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

**draft-tsou-pcp-natcoord-09**

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Q, Sun, M. Boucadair, X. Deng, C.Zhou, T. Tsou, and S. Perreault (Presenter)

# 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.

- In this case, the Home Gateway would need the external address and restricted port-set
  - 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

# Why do we need PCP extension?

- PCP based extension is more suitable for the following situation:
  - Operators who do not have existing DHCPv4 server.
  - PPP extension can only be used when TC is deployed in BRAS, but not for higher layer.
  - Dynamic port-set allocation when one subscriber needs multiple port-sets when necessary.
  - Operators planning to migrate the DS-Lite AFTR to behave as a port range router
- A new Opcode is defined
  - Avoid overloading MAP
  - Ease separating the port-range function from the handling of individual mappings

# Changes since -07

- Update the PORT_SET_Nonce field to 96 bit
- Encode the port-set in contiguous port mask, and remove the Cryptographically_Random_Port_Range option
- Add coexistence with MAP
  - Normally, the PCP server for MAP_PORT_SET will not run NAT. So the PCP server will not usually run MAP and MAP_PORT_SET OpCode for the same subscriber.
  - In case the PCP server keeps the NAT bindings for some special-purpose applications, the external address and the port allocated to the subscriber should be consistent with the ones in MAP_PORT_SET response.

# Changes since -07 (cont')

- Add security consideration
  - The same security considerations discussed in [I-D.ietf-pcp-base] have to be taken into account.
- Add failover consideration
  - Section 14 in [I-D.ietf-pcp-base] and [I-D.boucadair-pcp-failure] can be applied.
  - The amount of Mapping entries in MAP_PORT_SET PCP server is much less than MAP. Therefore, the cost of state synchronization has been greatly reduced in MAP_PORT_SET.
- Ensure that the PCP server will not allocate overlap port-set and only assign individual port-set mapping.
- Remove the sentence indicating no-NAT a special feature of MAP_PORT_SET in PCP-controlled device.

# Comments from ML/Vancouver

- The sentence indicating no-NAT a special feature of MAP_PORT_SET in PCP-controlled device is not accurate.
  - *Solved => section 1*
- How does pcp-natcoord ensure the subscriber's equipment and the service provider equipment have the same configuration ?
  - *Indicate PCP server uses Internal address as an index and only non-overlap port-set mappings can be allocated. =>* section 3.3
- The Client MUST use a different Mapping Nonce for different MAP_PORT_SET requests. What breaks ?
  - *Explained in ML*
- Which UDP port does the CPE send that PCP request, if it does not yet already know the port range assigned to the CPE?
  - *Explained in ML. MAP_PORT_SET can be sent over either address family when Internal address is different.*
- PCP server should not support multiple port-set mappings for one subscriber.
  - *RECOMMENDED to configure the server to assign the maximum allowed port set in a single response. => Section 3.3*

# Running Code/Implementation

- Running code
  - http://sourceforge.net/projects/pcpportsetdemo/
- Implementation
  - China Telecom
  - France Telecom
  - Huawei
  - Fiberhome
  - Broadcom
  - GreenNet
  - Yamaha


- We already have run field trial/test in China Telecom

# Interop Test

- We have run an Interop test among 5 participants.
  - PCP Clients
    - Huawei
    - Yamaha
    - BII
    - Fiberhome
    - GreenNet

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  - PCP Server
    - Huawei
    - BII
    - GreenNet

| Test Function |
| --- |
| PCP Request |
| PCP Response |
| PCP renew |
| PCP release |
| PCP Error Process |
| PCP failover |
| …… |

- The test result is quite good, and it is simple to implement.

# Next Steps

- We have solved all the technical problems.
- We have running code/implementers/Interop/ Field Trial.

- Adopt the document as WG item ?