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WebRTC: Secret Messenger

An Abstract of

a Thesis

Presented to the Faculty of

Department of Computer Science

Western Illinois University

In Partial Fulfillment

of the Requirements for the Degree

Master of Computer Science

By

Dennis McMeekan

May, 2021

ABSTRACT

Type a brief description of the problem, the methods, techniques, and data used and the major finding of the study. Abstract should not exceed 350 words

In recent years, WebRTC applications have been used to establish real-time communication between two or more peers. This application provides limitless advantages to web developers across the entire world, but with these advantages, there are also disadvantages. The main focus of this study is to determine the security factors that may be exploited with WebRTC and mitigating these issues. The emphasis for the research and project portion was data integrity, along with a brief survey on IP leaks. Data integrity is an issue because of WebRTC’s open-source model, clients hold the ability to alter the actual data that is being sent from one peer to another using the API provided. It has been found that through the altering of data, a delay can be implemented in real-time on one client’s side, and then based on that delay the receiving client can receive a piece of information (a bit) based on the delay. This means that with no knowledge to the administrator or server side, a message or data can be sent secretly from one peer to another. This was discovered using WebRTC’s API and different test elements such as the bitrate, round-trip-time, and framerate in an effort to determine the error rate. Beyond this, IP leaks is highly discussed as a security flaw with WebRTC applications, as in most cases the user’s public IP address is used directly. This is commonly addressed with the use of a VPN (Virtual Private Network), but in almost all cases this can be a costly effort and can be limited in the data limitations of the client.

no protocols have been established on proper use of these type of applications. With this idea on the forefront, we wanted to capitalize on the security aspects of WebRTC, focusing on data integrity. This is the reliability of secure data transfer from one individual to another. It was established that by implementing a delay in data transfer from one client to another, a bit can be sent and received based on this delay by the other client. This is vital security flaw, as data can be transferred secretly through clients without any control by the administrator. There are prevention methods with this, by implementing random delays on the server or administrative side. This will greatly increase the error rate.

APPROVAL PAGE

This thesis by Dennis McMeekan is accepted in its present form by the Department of Computer Science of Western Illinois University as satisfying the thesis requirements for the degree Master of Computer Science.

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ACKNOWLEDGMENTS

Grateful acknowledgment is extended to Dr. Binto George, thesis supervisor, and committee members Dr. Nilanjan Sen and Dr. Chunying Zhao for their valuable suggestions and guidance given in this thesis project. I especially want to thank...

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