of octet 3 are coded 0 0 0 0 PDP type number value (octet 4) Bits 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 Reserved, used in earlier version of this protocol 0 0 0 0 0 0 1 PDP-type PPP All other values are reserved in this version of the protocol.
If bits 4,3,2,1 of octet 3 are coded 0 0 0 1 PDP type number value (octet 4) Bits
87654321 00100001 IPv4 address 01010111 IPv6 address 10001101 IPv4v6 address
All other values shall be interpreted as IPv4 address in this version of the protocol.
In MS to network direction: If bits 4,3,2,1 of octet 3 are coded 1 1 1 1 PDP type number value (octet 4) bits 8 to 1 are spare and shall be coded all 0.
Octet 3, bits 8, 7, 6, and 5 are spare and shall be coded all 0.

If PDP type number indicates IPv4, the Address information in octet 5 to octet 8 contains the IPv4 address. Bit 8 of octet 5 represents the most significant bit of the IP address and bit 1 of octet 8 the least significant bit.

If PDP type number indicates IPv6, the Address information in octet 5 to octet 20 contains the IPv6 address. Bit 8 of octet 5 represents the most significant bit of the IP address and bit 1 of octet 20 the least significant bit.

If PDP type number indicates IPv4v6:

The Address information in octet 5 to octet 8 contains the IPv4 address. Bit 8 of octet 5 represents the most significant bit of the IP address and bit 1 of octet 8 the least significant bit.