

# PCP Client: Implementation Experiences

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# 1. Scope

- Implementation of PCP Client:
  - PCP Base I-D v13;
  - Added Port Reservation; <http://tools.ietf.org/html/draft-boucadair-pcp-rtp-rtcp-02>
  - THIRD\_PARTY option not supported.
- Platform – MeeGo (A Linux based platform):



- PCP Client Core + Graphical User Interface (for interop testing).

## 2. PCP Client Core

- PCP Client was implemented in C in user space daemon.
- Multithread client:
  - 1. New PCP Requests handler;
  - 2. Incoming PCP Responses listener;
  - 3. Schedule manager (e.g. refresh mappings, resend requests).
- Built around two lists (1:1 relation):
  - **Mappings;** (NOT\_SENT / WAIT\_RESP / MAPPED / REFRESHING / ERROR\_WAIT\_RESEND)
  - **Actions.** (when to refresh, when to resend request, etc...)

# 3. Implementation Considerations (1)

- The PCP Client must maintain the state of each mapping requested in a similar way the PCP Server does.
  - Needs to manage each mapping.
- As per Rev 13, if the PCP client realizes that the server has lost state, it will flood the PCP server with requests for the mapping the client is aware of.
- - So we decided to send requests at 0.5 sec intervals
- Needed to use connected UDP sockets to get PCP server address.

# 3. Implementation Considerations (2)

- Only one server address is supported.
  - For a Dual-stack client (v4 and v6 default gw), which PCP server to use is the absence of a configuration file? We decided that IPv6 default gw takes precedence.
- Client must track changes on the default route to check if the PCP server is reachable.
  - Can use Linux NETLINK for this. Adds complexity to the code.
- The I-D does not state what to do in case of receiving Port Unreachable from the server.

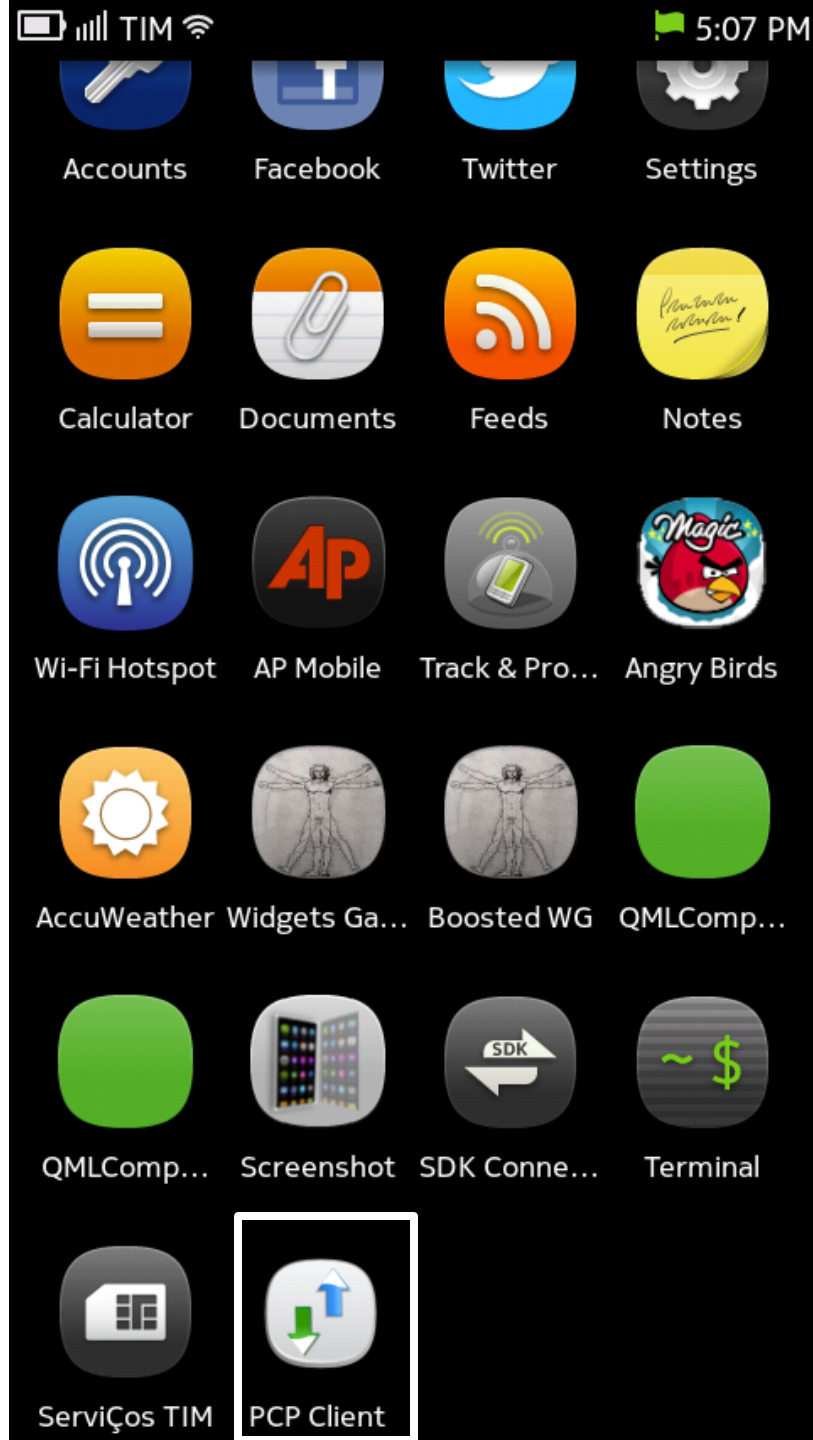
# 3. Implementation Considerations (3)

- The I-D was ambiguous about what fields the PCP server must copy into the PCP Request packet in case of a result code different than zero.
- As per rev 13 it was not clear if the O bit can be set by the client or if it was part of the Option definition, which means that Option numbers less than 128 are always mandatory.
- When sending delete all mappings request (lifetime, int\_port, proto are zero) what opcode should be used?

# 4. Graphical User Interface

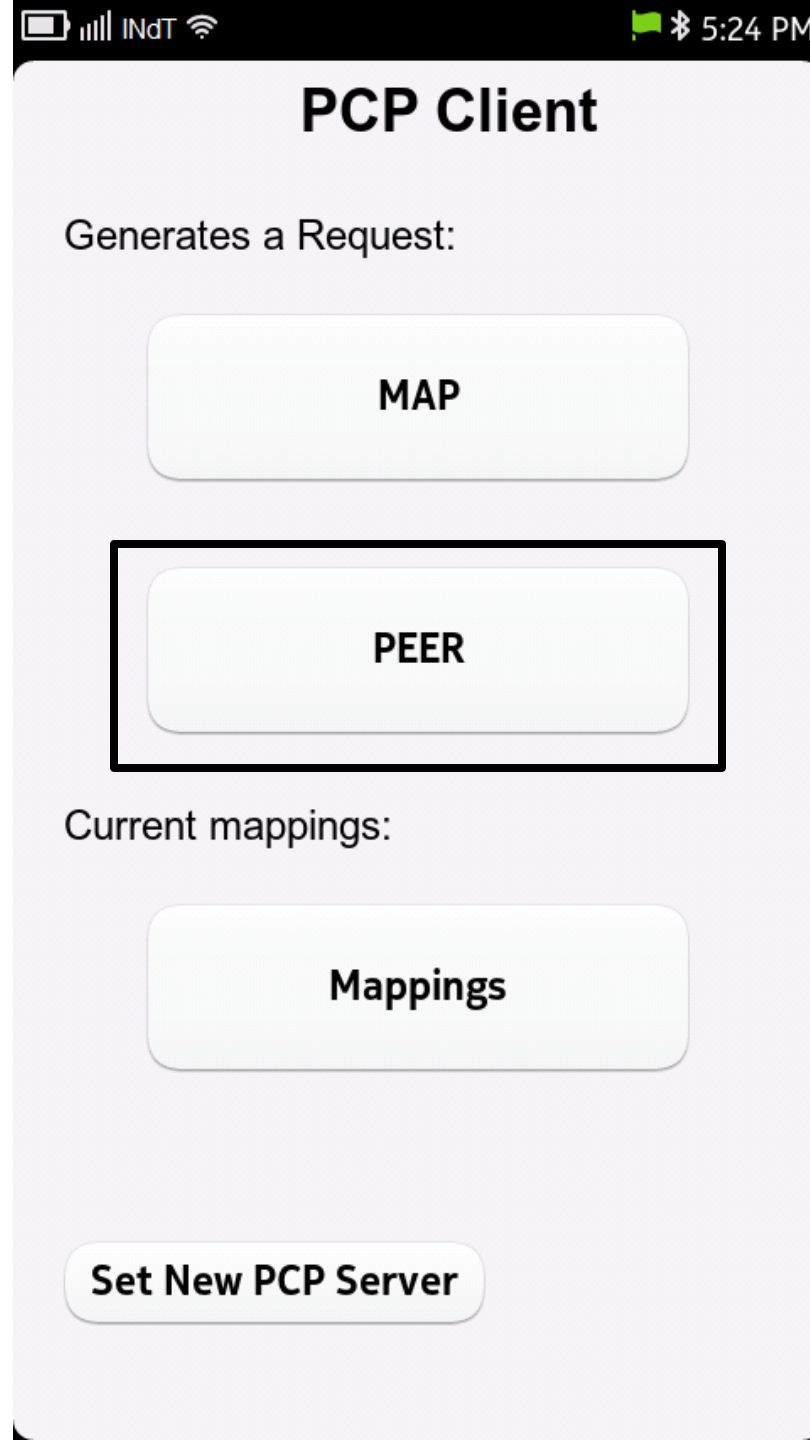
- Instead of trying to modify some software to use the PCP Client API, we decided to use a GUI just for testing the PCP Client Behavior.
  - Simulates an application that needs mappings.
- Developed in Qt, using QML and C++.

# 3. GUI





# 3. GUI



# 3. GUI

The screenshot shows an iPhone interface. At the top, the status bar displays signal strength, 'INdT', Wi-Fi, and the time '5:00 PM'. The main content area is titled 'Active TCP Connections' and features a 'Refresh' button in the top right corner. Below the title is a table with two columns: 'Source' and 'Remote Peer'. The table contains four rows of data, with the first row highlighted by a black border. Below the table, a dialog box prompts the user to 'Select the number of connection:'. The dialog includes a back arrow on the left, a button with the number '1', an 'Ok' button, and a 'Skip' button.

	Source	Remote Peer
1.	10.80.30.128:58962	199.59.149.200:80
2.	10.80.30.128:56881	10.80.30.128:22
3.	10.80.30.128:50662	174.129.4.72:80
4.	10.80.30.128:22	10.80.30.128:56881

Select the number of connection:

← 1 Ok Skip

# 3. GUI

INdT 5:00 PM

\*opCode:  PEER4  PEER6

\*Requested Lifetime:

\*Protocol:

Internal Address:

\*Internal Port:

\*Remote Peer IP Address:

\*Remote Peer Port:

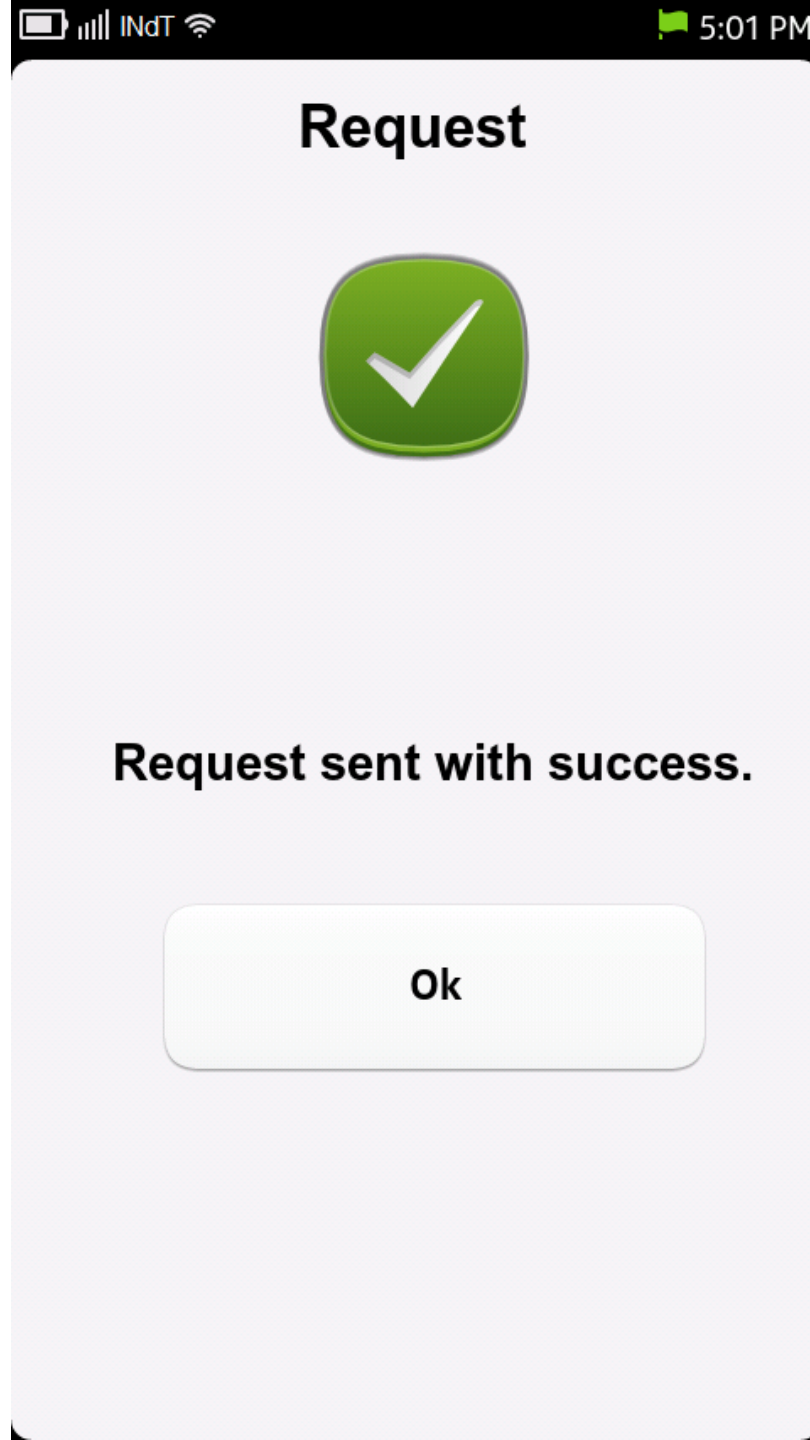
External IP Address:

External Port:

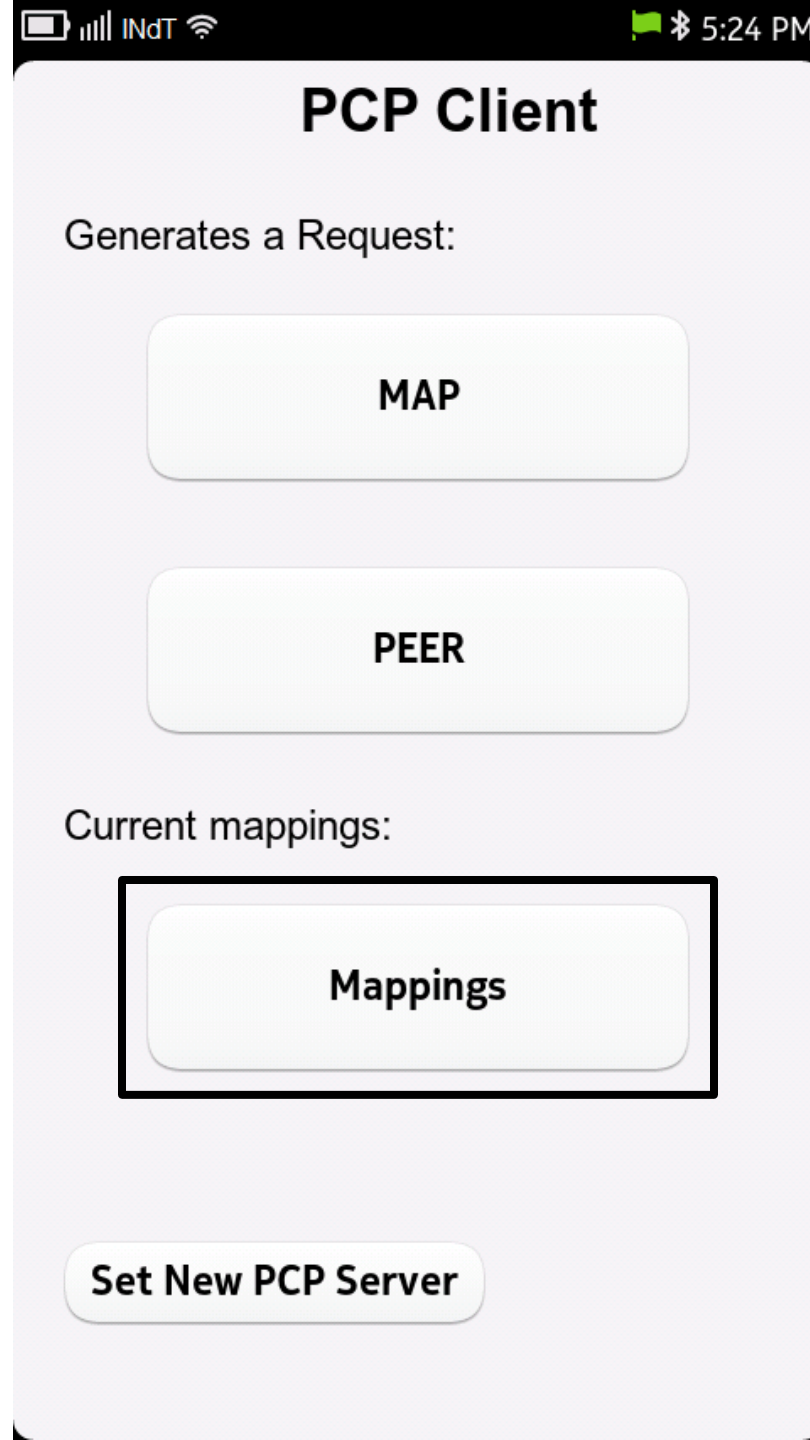
**Send Request**

← ☰

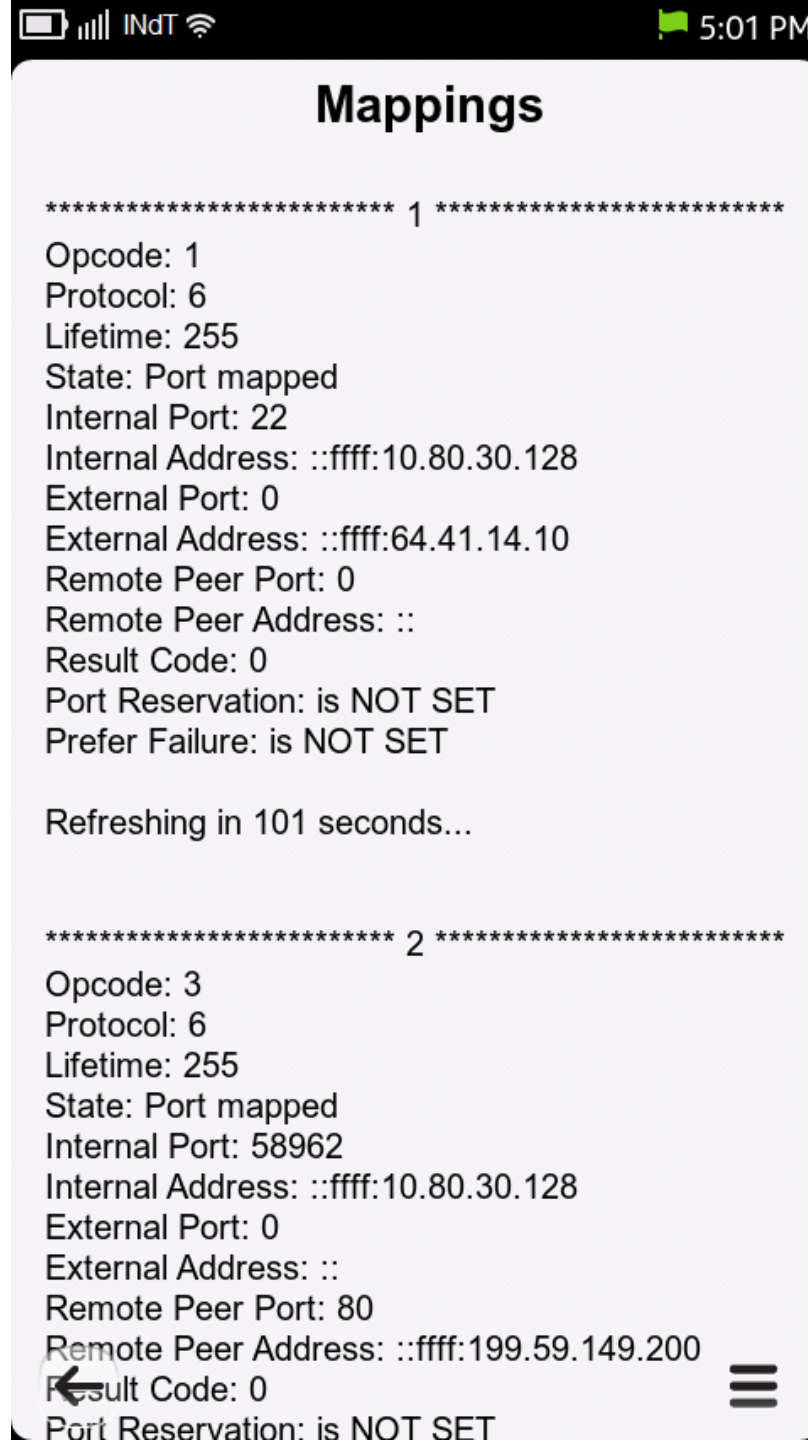
# 3. GUI



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# 3. GUI



# Questions?

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