

PROJECT TITLE (24 pt.)

PROJECT REPORT TR-104(14 pt.)

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INDUSTRIAL TRAINING (12 pt.)

BACHELOR OF TECHNOLOGY

Computer Science and Engineering (14 pt.)

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Submitted By:

Student Name (Univ Roll No) (14 pt.)

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T & P Coordinator

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ABSTRACT

Packet Filtering firewalls can use a database of rules to decide which packets will be allowed to move in and out and from one network onto another. However with the increase in size of rule list, it's very hard to manage and validate the rules, which can also increase the cost of rule lookup and that may add significantly to latency. Packet filtering is the one of the major contemporary firewall design techniques. Implementation of such packet filter using Binary Decision Diagram (BDD) gives more advantages in terms of memory usage and look up time. In the case of the list-based packet filter firewall where rules are checked one by one for each incoming packet, the time taken to decide on a packet is proportional to the number of rules. The performance is improved with rule promotion but that is a slow and static kind of firewall implementation. In this work a BDD-based approach is presented which gives much better result in terms of number of comparisons or accesses the rule list make. This work presents the study, design and implementation of a packet filter firewall using binary decision diagram which provides faster processing of packets while maintaining the integrity of the original security policy. Results on large number of packets show that for most-accept packets, and for most- reject packets there is manifold reduction in such comparisons when BDD-based approach is used over list-based with promotion approach.

Letter Head of the Company / Organization

WHOM IT MAY CONCERN

I hereby certify that “NAME OF THE STUDENT” Roll No _____ of Guru Nanak Dev Engineering College Ludhiana, has undergone six month industrial training from to _____ at our organization to fulfill the requirements for the award of degree of B.Tech. (Branch). He/She works on _____ project during the training under the supervision of _____. During his/her tenure with us we found him /her sincere and hard working.

Wishing him/her a great success in the future.

Signature of the Student

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ACKNOWLEDGEMENT

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Tejas Joshi
Kanan Kaura

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[1] B. Klaus and P. Horn, Robot Vision. Cambridge, USA: MIT Press, 1986.

[2] L. Stein, Computers and You, J. S. Brake, Ed. New York, USA: Wiley, 1994.

[3] M. Abramowitz and I. A. Stegun, Eds., Handbook of Mathematical Functions (Applied Mathematics Series 55). Washington, DC, USA: NBS, 1964.

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[1] H. Chen, S. C. Laroia, and M. Adithan, "Precision Machining of Advanced Ceramics" International Conference on Advanced Manufacturing Technology (ICMAT - 94), Johor Bahru, Malaysia, 1994, pp. 203-210.

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[1] R. E. Kalman, "New results in linear filtering and prediction theory," Journal of Electrical Engineering, vol. 83, no. 5, pp. 95-108, Mar. 1961.

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[3] E. P. Wigner, "On a modification of the Rayleigh-Schrodinger perturbation theory," (in German), International Journal of Computational Intelligence Studies, vol. 53, p. 475, Sep. 1935.

[4] W. Rafferty, "Ground antennas in NASA's deep space telecommunications," IEEE Transactions on Antennas and Propagation, vol. 82, pp. 636-640, May 1994.

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[1] R. J. Vidmar. (1994). On the use of atmospheric plasmas as electromagnetic reflectors [Online]. Available FTP:atmnext.usc.edu Directory: pub/etext/1994 File: atmosplasma.txt

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[1] J. Jones. (1991, May 10). Networks (2nd ed.) [Online]. Available: <http://www.atm.com>

Patents, Standards, Thesis (M.S.) and Dissertations (Ph.D.)

Patents

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[1] J. K. Author, "Title of patent," U.S. Patent x xxx xxx, Abbrev. Month, day, year.

Example:

[1] J. P. Wilkinson, "Nonlinear resonant circuit devices," U.S. Patent 3 624 125, July 16, 1990.

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Standards

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Examples:

[1] IEEE Criteria for Class IE Electric Systems, IEEE Standard 308, 1969.

[2] Letter Symbols for Quantities, ANSI Standard Y10.5-1968.

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[1] J. O. Williams, "Narrow-band analyzer," Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.

[2] N. Kawasaki, "Parametric study of thermal and chemical non equilibrium nozzle flow," M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.

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as shown by Brown [4], [5]; as mentioned earlier [2], [4]–[7], [9]; Smith [4] and Brown and Jones [5]; Wood et al. [7]

or as nouns:

as demonstrated in [3]; according to [4] and [6]–[9].

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- [1] R. E. Kalman, “New results in linear filtering and prediction theory,” *Journal of Electrical Engineering*, vol. 83, no. 5, pp. 95-108, Mar. 1961.
- [2] Ye. V. Lavrova, “Geographic distribution of ionospheric disturbances in the F2 layer,” *Applied Soft Computing*, vol. 19, no. 29, pp. 31–43, Feb. 1961.
- [3] E. P. Wigner, “On a modification of the Rayleigh–Schrodinger perturbation theory,” (in German), *International Journal of Computational Intelligence Studies*, vol. 53, p. 475, Sep. 1935.
- [4] W. Rafferty, “Ground antennas in NASA’s deep space telecommunications,” *IEEE Transactions on Antennas and Propagation*, vol. 82, no. 3, pp. 636-640, May 1994.

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