USE OF NFC FOR DATA STORAGE IN CONTEXTS WITHOUT CONNECTION ASSURANCE

Newton Scavazzini

J.J. De Groote

Centro Universitário Barão de Mauá

newtonscavazzini@gmail.com

Objectives

The purpose of this work is to use NFC (Near Field Communication) technology for data storage in contexts where there is no possibility of guaranteeing a connection between the processing terminals or with a central server. This is a common situation, for example, when storing health data for Mobile Health (mHealth) patients [1]. The objective of this research is to develop and analyze an application for mobile devices with a payment system that stores credits in NFC tags, similar to that implemented in the Bilhete Único (Single Ticket) system in São Paulo city. This context has connection and data reliability limitations, which cannot suffer any kind of undue breach.

Materials and Methods

The NFC tags have a memory that allows data to be read and written simply by approaching an NFC receiver. The data are stored in byte arrays that can be encoded in NDEF (NFC Data Exchange Format) standards, or in a format readable only by specific applications, like the method developed in this research. To ensure the data integrity, before writing in the tag, the data goes through a symmetric encryption process that uses the unique identifier of the NFC tag as part of the key, making it more difficult to clone and manipulate the data. Figure 1 shows the format of the byte array that the system processes to manage the customer data.

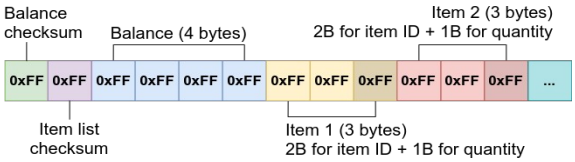

Figure 1: Byte array stored in an NFC tag with customer data.

Results

The application with data storage and processing features was developed using Kotlin programming language and the Android platform. Simulations were carried out installing the application on different devices to test the features. The NFC tag used is the NTAG213 model with 144 bytes of data storage. The application proved to be stable when performing the functionalities and easy-to-use, showing that the NFC technology can be used to identify users, record credits and consumption data.

Conclusions

It was possible to develop an efficient payment system for short-duration events showing that NFC technology is a safe, practical and low-cost alternative to be used in contexts where there is no assurance of connection between the processing terminals or with a central server.

References

[1] AYYALRAJ, M. K.; BALAMURUGAN, S. A. A. Patient Health Description using NFC-Tag-M-Health. *In: 2019 Amity International Conference on Artificial Intelligence (AICAI)*. IEEE, 2019. p. 642-646.