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PCP Server Discovery in Mobile Networks with SIPTO
draft-chen-pcp-sipto-serv-discovery-00

Abstract

This document proposes an extension to DHCPv4 Relay information so that a PCP client learns the relevant PCP server deployed in the context of traffic offload.

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[1.](#) Introduction

Given the exponential growth in the mobile data traffic, Mobile Operators are investigating solutions to offload some of the IP traffic flows at the nearest access edge that has an Internet interconnection point. This approach results in efficient usage of the mobile packet core and helps lower the transport cost. Since Release 10, 3GPP starts supporting of Selected IP Traffic Offload (SIPTO) function defined in [\[TS23.060\]](#), [\[TS23.401\]](#).

The SIPTO function described in [\[TS23.060\]](#) allows an operator to offload certain types of traffic at a network node close to the UE's point of attachment to the access network. Traffic Offload Function(TOF) has been defined to make such decisions and enforces NAT for those traffic. The traffic would go through the Mobile Packet Core only if the flow identification doesn't match TOF filters. SIPTO architecture is also explained in [\[I-D.chen-pcp-mobile-deployment\]](#).

[\[I-D.ietf-pcp-dhcp\]](#) specifies DHCP (IPv4 and IPv6) options to communicate Port Control Protocol (PCP) Server addresses to hosts. However, PCP Client on the mobile node will not know whether a flow will traverse the Mobile Packet Core or will get offloaded at the TOF

and hence will not know which PCP server to send its requests to. Even if the mobile node learns its PCP server using DHCP, it will only learn about the PCP server in the Mobile Packet Core since the source of information is the DHCP server in the Mobile Packet Core. The mobile node may never learn the presence of the PCP server at

TOF. This requires TOF to act as a PCP Proxy for the PCP server in the Mobile Packet Core and as a PCP server for the offloaded traffic at the TOF. However, this alone does not solve this problem since the mobile node needs to be informed of the PCP proxy on the TOF.

This document proposes an extension to DHCPv4 Relay Information Option to achieve this objective. This will also ensure that the PCP client will only learn the PCP server address of the TOF.

Note:

- o The SIPTO problem can be addressed for IPv6 either by using NPTv6 [[RFC6296](#)] or associating the mobile device with multiple IPv6 prefixes (one prefix to offload the traffic and other one provided by the Mobile Packet Core for IP Mobility, access to Application Servers in Mobile Packet Core etc). New DHCPv6 Relay Agent PCP Server option will only be required if NPTv6 is used to offload the traffic. However if multiple IPv6 prefixes are assigned to the mobile device then it can use the mechanism explained in [[I-D.ietf-pcp-server-selection](#)] to contact multiple PCP servers.
- o The proposed extension to DHCPv4 Relay Information Option in this document is also useful to solve problems in other deployments like PMIPv6 [[RFC5213](#)] where mobile access gateway can selectively offload some of the IPv4 traffic flows in the access network instead of tunneling back to the local mobility anchor in the home network [[RFC6909](#)].

[2.](#) Terminology

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 [[RFC2119](#)].

[3.](#) DHCPv4 Relay Agent

When DHCPv4 Relay Agent [[RFC3046](#)] is co-located with the TOF, the proposal is for the relay agent to influence the DHCPv4 Server to opt for the PCP server address proposed by the Relay Agent over the one configured on the DHCPv4 Server. The DHCPv4 Relay Agent will insert a new suboption under relay agent information option indicating the IP address of the appropriate PCP server/proxy. For this to happen, the UE MUST ensure that it includes OPTION_PCP_SERVER in the Parameter Request List Option in the DHCPv4 Discover/Request message.

[3.1.](#) Format

To realize the mechanism described above, the document proposes a new PCP Server suboption for the DHCPv4 relay agent information option that carries the IP address of PCP Server. If a PCP server is associated with more than one IP address, all those IP addresses can be listed as part of this option. If there is more than one PCP server, there will be multiple instances of this option each corresponding to a PCP server.

Code	Length	PCP IP address				
TBA	n	a1	a2	a3	a4	...

Code: TBA

Length: Includes the length of the "PCP Server IP address" field in octets; The maximum length is 255 octets. The length should be multiple of 4.

PCP Server IP address: The IP address of the PCP Server to be used by the PCP Client when issuing PCP messages.

[3.2.](#) Relay Agent behavior

A DHCPv4 relay agent MAY be configured to include a PCP Server suboption in relayed DHCPv4 messages. If the source IP address in the DHCPv4 request matches the TOF filter configuration then the PCP Server IP address SHOULD be inserted into the PCP Server suboption.

The PCP Server IP address is determined through mechanisms outside the scope of this document.

[3.3.](#) DHCPv4 Server behavior

The proposed suboption provides additional information to the DHCP server. Upon receiving a DHCPv4 Discover/Request containing the suboption, the DHCPv4 server, if configured to support this suboption, MUST populate the DHCPv4 Offer/Ack with the suggested PCP server IP address overriding any other PCP server IP address configuration that it may already have. There is no special additional processing for this suboption.

[4.](#) Security Considerations

The security considerations in [[RFC6887](#)] , [[I-D.ietf-pcp-proxy](#)] and [section 5 of \[RFC3046\]](#) also apply to this use.

[5.](#) IANA Considerations

Authors of this document request IANA to assign a suboption number for the PCP Server Suboption from the DHCP Relay Agent Information Option [[RFC3046](#)] suboption number space.

[6.](#) Acknowledgements

TODO

[7.](#) Change History

[Note to RFC Editor: Please remove this section prior to publication.]

[8.](#) References

[8.1.](#) Normative References

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