Analysis of Port Control Protocol in Mobile Network

draft-chen-pcp-mobile-deployment-02

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Status

- The work had been presented at IETF#83, 84, 85 during PCP session
- We are encouraged to improve the draft and presented here to solicit feedback from wider audiences

Motivation

- It’s highly desirable to adopt PCP in Mobile networks
  - Keepalive Message Optimization
  - Energy Saving on terminals
  - Restoring Internet Reachability
  - Balance Resource Assignment
- Why is the document needed?
  - Encourage devices with low battery resources to embed a PCP client
  - Promote PCP in mobile operator’s networks
  - Harmonize considerations towards PCP designers/ implementers

Covered Topics

- Deployment architecture
- PCP Server Discovery
- MN and multi-homing
- Refresh Consideration
- Unsolicited Messages Delivery
- SIPTO Architecture
- Authentication Consideration

P1: PCP Server Discovery

- Issues: DHCPv4 is not available in 3GPP network on a wide scale. I-D.ietf-pcp-dhcp can’t be applied in the case
- Recommendations:
  - Using default router (require integration of NAT with GW)
  - Using PTR resolving (require operational planning, may not scale effectively)
  - Extending Protocol Configuration Options (PCO) in 3GPP spec (require additional 3GPP efforts)

P2: multi-homing

- Issues: PCP basically presumes to be applied in a single-homed model. However, multiple PDP contexts are allowed on a MN, on which multi-homed situation is retained
- Recommendations: MN has to be able to manage multiple PCP server cases

P3: Refresh

- Issues
  - Default MRD would result MN always staying active (prevent MN from moving to idle)
  - It would get worse when multiple PCP clients located on MN
- Recommendations
  - The configuration of MRD is matched with timers assigned by a radio link
  - A time-line observer mechanism may be helpful to control different PCP client behaviors resending requests within an optimal transmission window, e.g. adjusting IRT to synchronize different requests

P4: Unsolicited Messages Delivery

- Issues
  - Radio link is normally incapable of multicast
  - A unicast delivery may generate floods of messages e.g. multiple thousands of MN that were served by a PCP server would be implicitly paged.
  - Care should be taken when unsolicited messages are required
    - the mapping changed due to renumbering
    - the PCP server (or NAT) lost its state

P5: SIPTO Architecture

- Issues: traffic would be offloaded at a particular points; the host could not determine which egress path packets would take
- Workaround
  - Potential solution has been documented in I-D.rpcw-pcp-pmipv6-serv-discovery
  - More considerations should be taken into account in 3GPP network, in which radio layer ID, instead of 5-tuples, to identify the local offload context. Mapping functions between ID& 5-tuples are needed

P6: Authentication

- Issues: provisioning of new credentials to mobile devices is a difficult task
- Workaround
  - In-band solution: using EAP-SIM/EAP-AKA/ EAP-AKA' authentication is feasible way in 3GPP
  - Out-band solution: 3GPP GAA (Generic Authentication Architecture)

Comments/Questions?