CoviBlock:

A Merkle DAG and Blockchain Implementation for Covid-19 Records

**Chapter One**

**INTRODUCTION**

* 1. **Background of the Study**

In our world today, it is undeniable how technology has helped reshape our way of life. Be it gadgets, mobile applications or customized systems. In this regard, electronic medical systems have been in the healthcare industry to help in organization management and complement medical workers in their day-to-day operations.

The current technological advancements in the Philippines has yet to be manifested in its healthcare system. Though there were efforts from the government to adopt various modern tools, we are still miles behind other countries. Barriers such as weak infrastructure, technology complexity and poor interface design of applications have made it difficult for various health organization to progress (R. Ebardo, N. Celis, 2019).

Ospital ng Makati, a government-funded hospital, is one of the hotspots for Covid patients for the City of Makati. Being a public hospital, it is expected to handle larger demographics compared to its private counterparts. Since the start of the pandemic, it’s one of the primary test results and vaccination site in the city.

At current, the hospital has various ways in executing Covid Test Results. It has its own laboratory and partners with 3rd party laboratories to accommodate the demand. These results are given physically to the patient while the hospital keeps a softcopy in their system

For vaccination, the City of Makati has an online web portal to assist with scheduling. This online system is well received by its citizen because it lessens the crowd when going to the vaccination site and they are guaranteed of a slot compared to other cities that implement a “first come first serve” basis. The proof of vaccination is a physical certificate and the patient being tagged as fully vaccinated in the system.

Other cities also had the same effort of putting up systems to cater the pandemic needs. Manila, Mandaluyong and Taguig also have their own sets of application. Though the motivation is good, the issue of how to unify these applications have risen and calls for having a unified system on a national level are being thrown in various media outlets.

* 1. **Statement of the Problem**

At present, Ospital ng Makati is using a system for keeping Covid Test Results while vaccination records are maintained on a separate system used by the entire City of Makati. The patients only receive physical copies of these records as proof of execution.

Current setup for storing records poses several problems such as records lost, ease of access, document tampering and data mismanagement. There are reports of people making money out of tampering test results and vaccine certifications.

* 1. **Objectives of the Study**

This study aims to develop an alternative platform to store Covid-19 related records for Ospital ng Makati with better level of validation.

Specifically, the study seeks to address the following objectives:

1. To develop an application that will decentralize the storage of Covid-related files using the concepts of Merkle DAG and blockchain
2. To develop an application that will prevent tampering or other illegal modifications to records
   * Rethink how this is applied to the system (additional functionality, access control to authorized personnel)
3. To develop an application that will provide ease of access and portability of records
   * (lacking words, portability of records to patient?, we can remove this if it’s vague)
   * Contradicting to statement 4
4. To develop an application that will provide record access autonomy to patients
   * Elaborate how this will be achieve (maybe define the algorithm? By public private key usage)
   1. **Scope and Limitations**

The study will be focusing on developing an application for management of Covid Test Results and Vaccine Certificates for Ospital ng Makati. Since there are privacy regulations concerning health information, the researcher will use dummy data and instead will probe more on the processes on how these records are managed.

The study will exclude the test results generation and vaccine management. Thus, it is more focused on how the result and outputs of these process are handled and being catered to the patient.

* 1. **Significance of the Study**

Results obtained from the study will benefit the following stakeholders:

**Patients**. Above all, patients will greatly benefit on this application. Various regulations and laws have been implemented to ensure people are not spreaders or vaccinated. Currently, there are no unified way in getting and presenting these records are proof. More so, bad actors are using this pandemic to make money out of tampering records. The application will help solve the woes of patients in terms on ease of access and portability of their records. They will also have full autonomy of said records.

**Medical Personnel**. The application will help medical workers to focus on their medical line of duty and alleviating various admin jobs.

**Third Party Validators.** As mentioned above, records tampering has become rampant. Businesses or employers requiring such records can now be protected of this illegal activity.