

INFORMATION ON DOCTORAL THESIS

1. Full name: Minh Viet Kieu
2. Sex: Male
3. Date of birth: 03/01/1983
4. Place of birth: Hanoi
5. Admission decision number: 1006/QĐ-CTSV dated 12/07/2015
6. Changes in academic process: None
7. Official thesis title: Modeling and countering TCP-targeted low-rate denial-of-service attacks.
8. Major: Computer network and data communication
9. Code: 9480102.01
10. Supervisors:
 - Prof. Dr. Thanh Thuy Nguyen
 - Dr. Dai Tho Nguyen
11. Summary of the **new findings** of the thesis:
 - Propose a new method to estimate TCP throughput under LDDoS attacks, the research is carried out with a simple network model consisting of one to many TCP flows with the same propagation delay and all passing through a bottleneck link. The simulation results show that the accuracy of the proposed method is quite high in the considered scenarios where TCP does not use delayed acknowledgment and it can determine the range of values into which TCP throughput is likely to fall when TCP uses delayed acknowledgment.
 - Propose a mechanism for changing the CPR threshold of the CPR-based approach over time. The simulation results show that the CPR-based approach with the adaptive threshold can protect TCP throughput quite well under LDDoS attacks while ensuring fair bandwidth sharing between new TCP connections under attack-free conditions.
 - Propose a new metric called CIR (*Congestion Interval Rate*) to replace the old one CPR. The simulation results show that the CIR-based approach can protect TCP throughput better than the original approach when attacks happen.

12. Practical applicability, if any: yes

13. Further research directions, if any:

- Estimating the throughput of heterogeneous TCP flows under low-rate DDoS attacks.
- Studying Linux TCP, especially its retransmission timeout mechanism.

14. Thesis-related publications:

- a) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen (2017), "Using CPR Metric to Detect and Filter Low-Rate DDoS Flows", The Eighth International Symposium on Information and Communication Technology, pp. 325 – 332.
- b) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen (2018), "Techniques for Improving Performance of the CPR-Based Approach", The Ninth International Symposium on Information and Communication Technology, pp. 163 – 168.
- c) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen (2020), "A Way to Estimate TCP Throughput under Low-Rate DDoS Attacks: One TCP Flow", The fourteenth RIVF International Conference on Computing and Communication Technologies, pp. 334 – 341.
- d) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen, Nguyen Linh Trung (2023), "On Estimating the Throughput of Homogeneous TCP Flows under Low-Rate DDoS Attacks", submitted to Journal of Information Security and Applications.
- e) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen (2023), "A Congestion Interval Rate Based Approach for Flow Level Detection and Filtering of Low-Rate DDoS Attacks", submitted to Computer Communications.
- f) **Minh Viet Kieu**, Dai Tho Nguyen, Thanh Thuy Nguyen (2024), "A Threshold Adaptation Mechanism for Detecting and Filtering Low-Rate DDoS Attacks", accepted by VNU Journal of Computer Science and Communication Engineering.

This list includes 06 publications./.

Date: 01/04/2024

Signature:

Full name: Thanh Thuy Nguyen

Signature:

Full name: Dai Tho Nguyen

Date: 01/04/2024

Signature:

Full name: Minh Viet Kieu