Using PCP To Coordinate Between the CGN and Home Gateway Via Port Allocation

draft-tsou-pcp-natcoord-05

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Context Reminder

- The requirement on CGN processing capability grows with increasing subscribers
- Delegating NAT function to the Home Gateway will offload the burden on CGN
- Application scenario: Lightweight 4over6
  - *http://tools.ietf.org/html/draft-cui-softwire-b4-translated-ds-lite-05*
  - Given, PCP is already used to instruct individual mappings and PCP provides a flexible means for port set management, **we need to extend PCP with the ability to reserve port sets** instead of individual mappings

Changes Since -04

- Define a new OpCode to request a range of ports: MAP_PORT_SET
  - Avoid overloading MAP
  - Ease separating the port-range function from the handling of individual mappings

- Define two Options to assign port sets:
  - Port Range: To convey contiguous and non-contiguous port-set
  - Random Port Range: To convey pseudo-random port-set

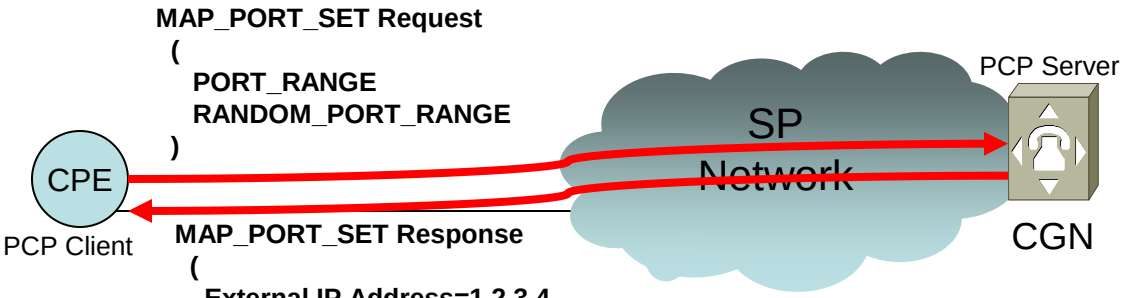
Procedure Overview

- Two port-set PCP Options MUST be supported
- Several policies can be enforced in the PCP Server's side
  - Size of the port range to allocate
  - Enable random port sets
  - Allow several port sets
  - Port Quota
  - Assign WKP
- The PCP Server MUST maintain a binding for each port set allocation
  - {PCP Client IP Address, (External IP Address, Port Set)}

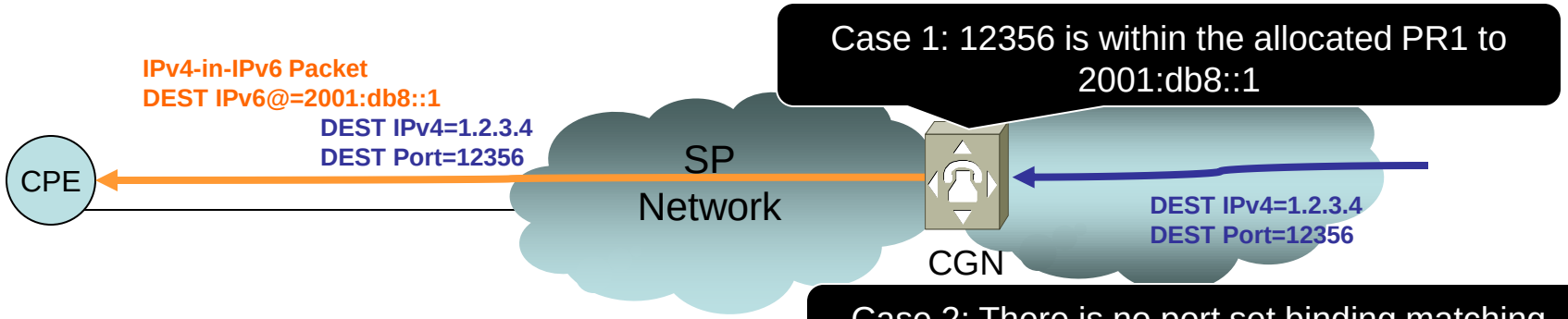
Procedure Overview (Cont'd)

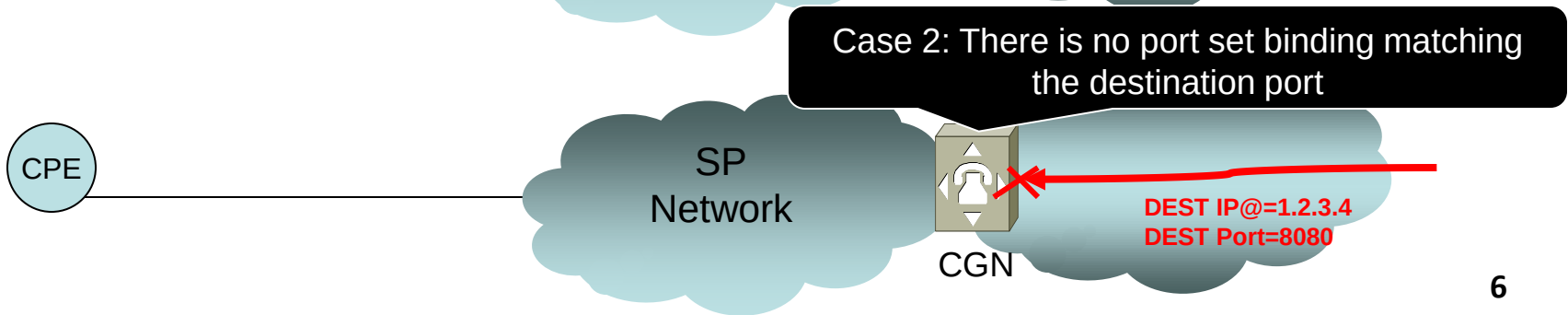
- Generating a MAP_PORT_SET Request
  - Contains at least one of the port-set Options
  - PREFERE_FAILURE can be used if required
  - It is up to the PCP Server to assign a free port set
- Renewing a MAP_PORT_SET Mapping
  - Lifetime refresh: Similar to the base PCP specification
- Processing a MAP_PORT_SET Request
  - The whole port-set should be treated consistently
  - If an error is encountered, use an appropriate error code from the list defined in the base PCP specification

Port Set Example



PCP Client IP Address	External IP address	External Port Range
2001:db8::1	1.2.3.4	PR1

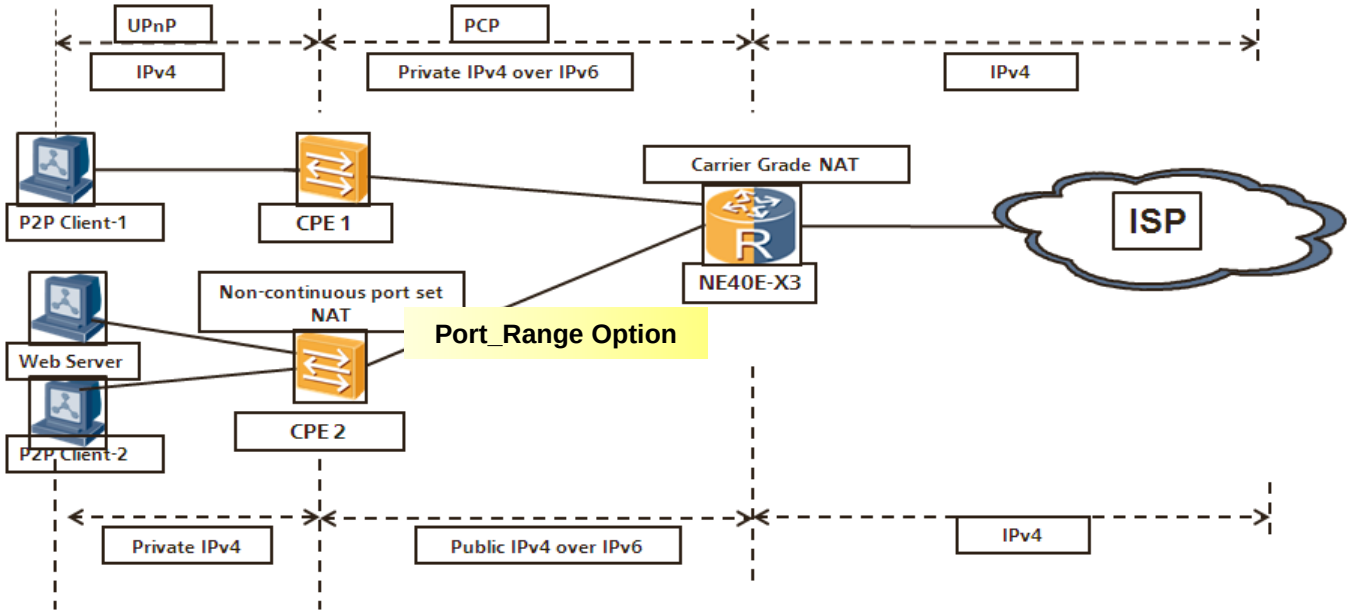




Next Steps

- Discussion
  - Is there a justification to allow THIRD_PARTY Option to be used for MAP_PORT_SET?
  - The current version focuses on Lw4over6, is there a use case for double translation?
- Adopt the document as WG item
- You can download the source code of MAP_PORT_SET from
  - *http://sourceforge.net/projects/pcpportsetdemo/*

Port-Set Options implementation



- CPE2
  - PCP Client with Port_Range Option and NAT Support
- Carrier Grade NAT
  - PCP Server with Port_Range Option and NAT bypass Support
- Web Server
  - Configure NAT Pinhole on CPE2
- More Info
  - pcp demo in IETF#81: http://www.internetsociety.org/articles/new-technology-demo-pcp
  - Open source code: http://sourceforge.net/projects/pcpclient/?source=directory