DHCP option to transport Protocol Configuration Options
draft-melia-dhc-pco-00

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Abstract

This document specifies how to convey Protocol Configuration Options (PCO) [24008] from/to the access network to/from the Mobile Node.
(MN). There are scenarios defined in 3GPP (TS 23.402) and WiMax
forum NWG where the mobile node accessing the non-3GPP trusted system
needs to convey such information to the Mobility Access Gateway (MAG)
functionality implemented in the serving gateway (S-GW). The MAG
requires the PCO field to send such information to the Local Mobility
Agent (LMA) (implemented in the PDN gateway, P-GW) in a Proxy Binding
Update (PBU) message. PCO options are exchanged between the MN and
the LMA to transport information such as P-CSCF address, DNS server
address.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in RFC 2119 [RFC2119].

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1. Introduction

The 3GPP standardization body is currently defining the Evolved Packet Core (EPC) architecture. The system integrates several access technologies classified as 3GPP access, non-3GPP trusted access system (e.g. WiMax) or non-3GPP non trusted access system (e.g. WIFI). Among others, two components of the EPC are relevant for this document, namely the S-GW and the P-GW implementing the MAG and the LMA function respectively. When the MN performs a network attachment it sends several info to allow the MAG functionality to send a Proxy Binding Update to the LMA for connectivity setup and IP address configuration. The PBU optionally contains, as specified in 3GPP 29275, the Protocol Configuration Options. The LMA receiving the PBU message replies with a PBA message containing the requested information. If the interface between the MAG and LMA for non-3GPP trusted access (S2a) is implemented via Proxy Mobile IPv6 then the MN exchanges DHCPv4, DHCPv6 or Neighbor Discovery messages with the S-GW to trigger the MAG functionality to send PBU messages. This document specifies how to encode PCO options into DHCPv4 and DHCPv6 messages when the host accesses the EPC through a non-3GPP access system i.e. WiMax interface.

2. DHCPv4 option for PCO

This option enables the host using an IPv4 stack to convey PCO data to the access network. The host includes this option in the DHCP Request message sent to the access gateway/NAS (Network Access Server) which acts as the DHCP server or relay.
### 3. DHCPv6 option for PCO

This option enables the host using an IPv6 stack to convey PCO data to the access network. The host includes this option in the DHCP Request message sent to the access gateway/NAS (Network Access Server) which acts as the DHCP server or relay.

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Option Code |   length   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
|                     DATA.......                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Option Code

OPTION-IPv6-PCO (To Be Assigned) – 1 byte.

Length

An 8-bit field indicating the length of the option excluding the ‘Option Code’ and the ‘Length’ fields.

DATA

PCO data that is carried in this message.

Figure 1
4. Option usage

4.1. Usage of DHCPv4 Options for PCO transport

The requesting and sending of the proposed DHCP options follow the rules specified for DHCP options in [RFC2131].

4.1.1. Mobile Node behavior

The mobile node may include PCO data in the DHCPREQUEST message. The MN may receive unsolicited PCO data in the DHCPACK message.

4.1.2. DHCP server behavior

When the DHCP server receives the DHCPREQUEST message with a PCO Option the DHCP server MUST always construct the response according to the requested option.

The DHCP might optionally decide to send PCO data to the mobile node in the DHCPACK message.

4.2. Usage of DHCPv6 Options for PCO transport

The requesting and sending of the proposed DHCP options follow the rules specified for DHCP options in [RFC3315].

4.2.1. Mobile node behavior

The mobile node may include PCO data in the REQUEST message. The MN may receive unsolicited PCO data in the REPLY message.

4.2.2. DHCP server behavior

When the DHCP server receives the REQUEST message with a PCO Option the DHCP server MUST always construct the response according to the requested option.

The DHCP might optionally decide to send unsolicited PCO data to the mobile node in the REPLY message.

5. IANA Considerations

This document defines one new DHCPv4 option:

PCO Option for DHCPv4 (OPTION-IPv4-PCO) To Be Assigned

This document defines one new DHCPv6 option:
6. Security Considerations

The security considerations in [RFC2131] apply. If an adversary manages to modify the response from a DHCP server or insert its own response, an MN could be led to obtain rogue PCO information.

It is recommended to use either DHCP authentication option described in [RFC3118] where available, or rely upon link layer security.

This will also protect the denial of service attacks to DHCP servers. [RFC3118] provides mechanisms for both entity authentication and message authentication.

7. Acknowledgements

8. References

8.1. Normative References


8.2. Informative References

[24008]    "3GPP 24.008 -- Mobile radio interface Layer 3 specification; Core network protocols; Stage 3", December 2008, <3GPP 24008>.
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