

Extensions to PCP

draft-boucadair-pcp-extensions

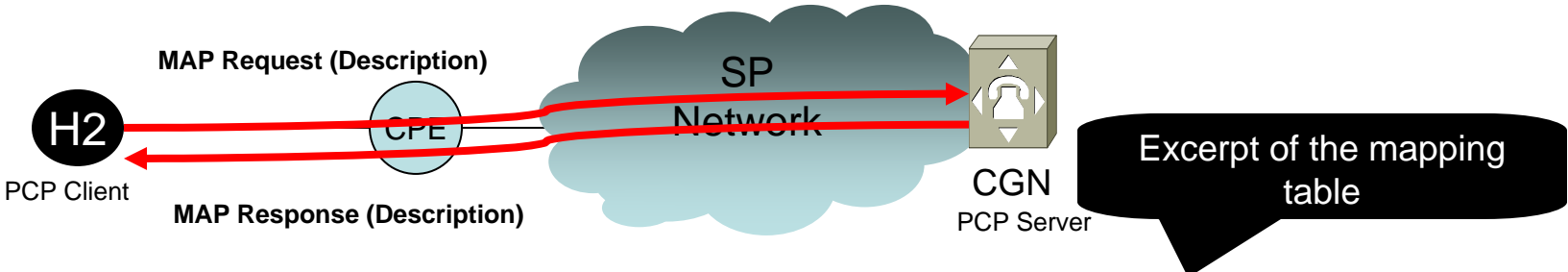
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M. Boucadair, R. Penno, D. Wing

Scope

- This document defines several extensions to PCP
 - Presented as PCP Options
 - But some of them could be defined as PCP OpCodes

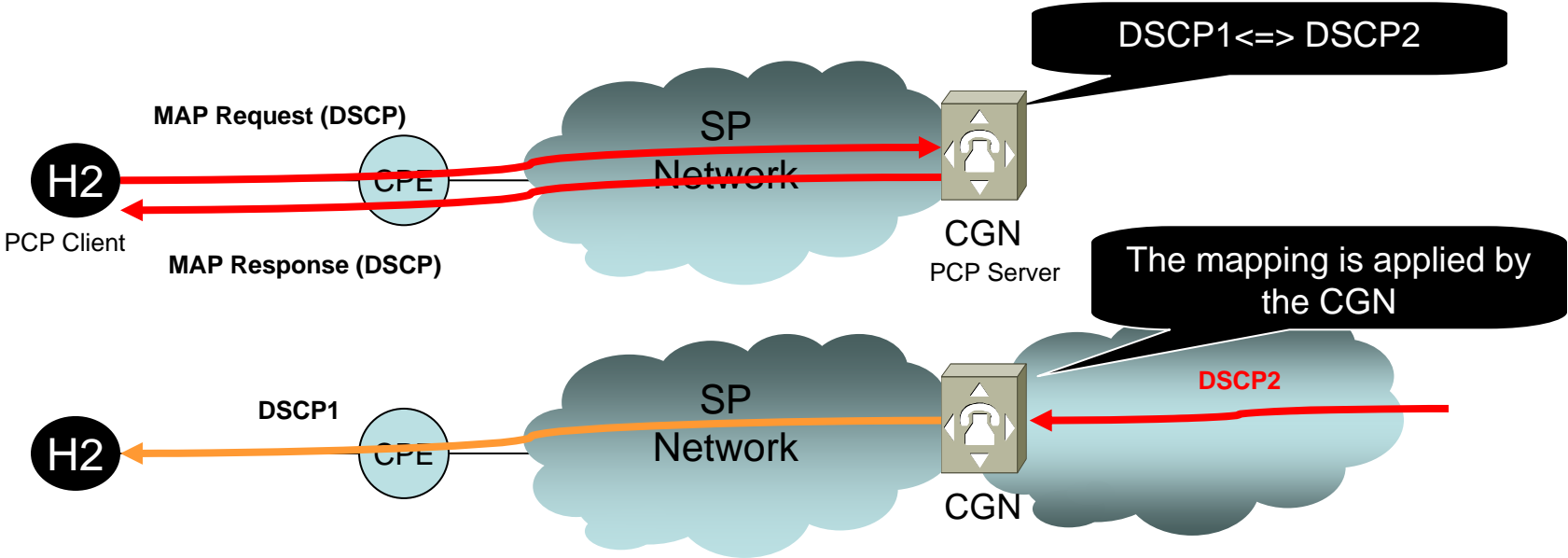
Description Text for a Binding



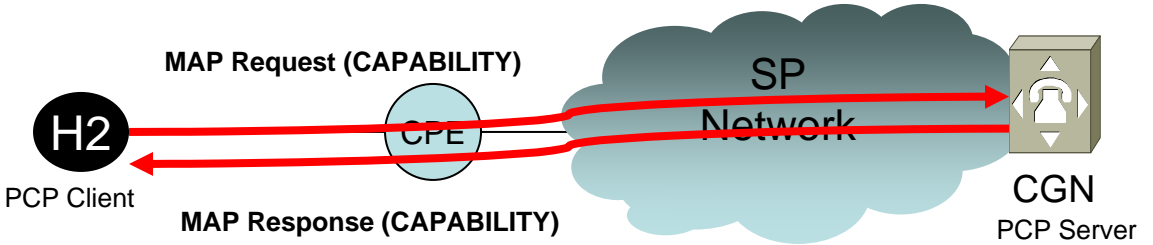
Internal IP Address	Internal Port	External IP address	External Port	Description
10.1.2.3	5060	1.2.3.4	16597	To access my WebCam from outside

Associate a free description text with a mapping
The PCP Server limits the length of the description text
It returns the stored description data to the PCP Client in the PCP Response

Enforce a DSCP Marking Policy



Acquire PCP-Controlled Device Capabilities



Position	Name	Meaning
1	From (F)	0=from IPv4, 1=from IPv6
2	To (T)	0=to IPv4, 1=to IPv6
3	Port-Xlate (P)	1=translated, 0=not translated
4	Addr-Xlate (A)	1=translated, 0=not translated
5	Port-Set (S)	1=enabled, 0=not supported
6	Packet-Control (C)	1=enabled, 0=not supported
7	Direction-Out (I)	1=enabled, 0=disabled
8	Direction-In (O)	1=enabled, 0=disabled

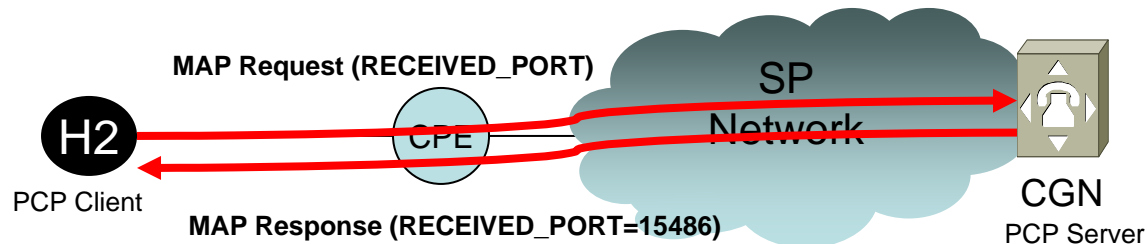
A NAT44 would be characterized as

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From=0 (IPv4)
To=0 (IPv4)
Port-Xlate=1 (Yes)
Addr-Xlate=1 (Yes)
Port-Set=0 (No)
Packet-control=0 (No)
Direction-out (O) (No)
Direction-In=0 (No)

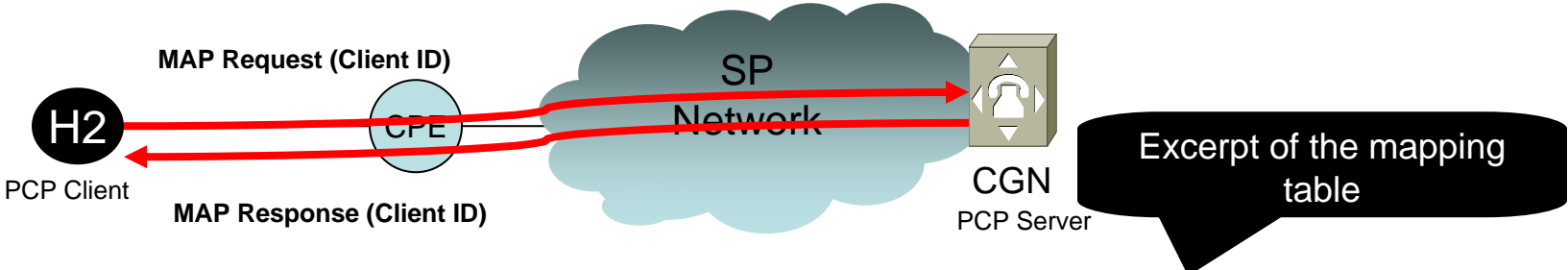
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Detect NAT Presence in the Forwarding Path



Retrieve the assigned port number: can be used together with the PCP Client's IP Address to detect whether there is a NAT in the path

Make Sure PCP Id is Persistent Through Various Conditions



Client-ID	Internal IP Address	Internal Port	External IP address	External Port
4576732139 7231	10.1.2.3	5060	1.2.3.4	16597

Persistent PCP Identifier during CPE reboot or IP address change

Avoid stale mapping entries in the PCP Server
Allows to refresh the mapping when a new IP prefix/address is assigned

Next Steps

- Comments are welcome
- Should we define each option as individual documents?

PCP Failure Scenarios

draft-boucadair-pcp-failure

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M. Boucadair, F. Dupont, R. Penno

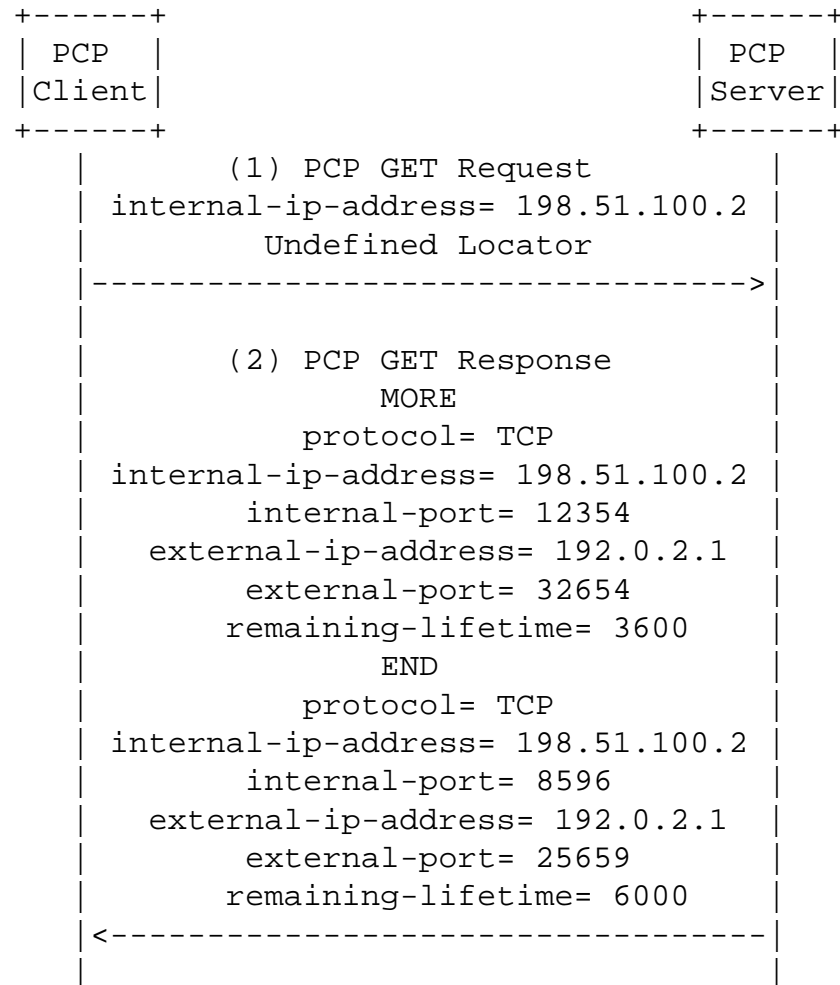
Scope

- Document PCP failure scenarios:
 - PCP Client crash
 - Application crash
 - PCP Server failures
 - Discussion on PCP Server redundancy mode: (1) State Redundancy is Enabled, (2) Cold-Standby without State Redundancy and (3) Anycast Redundancy Mode
 - Change of the IP address of the CPE WAN I/F
 - e.g., how an IPv4 host connected to a DS-Lite CPE is aware that a new IPv6 address is used by the B4?
 - Host failure
 - Change of Internal IP address (3rd party case)
- Some failure modes may lead to stale mappings and therefore burn out per-user quota
 - Access to the service may be impacted
- Document a mechanism for state synchronization purposes between client and server

State Synchronization Procedure

1. One element (i.e., PCP Client/host/application, PCP Server, PCP Proxy, PCP IWF) of the chain is **REQUIRED** to use stable storage
2. If the PCP Client (resp., the PCP Server) crashes and restarts, it synchronizes with the PCP Server (resp., the PCP Client)
3. If both crash, then one has to use stable storage and we fall back in the previous case as soon as we know which one (the Epoch value provides this information)

GET/NEXT Flow Example



Next Steps

- Comments are welcome
- WG adoption?

Reserving N and N+1 Ports with PCP

draft-boucadair-pcp-rtp-rtcp

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M. Boucadair, S. Sivakumar

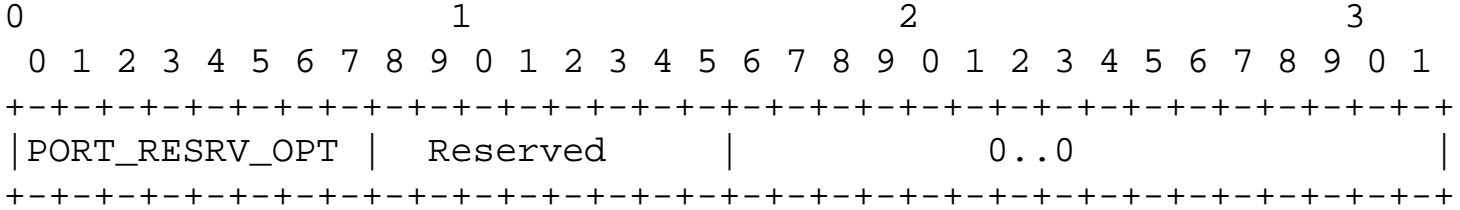
Scope

- Defines a new PCP Option to reserve a pair of ports (N and N+1) in a PCP-controlled device while preserving the parity and contiguity
 - Use Case: Ease the NAT traversal for RTP/RTCP flows when “a=rtcp” attribute is not deployed
 - The proposed PCP Option
 - Preserves the port parity as discussed in Section 4.2.2 of [RFC4787]
 - Preserves port contiguity as discussed in Section 4.2.3 of [RFC4787] (i.e., RTCP=RTP+1)

Benefits

- Does not overload the CGN with dedicated ALGs
 - Performance optimization
- Pros
 - Improves behavior of SBE (Session Border Element) e.g., SBC, P-CSCP, Outbound Proxy Server, etc.
 - Hosted NAT Traversal, media latching, etc. can be avoided
 - Reduces risk of SBE and NAT overload
 - No need to issue frequent REGISTER messages to maintain the NAT binding (SIP case)
 - The activation of Hosted NAT traversal techniques in some operational network elements (e.g., SBC) severely affect the overall performance of the device (up to 60%)
 - Works for unidirectional media streams (e.g., announcement server, IVR, etc.)

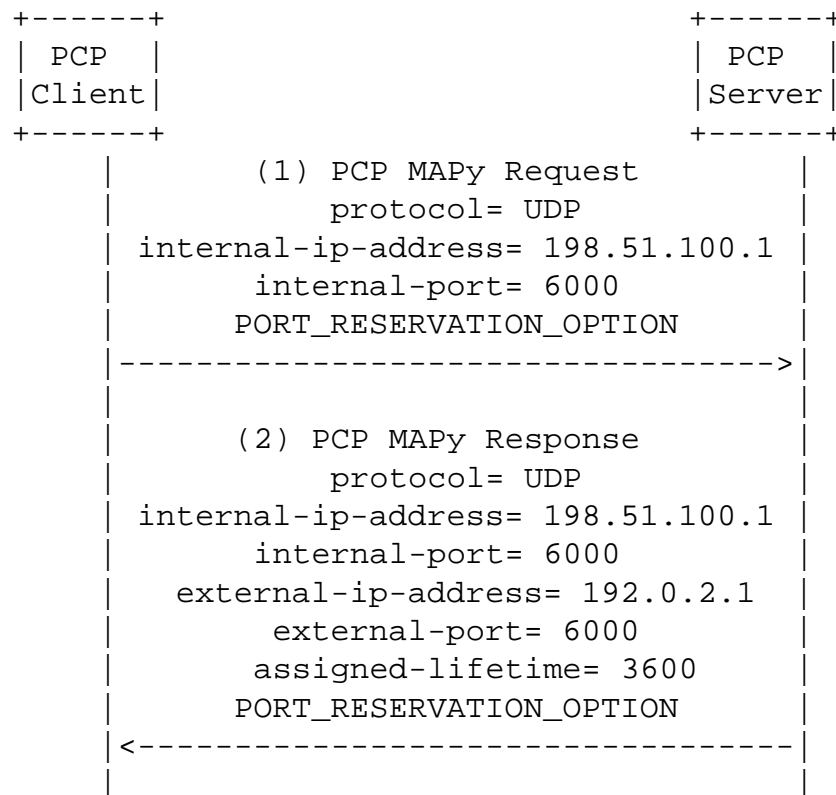
PCP Option



This Option:

- Name: Port Reservation Option (PORT_RESRV_OPT)
- Number: TBA (IANA)
- Purpose: Used to retrieve a pair of ports
is valid for OpCodes: MAP4, MAP6
- Length: 0
- May appear in: both request and response
- Maximum occurrences: 1

Flow Example



Status & Next Steps

- All received comments have been covered
- WG adoption?