PCP Working Group
Internet-Draft
Intended status: Informational
Expires: September 7, 2011

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March 6, 2011

Requirements for Always Online Applications
draft-cao-pcp-mobapp-online-00

Abstract

This document discusses several requirements for always online mobile applications which reveals that PCP only solution does not fill the gap.

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1. Introduction

This document discusses several requirements for always online mobile applications which reveals that PCP only solution does not fill the gap.

1.1. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL","SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

2. Scenario and Problems

Figure 1 depicts the secenario of the mobile network environment. BS is the radio Base Station which provides wireless connectivity to the MN. The MNG/FW is the MN's default router which provides IP address management and NAT/Firewall functionality. The Border Router (BR) as the name implies, borders the Internet for the mobile network. The BR does not perform subscriber management for the mobile network. The mobile application server is server on the Internet that provides application layer service to the MN.

To make the mobile application behave like always online, there are several states that need to be kept. Below, we take Instant Message applications as an example,

1. Mobile App Server: the server needs to know if the mobile client is still active and if the mobile node is still on-line. Mobile application developers always make the mobile client send keep alive messages at an interval.
2. NAT state: The GW/FW needs to keep the NAT binding state for the TCP/UDP mappings. Once the NAT states staled, the mobile application server is not able to push messages to the mobile client.
3. IP address state: the mobile network normally uses the so called "packet data protocol (PDP)" to manage the IP connection with the MN.
4. Wireless Channel State: when packets are ready, the mobile node needs to acquire the wireless channel in order to receive or transmit those packet.

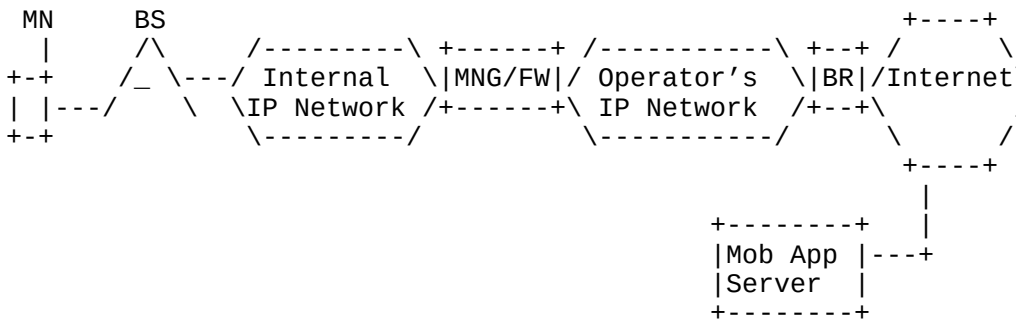

Figure 1: Mobile Client/Server Applications

3. Requirements for Always-online Mobile Applications

The requirements that need to be addressed by an always-online mobile applications.

3.1. R1: Support for NAT and Firewall State Keep-alive

Mapping states on the NAT box or Firewall should be retained in order to make the MN visible and reachable from outside. PCP [I-D.ietf-pcp-base] is an instant solution this problem, however it does not take into account the other problems as list below.

3.2. R2: Keep the State on Mobile App Server

The mobile application server needs to keep track of the mobile node in order to know the status of the mobile application. For example, mobile Instant Message servers need to know the MN's presence status and notify their friends accordingly.

Note: most mobile applications send keep alive messages between the MN and the server in order to keep the state on both the App Server and the NAT/FW.

3.3. R3: Keep the State on Mobile Network Gateway

The IP connection between the MN and Mobile Network Gateway (MNG) is managed by a certain Packet Data Protocol (PDP) in the mobile network. The MNG frequently releases the resources and state of IP connection after a setup timeout. In order to make the mobile applications always online, the state on the MNG should be

maintained.

3.4. R4: Relieve Burden on Air Interface

In order to maintain any states mentioned above, it necessarily send many small packets between the MN and MNG or MN and the APP Server which incurs a huge burden on the air interface. Whenever transmitting packets, one dedicated channel is required. When the channel is released, the paging procedure is triggered. Both of these incur a lot of signalling on the air interface. It is highly indispensable to relieve the burden on air interface.

4. Security Considerations

TBD.

5. IANA Considerations

This document does not require any IANA actions.

6. Normative References

[I-D.ietf-pcp-base] Wing, D., Cheshire, S., Boucadair, M., Penno, R., and F. Dupont, "Port Control Protocol (PCP)", draft-ietf-pcp-base-06 (work in progress), February 2011.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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