Network Working Group   G. Tsirtsis
Internet-Draft   V. Park
Intended status: Standards Track   V. Narayanan
Expires: August 26, 2012   Qualcomm
                                                              K. Leung
                                                                 Cisco
                                                     February 23, 2012

                  Dynamic Prefix Allocation for NEMOv4
                  draft-ietf-mip4-nemov4-dynamic-06.txt

Abstract

   The base NEMOv4 specification defines extensions to Mobile IPv4 for
   mobile networks. This specification defines a dynamic prefix
   allocation mechanism.

Status of this Memo

Copyright Notice

described in the Simplified BSD License.

Table of Contents

1. Requirements notation

    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. Introduction

   The base NEMOv4 specification [RFC5177] defines extensions to Mobile
   IPv4 [RFC5944] for mobile networks. This specification adds support
   for dynamic allocation of mobile prefixes by the home agent.

3. Dynamic Mobile Prefix allocation

   The following extension is defined according to this specification.

3.1. Mobile Client Considerations

   According to this specification, the Prefix field of the Mobile
   Network Request Extension MUST be set to zero to indicate that that
   the Mobile Router requests mobile network prefix(es) to be assigned
   to it by the home agent. In this case, the Mobile Router MAY set the
   prefix length field of such extensions to zero or to a length of its
   choice as a hint to the home agent. According to this specification,
   mobile network request extensions with the prefix field set to zero
   MAY be included in a registration request message either during
   initial registration or during a subsequent registration.

   When a Mobile Router receives a registration reply it MUST process it
   as defined in Mobile IPv4 [RFC5944] and [RFC5177]. If one or more
   network acknowledgement extension are included with the Code field
   set to "Success" the Mobile Router SHOULD treat the prefixes in the
   corresponding prefix fields as allocated prefixes and create the
   appropriate bindings as defined in [RFC5177].

   If in response to a registration request with a mobile network
   request extension with the prefix field set to zero, a Mobile Router
   receives a registration reply with a network acknowledgement
   extension including Code field set to 1 "invalid prefix", it may use
   it as a hint that the home agent does not support dynamic prefix
   allocation.

3.2. Home Agent Considerations

   A home agent receiving a mobile network request extension with the
   prefix field set to zero MAY return a mobile network acknowledgement
   extension [RFC5177] with the prefix field set to the prefix allocated
   to the Mobile Router. The length of that prefix is at the discretion
   of the home agent. The home agent MAY take into account the prefix
   length hint if one is included in the mobile network request
   extension. Once the home agent allocates a prefix it MUST maintain
   the prefix registration table as defined in [RFC5177]. Alternatively
   the home agent MAY return a mobile network acknowledgement extension
   with the Code field set to one of the negative codes defined in
   [RFC5177].

   Dynamic mobile prefix allocation as defined in this specification MAY
   be combined with dynamic home address allocation as defined in
   [RFC5177]. In other words the home address field of the registration
   request message MAY be set to zero while the message also includes

one or more mobile network request extensions with the prefix field
also set to zero.

Once the home agent allocates a prefix it MUST maintain the prefix
registration table as defined in [RFC5177]. The lifetime of the
allocated prefix will be equal to the lifetime of the binding cache
entry. The Mobile Router may request for multiple mobile network
prefixes to be assigned by the home agent. For a Mobile Network
Prefix for which the assignment was unsuccessful, the Code field in
the corresponding Mobile Network Acknowledgement extension should be
set to MOBNET_UNASSIGNED.

For dynamic prefix allocation the Mobile Router's home address MAY be
used to identify the client if it is not set to zero. Otherwise, as
defined in the NAI extension [RFC2794] of Mobile IPv4 [RFC2794], the
NAI extension needs to be included in the registration request, in
which case the same extension SHOULD be used to identify the Mobile
Router for prefix allocation purposes.

4. Security Considerations

   This specification operates in the security constraints and
   requirements of Mobile IPv4 [RFC5944], NAI [RFC2794] and [RFC5177].

   Home agent implementations SHOULD take steps to prevent address
   exhaustion attacks. One way to limit the effectiveness of such an
   attack is to limit the number and size of prefixes any one mobile
   router can be allocated.

5. IANA Considerations

   A new Code Value for the Mobile Network Acknowledgement Extension: 4
   (Home Agent cannot assign a mobile network prefix -
   MOBNET_UNASSIGNED).

6. Acknowledgements

   The authors would like to thank Pete McCann, Alexandru Petrescu,
   Ralph Droms, and Jari Arkko for their reviews and comments.

7. Normative References

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

   [RFC2794]   Calhoun, P. and C. Perkins, "Mobile IP Network Access
               Identifier Extension for IPv4", RFC 2794, March 2000.

   [RFC5177]   Leung, K., Dommety, G., Narayanan, V., and A. Petrescu,
               "Network Mobility (NEMO) Extensions for Mobile IPv4",
               RFC 5177, April 2008.

   [RFC5944]   Perkins, C., "IP Mobility Support for IPv4, Revised",
               RFC 5944, November 2010.

Authors' Addresses

    George Tsirtsis
    Qualcomm

    Email: tsirtsis@googlemail.com

    Vincent Park
    Qualcomm

    Phone: +908-947-7084
    Email: vpark@qualcomm.com

    Vidya Narayana
    Qualcomm

    Phone: +858-845-2483
    Email: vidyan@qualcomm.com

    Kent Leung
    Cisco

    Phone: +408-526-5030
    Email: kleung@cisco.com