Cryptographic Issues and Vulnerabilities in Web Applications

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M.Sc. in IT

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Department of Information Technology

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Dedicated

To

My Beloved Parents

And

Son Jalan RukmaHerath

DECLARATION

Here I declare my thesis of the research project work titled **"CRYPTOGRAPHIC ISSUES AND VULNERABILITIES IN WEB APPLICATIONS"** which was prepared submitted to the **Faculty Of Graduate & Research, Sri Lanka Institute Of Information Technology**, in the essential part of the requirements for the award of the **Master of Science in Information Technology Specializing in Cyber Security**, is a bonafide report of the work carried out me. The material contained in this Report has not been submitted to any University or Institution for the award of any degree.

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CERTIFICATE OF APPROVAL

The undersigned certify that the thesis entitled submitted to the Faculty Of Graduate & Research in partial fulfillment of requirement for the Master of Science in Information Technology Specializing in Cyber Security. The project was carried out under special supervision and within the time frame prescribed by the syllabus. As per the individual evaluation of the students that we pursued their dedication, hardworking, bonafide and ready to undertake any challenges appropriate commercial and industrial work related to their field of study and hence we recommend the award of Master of Science in Information Technology Specializing in Cyber Security.

1. ……

(Project Supervisor)

2. ……

(External Examiner)

3. ……

(Head)

Master of Science in Information Technology Specializing in Cyber Security

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This dissertation looks like a small portion of the single booklet however it could be contributed by several faculty members even though some of them are supported invisibly. My special appreciation goes to my mentor Dr. Lakmal and Ms. Chethana. With their contribution might not be carried out such work within the correct time. I will take this opportunity to express my gratitude to every individual who has given their fullest support for my achievement of this review report throughout our Master of Cyber Security program.

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ABSTRACT:

Web application security is the most controversial and crucial factor to be concentrated on considering the security aspect of cyberspace. Cryptography takes critical parts of security by implementing encryption and decryption phenomena on data at rest, in moving, and in use to be protected the security breaches. Cryptographic concepts had developed over the last few decades as a result of well-known series of mathematical and logical functions. Weakness of poor programming techniques or leakiness of traditional software development life cycles is a crucial element of the security vulnerabilities that can be a huge impact on several web applications which are currently in existence.

The cryptographic vulnerabilities of the web application would depend on several factors such as lack of knowledge on particular subject matters of cryptography, least privilege and contribution of security techniques while cording, unable to proceed with proper standardized vulnerability assessment criteria, the improper adaptation of cryptographic concepts, unable to intended with high secure framework like DevSecOps, depend on the procedures rather than empirical approaches, etc. Sophisticated tools and techniques are necessary factors of driving through the rectification and mitigation of the security vulnerabilities that exist in the web applications whereas implementation process, testing and monitoring of the System Development Life Cycle. This dissertation emphasized indeed a further illustration of cryptographic vulnerability assessment in several specimens collected from different domains from enterprise web applications and related APIs (Application Protocol Interface) currently established. The tools are the critical elements used to evaluate errors on the codes whereas statistical or dynamic analysis. Static tools are given in high percentage of accuracy of the results whereas automated tools are well suited for mega scripting projects such as millions of code evaluated for errors. Java-based code scripting has been dominated still among the huge percentage of the web sources. Python will be established gradually due to the high inbuilt security system on it. Java and Python are the programming languages still being dominated of existence to discuss in the cryptographic vulnerabilities on the process of web application developments. The ultimate goal of this dissertation could be retain valuable sources of documents enriched with sophisticated technics to be used a reference guide for the developers and the security engineers to fulfilled their gaps between code and security requirements.

Keywords: Application Protocol Interface, Cryptographic Vulnerability, DevSecOps, Dynamic Analysis, Statistical Analysis System Development Life Cycle

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