Using PCP to Reveal a Host behind NAT

draft-boucadair-pcp-nat-reveal
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Overall Context

• RFC6269 identifies issues with address sharing
• An important concern is how to identify a host among those sharing the same address
  – Various use cases: e.g., PCC architecture
• This document focuses on concrete use cases which are seen as issues to be solved in current deployments
Problem

How to correlate between the external IP address:port and the IMSI (or other internal identifier)?

- **AF** is some server in the mobile network (or could be a third party server trusted by the mobile network)
  - e.g., HTTP streaming server.
- How the PCRF can enforce the required QoS policies on the PCEF?
- Subscriber-based charging will fail
  - E.g., UE has a quota on the amount of video to watch after which subscriber is billed differently, UE billed based on number of bytes exchanged etc.
The Problem can be Generalized

- This problem is valid for any policy-based architecture [RFC2753]
  - PDP (Policy Decision Point)
  - PEP (Policy Enforcement Point)
Solution

Cellular Network – Evolved Packet Core

- Issue PCP QUERY to retrieve the internal IP @:port associated with the external IP Address

- Embed a PCP Client
- Embed a PCP Server

With this proposed technique, PCRF can create required bearers/setup QoS on PCEF so that the flow is prioritized accordingly based on the profile of UE with required bitrate.

- Policy Charging and Control (PCC) can identify the subscriber for accounting.
Query OpCode: Request

- PCP QUERY request is used by an authorized third party PCP client that is only aware of the 5-tuple \{External IP address and Port, Protocol, Remote Peer IP address and Port\} and needs to learn the Internal IP address and Port associated with the NAT mapping.
Query OpCode: Response

<table>
<thead>
<tr>
<th>Mapping Nonce (96 bits)</th>
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</thead>
<tbody>
<tr>
<td>Protocol</td>
</tr>
<tr>
<td>Reserved</td>
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<tr>
<td>External Port</td>
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<tr>
<td>Internal Port</td>
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<tr>
<td>External IP Address (128 bits)</td>
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<tr>
<td>Internal IP Address (128 bits)</td>
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</tbody>
</table>

- If Protocol, External Port and External IP address match an existing implicit dynamic mapping, then the PCP server builds a QUERY response with the Internal IP address, Internal Port and the lifetime associated with the mapping.
Clarifications

• The proposed solution assumes *the PCP Client and the PCP Server are under the same administrative entity*

• The proposed solution does not change the PCP machinery; in particular its *does not require to serve PCP requests on the Internet-facing interface*

• The proposed solution *does not modify PCP state*
Conclusions

• This is a missing piece of work
• There is a real need for this extension (3GPP PCC Architecture)
• The proposed solution is simple

• Consider WG adoption?