Toward Resilient Healthcare Information System

Goutam Kumar Saha
Email: sahagk@gmail.com, gksaha@ieee.org

Healthcare information or Medical information system needs to be resilient one in order to make medical data available, accessible and usable at the point of care. Resilient system has the ability to recover from or adjust easily to misfortune or change like disk failures. In order to ensure that healthcare information or Medical data persist over an intended period of time irrespective of whatever storage system, medical preservation is also an important issue specifically for chronic care conditions. It is not uncommon that medical information either get destroyed or become inaccessible at the point of care because of hurricane, fire, vandalism or any other disaster.

Medical data preservation may be based on Open Source Software Solutions to electronic data preservation including development of the tools and technologies to fulfill the digital preservation requirements such as Data Archival, Ingesting, Metadata Extraction, Format Conversion, Authentication, Integrity, Emulation, Long Term Usability of Data, Migration and porting of software solutions, Information and Rights and Privacy Management, Search and Retrieval, Automated Auditing, Preservation Process Management etc. The preservation activities also include development of preservation tools and technologies with proper understanding of the domain specific needs and the requirements of the designated user communities.

A resilient system has the ability to recover from or adjust easily to misfortune or change. Resiliency term is used to mean the ability to accommodate unforeseen environmental perturbations or disturbances in order to ensure persistence of service delivery that can justifiably be trusted, when facing changes. Appropriate planning on data backup (for example hot or cold backup), disaster recovery like restoring data loss, emergency mode operation, testing and revision procedures, applications and data criticality analysis will improve resilience. Resilience is further improved by deploying Distributed Hash Table (DHT) technology based distributed storage solutions for medical data storage by improving availability against any disaster. Establishing resilience in medical data increases medical data availability aiming to keep data accessible. Delivery time to point of care is an important factor of Medical Data Availability. The delivery time of data refers to the duration of time it takes to get medical information to the place where it is needed for patient care. Here, patient health is the explicit goal. Business continuity is not the explicit goal here. In order to develop a resilient healthcare information system we may adopt the prevalent techniques of dependable computing or especially the techniques meant for developing fault tolerant computing system that involve diversity and necessary redundancy in both hardware and software.

Further Reading:

"From Dependability to Resilience" by Jean-Claude Laprie.
"Making Medical Records More Resilient" by Robert Rudin.
"Software Based Fault Tolerance: a Survey" by Goutam Kumar Saha.