Publicly Verifiable Shared Dynamic Electronic Health Record Databases with Functional Commitment Supporting Privacy-Preserving Integrity Auditing

ABSTRACT:

Electronic health record (EHR) is a system that collects patients' digital health information and shares it with other healthcare providers in the cloud. Since EHR contains a large amount of significant and sensitive information about patients, it is required that the system ensures response correctness and storage integrity. Meanwhile, with the rise of IoT, more lowperformance terminals are deployed for receiving and uploading patient data to the server, which increases the computational and communication burden of the EHR systems. The verifiable database (VDB), where a user outsources his large database to a cloud server and makes queries once he needs certain data, is proposed as an efficient updatable cloud storage model for resource-constrained users. To improve efficiency, most existing VDB schemes utilize proof reuse and proof updating technique to prove correctness of the query results. However, it ignores the "real-time" of proof generation, which results in an overhead that the user has to perform extra process (e.g. auditing schemes) to check storage integrity. In this paper, we propose a publicly verifiable shared updatable EHR database scheme that supports privacy-preserving and batch integrity checking with minimum user communication cost. We modify the existing functional commitment (FC) scheme for the VDB design and construct a concrete FC under the computational l -BDHE assumption. In addition, the use of an efficient verifier-local revocation group signature scheme makes our scheme support dynamic group member operations, and gives nice features, such as traceability and non-frameability.

SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

- System : Pentium i3 Processor.
- Hard Disk : 500 GB.
- Monitor : 15’’ LED
- Input Devices : Keyboard, Mouse
- Ram : 4 GB

SOFTWARE REQUIREMENTS:

- Operating system : Windows 10.
- Coding Language : Java
- Web Framework : Flask

REFERENCE:

Y. Su, J. Sun, J. Qin and J. Hu, "Publicly Verifiable Shared Dynamic Electronic Health Record Databases with Functional Commitment Supporting Privacy-Preserving Integrity Auditing," in IEEE Transactions on Cloud Computing, doi: 10.1109/TCC.2020.3002553.