IMPROVING PERFORMANCE OF INTRUSION DETECTION SYSTEM USING GENERAL-PURPOSE COMPUTING ON GRAPHIC PROCESSING UNIT (GPGPU)

By

Ahmad Rinaldi Widianto

12111019

BACHELOR'S DEGREE

in

INFORMATION TECHNOLOGY

FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY

SWISS GERMAN UNIVERSITY
EduTown BSDCity
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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in this thesis.

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ABSTRACT

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Ahmad Rinaldi Widianto

Charles Lim, MSc., ECSA, ECSP, ECIH, CEH, CEI, Advisor

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The development of computer network and the Internet enables more machines to become connected. Together with mobile computing boom increases the number of data passed via network. More and more data stored in the cloud to meets mobile demands. This leads to even higher security threats. On the other hand, intrusion detection technology are mostly single threaded application. This solution works in the past where most computers are single threaded machines. With current changes in computing paradigm and the increase in network traffic this method becomes obsolete. The focus of this research is to develop a parallel intrusion detection by exploiting GPGPU. In parallel computing packets are processed concurrently, thus increasing system capacity in high throughput environment. GPGPU further exploit parallelism inside modern GPU, which is essentially SIMD engines. OpenCL will be used as programming library during this research. The result are in favour of GPU with original design improving performance by average of 3.51x against single-thread CPU implementation, and by average of 2.54x against multi-thread implementation. After some optimization the overall performance improved on the average by a factor of 11.21 compared to the older version. The performance advantage against CPU improve by a factor of 23.71 vs a factor of 12.28 faster than multi-thread implementation.

Keywords: Intrusion Detection, Graphic Processing Unit, GPGPU, Parallel Computing, OpenCL

DEDICATION

I dedicate this work to my beloved mother who always taking care of me and push me to achieve new heights.

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