International Journal of Computer Science and Software Engineering (IJCSSE), Volume 4, Issue 11, November 2015
ISSN (Online): 2409-4285 www.IJCSSE.org Page: 280-282

IPv6 Network provide secure Address over IPv4

Yogesh Dilip More

ME Computer Engineering, Dr.D.Y.Patil College of Engineering, Ambi,Talegaon-Dabhade, India

more.yogesh7816@gmail.com

ABSTRACT

IPv6 has extended features with a host of advantages when compared to IPv4 which could be capitalized to leverage on today's communication needs. Apart from its advantages, IPv6 header size has increased to twice the size of a typical IPv4 header. The paper points out the need of IPv6 addressing in IPv4 network and proposes a new addressing mechanism with a clear implementation procedure, while not restricting any IPv6 mobile node to roam only in IPv6 based networks. The main focus of the proposal is to permit an IPv6 mobile node to roam also into IPv4 based network and get serviced besides roaming in IPv6 based network.

Keywords: *Cognitive Method Hiding Factor, Cognitive Metrics, Information Hiding, Software Complexity Metrics, Software Engineering.*

1. INTRODUCTION

The large IPv6 header size of 40 bytes when compared to IPv4's header size of 20 bytes, results in bigger overhead affecting the performance of IPv6 packet transmission. The large IPv6 header size will be detrimental to the network transmission efficiency in terms of increased bandwidth utilization, increased latency and reduced throughput. Further the inclusion of IPSec which was optional in IPv4 as a mandatory component for IPv6 adds to the overhead. The use of IPSec also imposes computational and transmission performance cost [1].Both conventional (IPv4/IPv6) networks allow nodes using auto-configuring protocol to manage the resource address space [2, 3].

It must be able to select, allocate, and assign a unique network address to an un-configured node. When a node leaves the network, the corresponding address must eventually be de-allocated to prevent exhaustion of the address space [4, 5]. Auto-configuration protocols can be classified in protocols utilizing either stateless or stateful approaches. The latter assume the existence of a central entity to assign unique addresses to un-configured nodes and to keep state information about already assigned addresses in an address allocation table [6]. An example is the well-known Dynamic Host Configuration Protocol (DHCP) [7, 8].

2. IPV6 ADDRESSING IN IPV4 NETWORK

Whenever an IPv6 node roams into IPv4 network, IPv6node obtains IPv4 router address from its gateway solicitation request message. This 32-bit IPv4 router address that is in decimal format is converted into hexadecimal format and then is assigned from the 17th to 48th bit position of the network part of the IPv6 address. The first 16-bit is assigned as FormatPrefix (FP) that has not been reserved by other types of IPv6 address and we consider the format prefix as 1001. The 49th to 64th bit position is assigned with 0's. Using hash function onthe node's MAC address, IPv6 node generates the 64-bit address and assigns it in the least significant part. The 128-bit address generated for the IPv6 MN in IPv4 network shown in figure (1) is the CoA and referred to as the P46CGA in visited IPv4 network. This P46CGA is the MN's CoA which along with its MAC address and HAv6 address is recorded into v6 Enabled Gateway Table shown in figure (2), while IPv6 node sends a BU message to its HAv6.The reason why we select IPv4 router address is that whenever a packet is transmitted to this IPv6 MN, looking into the 17th-48th bit value and by converting this into IPv4 decimal notation, the location of themobile node can be easily identified and routed to the correct location in order to minimize the routing and packetprocessing delay.

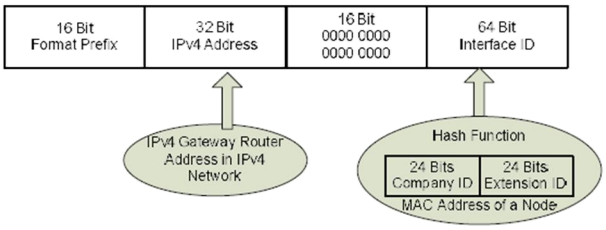

Fig. 1. IPv6 (P46CGA) Address Scheme in IPv4 Visited Network

3. GATEWAY

During the broadcasting of BU message, IPv6 node (A') in IPv6 network, also sends a packet containing CoA (P46CGA), its MAC address and its HAv6 address to the 6 gateway so that 6Gateway can record into its table the details of MNv6 to enable fast communication thereafter. 6 Gateway table is shown in figure (2) below.

MNv6 MAC Address	IPv6 address in this network	HAv6 Address of MNv6
00-0C-29-C2-52-FF	1001:78:FE:13:1::000C:29FF:FEC2:52FF	2001:230:d:fffd::1
.....	.....	.....

Fig. 2. Gateway Table

4. REGISTRATION OF COA WITH HAV6

IPv6 MN can send its current BU message to its HAv6 without the need of FA. This feature of IPv6 allows the IPv6 MN that is in IPv4 network, to register its CoA directly to its HAv6. Upon receiving the BU message from MNv6, HAv6 sends a Binding Acknowledgement (BAck) message to MNv6. The signaling diagram is shown in figure (3).

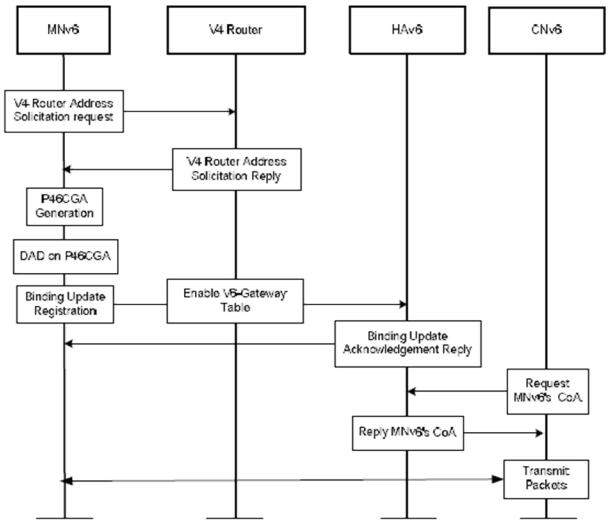

Fig. 3. Signaling Diagram for Care-of-Address Registration

5. REDIRECTION OF PACKETS

The P46CGA address is registered in the HAV6 as the CoA of the MNv6. When CNv6 wants to communicate withMNv6, it contacts HAv6 and obtains Mnv6's CoA. If the first 16 bit of CoA is newly assigned format prefix number, in our system like 1001, CNv6 understands that MNv6 is in IPv4 network. Then CNv6 extracts 17th to 48th bit of CoA; converts hexadecimal into decimal notation and assigns this value to another parameter. Using this parameter, the corresponding router can easily locate and minimize the routing delay and packet processing delay.

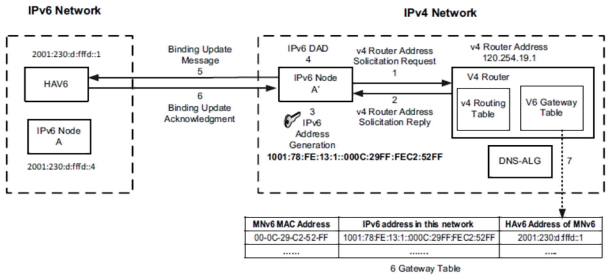

Fig. 4. Proposed IPv6 (P46CGA) Addressing Architecture in IPv4 Network

6. IMPLEMENTATION

Mobile Network can implement the simulated for its dissemination technique. By using NS2 simulator [9], a performance analysis will be carried out for the implementing procedure of IPv6 addressing in IPv4 network, presented in the table (I). The proposed system architecture is clearly depicted in figure (5).

TABLE I: Procedure of IPv6 addressing in IPv4 network

// This procedure assigns IPv6 Address for an MNv6
// When it roams in IPv4 network.

Procedure 6in4Addrreq
Begin
{
Set timer;
Initialize VRA;
While (timer <= maxtime)
{
Increment timer with system_time;
Request_v4router_Addr_for_6MN();
If
(Response_v4router__Addr_for_6MN(v4RA))
then

```
                {
                        6in4Addr(1-16)
                _IPv6_Format_Prefix_unassigned;
                        VRA                     =
                Convert_Decimal_to_Hexa(v4RA);
                        6in4Addr(17-48) _ VRA;
                        6in4Addr(49-64) _ 0;
                        6in4Addr(65-128)        _
                Hash(6MAC_Addrress);
                } // End of If
        } // End of While
} // End of Begin


// This procedure is for IPv4 Router to provide its address for
// IPv6 MN in IPv4 network and deny for altering any contents

Procedure V4Router
Begin
{
        If (Request_v4Router_Addr_for_6MN())
        then
        {
                Router_Addr_for_6MN
        (v4RouterAddress);
                Deny_anyother_request_from_MNv6;
        }// End of If
        If (P46CGA_BU_message_Broadcast)
        then
        {
                Enable 6GWTable;
                6GWTable_record(MNv6MAC,P46C
        GA, HAv6Add);
        } // End of If
}End of Begin
```

7. CONCLUSIONS

The core feature of the proposal is that because IPv6 node in IPv4 networks uses IPv4 router address, the IPv6correspondent nodes easily find the location of the network while routing CNv6 packet to Mnv6 and thus reduces therouting and packet processing delay. Further, there is no need of additional equipment to be included in the existing IPv4 and IPv6 network. Hence the proposed approach is scalable. For future work, the performance of the proposed mechanism will be evaluated using NS2 simulator. Furthermore, the issue of IPv4 addressing in IPv6 network may be considered as further research.

REFERENCES

[1] S. Kent and R. Atkinson, “Security Architectures for the Internet Protocol,” RFC2401, IETF, November 1998.
[2] European IPv6 Task Force”, IPv6 TF-SC Consortium, Workshop Industry Focus, Paris, June, 27-28, 2006.
[3] IPv6 Task Force Editorial Group, "Main Task force Report", Version 1.76, Document no.70, 11.2.2002.
[4] Geoff Huston, APNIC, “IPv4 Address Depletion and Transition to IPv6”, Internet Protocol Journal, Vol. 10, No. 3, pp 18-28, 2007.
[5] Geoff Huston, Telstra, “IPv4: How long do we have?...”, Internet Protocol Journal, Vol. 6, No. 4, pp 2-15, 2003.
[6] Gregory R. Schloz, Clint Evans, Jaime Flores, Mustafa Rahman, “Internet protocol version 6”, Internet Protocol Journal, Vol. 16 , Issue 3 , pp 197 – 204, March 2001.
[7] R. Droms, "Dynamic Host Configuration Protocol", RFC 2131, March 1997.
[8] R. Droms et al., “Dynamic Host Configuration Protocol for IPv6 (DHCPv6),” RFC 3315, July 2003.
[9] http://www.isi.edu/nsnam/ns/ns-documentation.html