Rejoinder for degree project

Version 3.2 – January 26, 2022

ET2606: Master's Thesis in Electrical Engineering with emphasis on Telecommunication Systems

February 11, 2024

Title	A Prevention Technique for DDoS Attacks in SDN using Ryu Controller Application
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Opponent 1	Manideep Gunturu
Opponent 2	Venkat Sai Akhil Dasyam

1 Introduction

The purpose of this document is to address the comments and queries raised by both the thesis examiner and the opponent in their respective oppositions. Section 2 provides responses to the arguments presented by the opposition. We updated the thesis document by effectively addressing the opposition and updating the majority of the criticisms.

2 Response to opponent reports

ID	Comment	Answer
O1.1	Full forms for abbreviations in the abstract should be included	Included full forms for all the abbreviations used in the abstract
O1.2, O2.2	The order of Chapters 2 and 3 in outline 1.5 should be reversed	Resolved this mistake in section 1.4 Outline
O1.3	A few grammatical mistakes and spelling mistakes throughout the document need to be corrected	Checked and corrected the grammatical and spelling mistakes throughout the document
O1.4	Figures used in sections 3.1, 3.2, and 3.3, should be referred to in their description	Referred the figures 3.1, 3.2, and 3.3 in their corresponding description in sections 3.1, 3.2, and 3.3.2
O1.5	The label for Figure 3.3 is 'OpenFLow Switch', correct it by writing 'OpenFlow Switch'	Corrected the spelling in the label of the Figure 3.3
O1.6	Remove the ':' from the heading of subsection 3.6.2 Methodologies of Snort IDS	Removed ':' in the heading of subsection 3.6.2

ID	Comment	Answer
O1.7	In subsection 3.6.2, instead of writing 'Referring to Figure 3.5' one can use 'Figure 3.5'	Changed 'Referring to Figure 3.5' to 'In figure 3.5' in subsection 3.6.2
O1.8, O2.5	The text in subsections 4.5.3, and 4.5.4 refers to the wrong sections. Change the referred sections 2.3.1 and 2.3.4 to sections 3.3.1 and 3.3.4.	Corrected the wrongly referred sections in subsections 4.5.3 and 4.5.4
O1.9	Use the units for the performance metric 'Average time' in the results section of Experiment 2	Added units for 'Average time' to a graph in Experiment 2 of the results section
O1.10	A paragraph in subsection 5.1.2.3 under 'Flow Rules Analysis' is wrongly referred to subsection 5.2.4	Removed the wrong reference 5.2.4 in subsection 5.1.2.3
O1.11	Refer to the corresponding figure and remove '(Figure E)' in subsection 5.1.2.3	Changed the reference Figure E to Figure 5.11 in subsection 5.1.2.3
O2.1	Provide early explanations for 'flooding and IP spoofing attacks' and 'Snort IDS' in the Introduction and introduce the significance of those	Included flooding attacks, IP spoofing attacks, and Snort IDS in section 1.1
O2.3	Address the conceptual gap related to spoofing attacks in the 'Key Technologies' section	Explained about IP spoofing attacks in Key Technologies under Section 3.5
O2.4	Improve the clarity and descriptiveness of subsection titles for sections 4.5.3 to 4.5.5 in Chapter 4	Changed the title of subsection 4.5.3 to 'Configuration of Ryu to mitigate IP spoofing', 4.5.4 to 'Configuration of Ryu to mitigate Flooding attacks', and 4.5.5 to 'Configuration of Ryu to mitigate Flooding and IP spoofing'
O2.6	Enhance the clarity of figures in Chapter 4 for better visual presentation	Included clear pictures for the flow charts in Chapter 4
O2.7	Provide detailed descriptions of Command Line Interface (CLI) outputs in results for Experiment 1 in the Experiments and Results chapter	Included explanations for each figure in Experiment 1 of Section 5.1
O2.8	Could provide a clearer context for the terms 'Series1' and 'Series2' in Figure 5.7 and also include relevant units in the figures	Changed 'Series 1' and 'Series 2' in Figure 5.7 to what they stand for and units are also included
O2.9	Align images with their respective descriptions in the Experiments and Results chapter	Aligned the images according to their respective descriptions in Chapter 5
O2.10	Strengthen the connection between the content in the Discussion chapter and the initial research aims	Included the discussion on this research's aim in Chapter 6.
O2.11	Directly engage with the research questions posed in the thesis during the Discussion chapter	Included discussion on the findings of research question in chapter 6
O2.12	Could include some limitations or challenges faced in Conclusion or in Discussion chapter	Included the limitations, challenges faced is already discussed at the start of chapter 6 Ex omnet++

ID	Comment	Answer
O2.13	Few references like [9] and [13] could be rewritten using a proper bibliographical format	[13] is corrected in the references and [9] is already in the correct format.
Exa1.1	Change the RQ1 to suggest SDN as a detection mechanism	Changed the RQ1 to "To what extent does integration of Snort IDS in SDN demonstrate effectiveness in detecting flooding and IP spoofing attacks?"
Exa1.2	Clearly explain the graphs of Experiment-2	Clear explanantions for each of the graph for experiment-2 are included

O1.1 = Opponent 1, 1st comment, etc., O2.1 = Opponent 2, 1st comment, etc. Exa1.1=Examiner, 1st comment, etc.

3 Further changes

The further changes made to the thesis document are stated here:

1. Databases used to collect research papers are included.
2. Enlarged the graphs for experiments 2 and 3.
3. Restructured the text into larger paragraphs in Section 6.2
4. Subheadings in Chapter 3 are changed to bold text.