

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	Global P2P Network for Confidential Sharing of Threat Intelligence and Collaborative Defense
<b>Author's name:</b>	<b>Martin Repa</b>
<b>Type of thesis :</b>	Master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering
<b>Department:</b>	Department of Computer Science
<b>Thesis reviewer:</b>	Sebastian Garcia
<b>Reviewer's department:</b>	Department of Computer Science

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>A</b>
<i>How demanding was the assigned project?</i>	
The assignment was incredible hard since the goal was to design, implement, verify and make work in reality a new global P2P network designed for security purposes, considering adversaries. Such a task is usually the work of many people, but the student was able to make it for his thesis.	
<b>Fulfilment of assignment</b>	<b>A</b>
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The assignment was completely fulfilled. All the goals were achieved with good verifications. No part of the assignment was left undone. The student research previous networks and papers, design a new P2P network system for security purposes, implemented it in Go as a module for the Slips intrusion detection system, conducted verifications on how it would work in reality and make it run in tests environments.	
<b>Methodology</b>	<b>A</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The methodology selected is correct and the solution methods are sound. From a clear knowledge of the previous works in the area (including contacting the developers of the IPFS P2P network to discuss ideas), to a design based on real security needs and adversarial attacks on the network, to a long implementation in Go (including a module for the Slips intrusion prevention system), and a verification of epidemic spread methods through simulation. The thesis is ready to be implemented in real life.	
<b>Technical level</b>	<b>A</b>
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	

The student employed his expertise in the area to correctly design a P2P that can consider adversaries in the network. The design is robust enough to be implementable in real life and sustained by multiple evaluations in simulations. The Go implementation of the code is good, professional and robust, being ready to be used. The thesis also correctly explained the process, experiments, limitations and weaknesses of the system.

## **Formal and language level, scope of thesis**

**A**

*Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?*

The notation is properly used, the thesis is logically organised and sufficiently extensive. The presentation is good and correctly explained the work done in the thesis. The English could be improved to be more professional for a paper, but it is more than enough for a master thesis.

## **Selection of sources, citation correctness**

**A**

*Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?*

The thesis does good reference to previous works in P2P, although there were not many P2P networks considering the adversarial peers. The student did original work that is clearly distinguished from the previous work: This is the first global P2P network designed for security. The citations were correct.

## **Additional commentary and evaluation (optional)**

*Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.*

The thesis is of exceptional quality, and it is very novel by being the first global P2P for security defence. Its impact in the field of security can be deep and it can last for a long time. Its strength is that it was designed to be resilient to adversarial attacks and takes into account the trust in organisations. Its weakness is the work that has to be done in order for companies and organisations to adopt it. The utility is very important for a problem where now the best solution are lists of IPs and domains sell online. The student showed a mature and professional skill in solving the thesis.

### **III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE**

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

The grade that I award for the thesis is **A**

The thesis has a very exceptional quality that it is not easily seen in other master theses. It works in a very important area for the security community (how to share information about attacks, to be better protected) by proposing a new idea: a P2P network for security protection. Just like BitTorrent was designed for sharing files, Iris is designed for security protection. The student managed to completely implement from scratch, in Go, the whole system (>5000 lines) including a working module for the Slips intrusion detection system. On top of this the student designed the system with some resilience against adversary peers trying to attack with the network. The whole system was evaluated with simulations of epidemic



## THESIS REVIEWER'S REPORT

protocols to understand how fast messages messages can spread through the network. This system has the potential to be a real addition to the cybersecurity defence and threat intelligence world, and to be the base of larger research and collaborations.

I strongly recommend this thesis for an Award

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Date: 2022/06/12

Signature: