Using PCP to Reveal a Host behind NAT
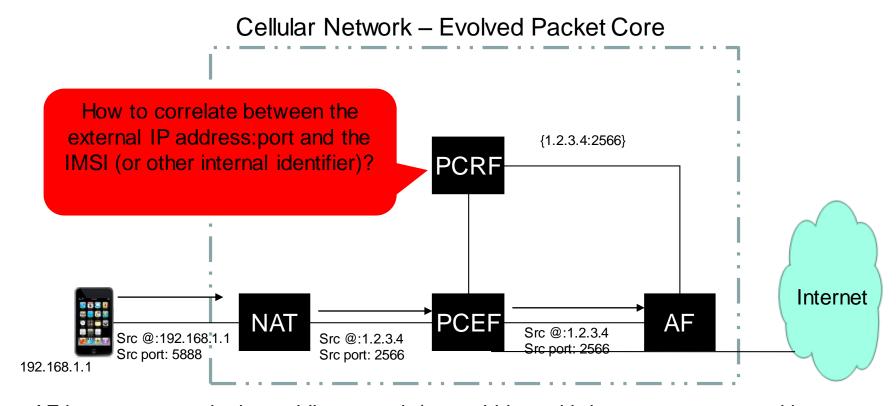
draft-boucadair-pcp-nat-reveal

IETF 87-Berlin, July 2013

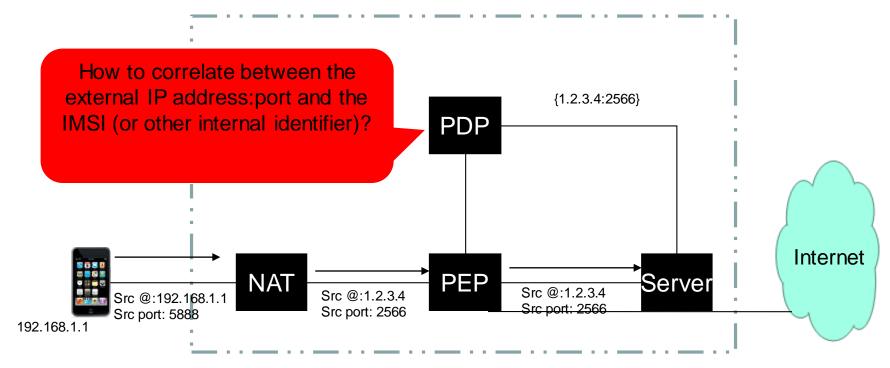M. Boucadair, T. Reddy, P. Patil & D. Wing

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

Cellular Network – Evolved Packet Core

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

PCRF

{1.2.3.4:2566}

Internet

NAT

Src @:192.168.1.1
Src port: 5888

192.168.1.1

Src @:1.2.3.4
Src port: 2566

PCEF

Src @:1.2.3.4
Src port: 2566

AF

- 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.
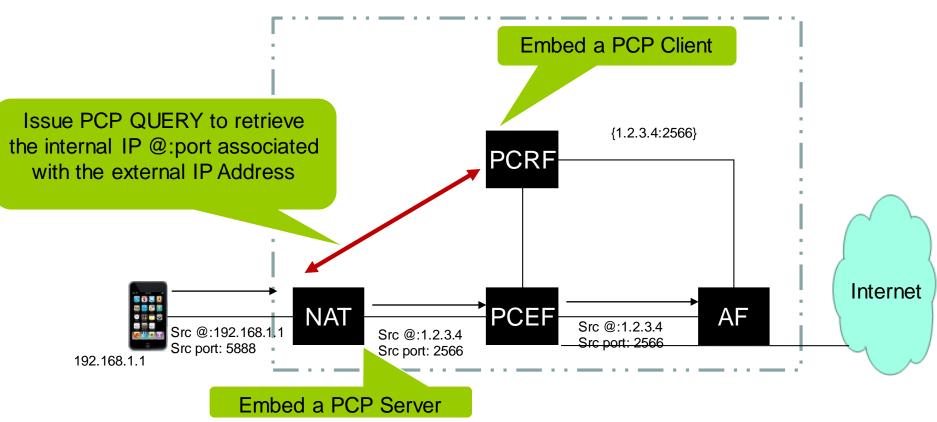
3

The Problem can be Generalized

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

PDP

{1.2.3.4:2566}

Internet

NAT

PEP

Server

Src @:192.168.1.1
Src port: 5888

192.168.1.1

Src @:1.2.3.4
Src port: 2566

Src @:1.2.3.4
Src port: 2566

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

Solution

Cellular Network – Evolved Packet Core

Embed a PCP Client

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

{1.2.3.4:2566}

PCRF

Internet

NAT

PCEF

AF

Src @:192.168.1.1
Src port: 5888

Src @:1.2.3.4
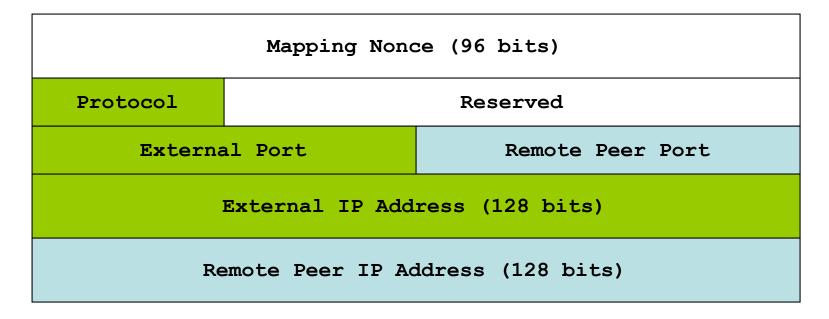Src port: 2566

Src @:1.2.3.4
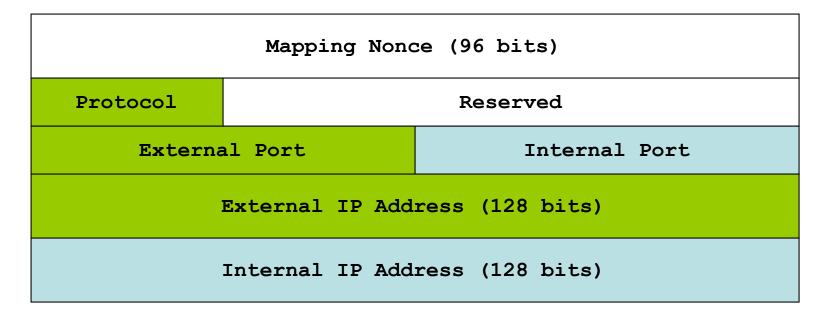Src port: 2566

192.168.1.1

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

Mapping Nonce (96 bits)		
Protocol	Reserved	
External Port		Remote Peer Port
External IP Address (128 bits)		
Remote Peer IP Address (128 bits)		

- 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

6

Query OpCode: Response

Mapping Nonce (96 bits)		
Protocol	Reserved	
External Port		Internal Port
External IP Address (128 bits)		
Internal IP Address (128 bits)		

- 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?