

University of Essex

Online

MSc Cyber Security

Research Methods and Professional Practice

(RMPP_PCOM7E)

Unit 8 – Research Proposal Outline

Securing VoIP using TLS and SRTP: A practical study in Service Provider networks.

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Project Title

Securing VoIP using TLS and SRTP: A practical study in Service Provider networks.

Research Problem: Significance and Contribution to the Discipline

This research aims to address the increasing demand for securing VoIP (Voice over Internet Protocol) communication in Service Provider (SP) networks. The focus will be on enhancing performance and security of VoIP networks by implementing TLS (Transport Layer Security) and SRTP (Secure Real Time Protocol). The study intends to contribute to the existing literature by evaluating the effectiveness of TLS and SRTP in securing VoIP communication and providing practical recommendations for Service Providers to improve the security of their VoIP networks.

Research Question

How effective is the implementation of TLS and SRTP in securing VoIP communication in Service Provider networks?

Aims and Objectives

- To evaluate the impact of implementing TLS and SRTP on the performance and security of VoIP communication in Service Provider networks.
- To analyse the effectiveness of TLS and SRTP in securing VoIP communication against potential security threats.
- To provide practical recommendations for Service Providers to improve the security of their VoIP networks.

Literature Review

The literature review will cover the existing research on VoIP communication, network security, and the implementation of TLS and SRTP in securing VoIP networks. It will examine the current best practices and identify the gaps in the literature that this research aims to address. Research papers that will be used to understand the current literature are listed under References.

Methodology/Development Strategy/Research Design

The research methodology will involve designing and setting up a test environment to simulate VoIP communications using SIP (Session Initiation Protocol) over a Service Provider network. The configuration and testing of SIP over TLS and SRTP will be performed, for different voice call scenarios producing network traffic. The network traffic will be captured and analysed using Wireshark and other tools to measure the call setup time and quality. The results will be compared with and without TLS and SRTP to evaluate the effectiveness of the implementation in securing VoIP communication.

Ethical Considerations and Risk Assessment

The project will comply with ethical guidelines such as the ACM Code of Ethics (ACM, 2018) and the BCS Code of Conduct (BCS, 2022), including obtaining the necessary permissions and consent from any Service Providers involved in the research. The research will not involve any sensitive or personal data, and measures will be taken to ensure the privacy and confidentiality of the participants (if any). A risk assessment

will be conducted to identify and mitigate any potential risks associated with the research.

Description of Artefacts

The research will include simulated SIP call flows with and without TLS and SRTP to demonstrate the effectiveness of the implementation in securing VoIP communication. Practical recommendations for Service Providers to improve the security of their VoIP networks will also be provided.

Proposed Timeline

It is assumed that the project module must be completed in 28 weeks. Figure 1 below represents an estimate timeline:

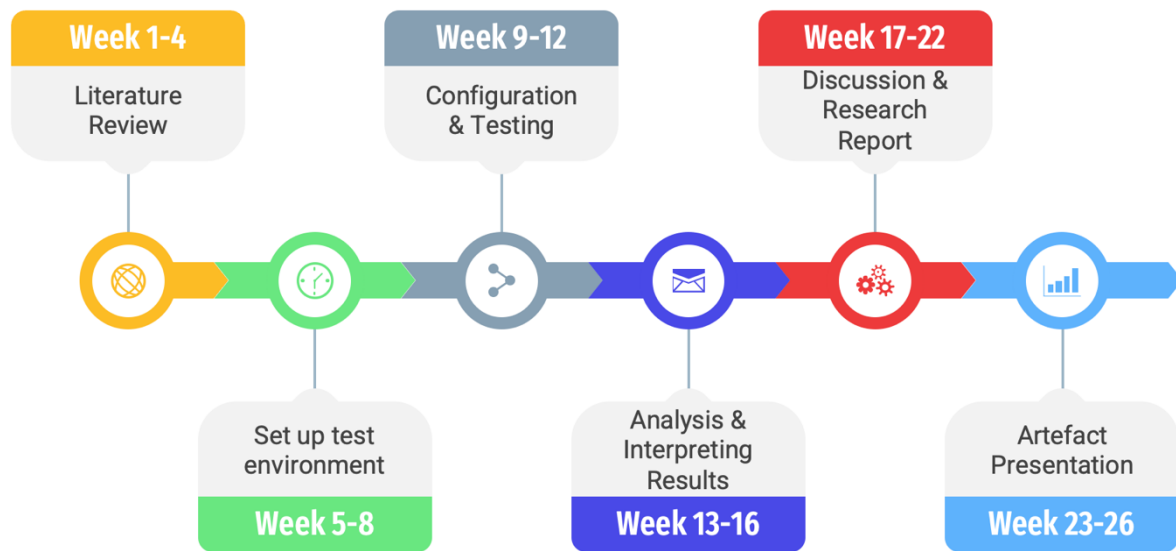


Figure 1: Proposed Timeline

The proposed timeline for the project will involve a literature review and research question refinement in weeks 1 - 4, followed by the design and setup of the test environment in weeks 5 - 8. Weeks 9 - 12 will involve the configuration and testing of SIP over TLS and SRTP as well as capturing data. Weeks 13 - 16 will be devoted to analysing and interpreting results. Week 17 - 22 will be reserved for finalising the discussion and completing the project report. Lastly, Week 23 - 26 will be used to work on the artefacts and presentation. Two weeks has been allocated for unforeseen circumstances that may affect the timeline.

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