Performance Analysis of Fast Address Search Algorithm of NAT-PT

E-mail: 9418553@ mail.dyu.edu.tw

ABSTRACT

The limited size and structure of the Internet address spaces of IPv4 have caused difficulties in coping with fast growing number of Internet users. IPv6 is a feasible solution for the problems identified with IPv4. It not only provides larger address spaces but also support security, mobility, and quality of service. However, before a complete deployment of IPv6 become reality, two network protocols IPv4 and IPv6 will co-exist and inter-working between them is important. The transition from IPv4 to IPv6 will be lengthy, while network devices supporting both protocols are required. NAT-PT is designed for these devices that allows IPv6 network to communicate with IPv4 network. In this thesis, a fast address search algorithm is proposed. The algorithm improves the efficiency of searching mapping table entries. Compared to the original NAT-PT reference design, the proposed new method is faster and flexible.

Keywords: IPv6; NAT-PT

Table of Contents

REFERENCES

[1] S. Deering, R. Hinden, " Internet Protocol, Version 6 (IPv6) Specification," RFC 2460, December 1998.

[2] R. Hinden, M. O'Dell, S. Deering," An IPv6 Aggregatable Global Unicast Address Format," RFC 2374, July 1998.

[3] Daniel G. Waddington, Fangzhe Chang," Realizing the Transition to IPv6," IEEE Communication Magazine, June 2002.

[4] Mallik Tatipamula, Patrick Grossetete, Hiroshi Esaki," IPv6 Integration and Coexistence Strategies for Next-Generation Network," IEEE Communication Magazine, January 2004.

[5] The Internet Engineering Task Force. (http://www.ietf.org/) [6]   IPv6   (http://www.proj.ipv6.org.tw/) [7] R. Hinden, S. Deering," IP Version 6 Addressing Architecture," RFC 2373, July 1998.

[8] C. Partridge," Using the Flow Label Field in IPv6," RFC 1809, June 1995.

[9] P. Karn, P. Metzger, W. Simpson," The ESP DES-CBC Transform," RFC 1829, August 1995.

[10] S. Kent, R. Atkinson," IP Authentication Header," RFC 2402, November 1998.

[11] S. Thomson, T. Narten, " IPv6 Stateless Address Auto- Configuration," RFC 2462, 1998.

[12] E. Nordmark and R. Gilligan," Transition Mechanisms for IPv6 Hosts and Routers," RFC 2893, 2000.

[13] A. Durand," Deploying IPv6," IEEE Internet Computing, Volume: 5 Issue: 1, Jan.-Feb. 2001, pp. 83 – 85.

[14] T. Dunn," Marketplace – the IPv6 transition," IEEE Internet Computing, vol.6, pp. 11-13, May/June 2002.

[15] M. Samad, F. Yusuf," Deploying Internet protocol version 6 (IPv6) over Internet protocol version 4 (IPv4) tunnel," Proceedings of IEEE Student Conference on Research and Development pp.109-112 2002.

[16] G. Tsirtsis and P. Srisuresh," Network Address Translation- Protocol Translation (NAT-PT)," RFC 2766, 2000.

[17] Xiaoyu Zhao and Yan Ma," Linux Based NAT-PT Gateway Implementation," Info-tech and Info-net, 2001. Proceedings. ICII 2001-Beijing. 2001 International Conferences on ,Volume: 5, pp. 258-263, 2001.

[18] E. Nordmark.," Stateless IP/ICMP Translation Algorithm (SIIT)," RFC 2765, 2000.

[19] http://www.ipv6.or.kr/, ETRI/PEC: Linux-based Userspace NAT-PT.

[20] Srisuresh, P., Tsirtsis, G., Akkiraju, P. and A. Heffernan," DNS extensions to Network Address Translators (DNS_ALG)," RFC 2694, September 1999.

[21] M. Allman, S. Ostermann, C. Metz," FTP Extensions for IPv6 and NATs," RFC 2428, September 1998.

[22] GNU Binutils Tools (http://sources.redhat.com/binutils/) [23]   ,   ,"   Linux
   ,"   ,   IPv6, pp. 1435-1441 [24] Gnuplot: http://www.gnuplot.info/ [25] Rahul Banerjee, N. reethi, M. Sethuraman," Design and Impementation of the Quality of Service in IPv6 using the modified Hop-by-Hop Extension Header," IETF, March 2002.