Centralizing EMRs Using a Cloud Platform in the UAE

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**Situation**

EMRs is the coming of age tech that revolutionized data storage and access to make it more efficient and less costly. Current ways of storing EMRs is by setting up servers that can handle vast amounts of information. The problem with that is there is a lot of information that needs to be stored, millions of records for an entire nation like the UAE and that means a lot of servers in different locations. Now the world is becoming more digital, paper-based health records are rapidly being replaced with electronic medical records (EMR) for the many advantages that it holds. Specifically in the UAE, 96.7% of all hospitals have initiated a process to transform to a paperless environment [1]. UAE hospitals will also become vulnerable to these breaches now that it is turning digital.

**Problems**

- **Cost:** Building and maintaining a well secured datacenter in a hospital is a costly operation, which renders EMRs storage an issue for many hospitals in the UAE.
- **Scalability:** As the number of patients in a hospital increase, the number of servers in the data center required to store the EMRs increase. Hospitals have limited space making the addition of servers a problem.
- **Security:** Data loss, hacking and theft of EMRs are common in hospitals and can lead to blackmail, scam and identity theft.
- **Patient Misidentification:** Patients may be incorrectly diagnosed due to name duplication or data entry error.
- **Redundancy:** The same patient will have different copies of his/her medical record distributed among multiple hospitals he/she visited, and each record is only updated by the doctors working in that hospital.

**Solution**

To solve the above problems, we propose to build a secure cloud data center to store and manage EMRs for all hospitals in the U.A.E. Figure 1 shows a schematic of our proposal.

**Security**

The data center will be built in a secured perimeter with limited access to authorized individuals. Using security as a service, SeCaaS, the EMRs are monitored in real time, provided by Cloud Security Alliance, CSA, which will protect the EMRs from any potential threat.

**Building the datacenter**

To centralize, store, manage, and secure EMRs in one data center, the following steps have to be taken:

1. Building a secure data center along with a secondary back up data center in a secured perimeter with authorized access.
2. Constructing an air and water cooling system to fully support and cool the servers in the datacenter.
3. Adding a fire alarm system, and a fully functioning electric generator to prevent damage or loss of data from natural hazards and power outages.

**Electronic Medical Record (EMR)**

Our solution includes implementing a database that stores all the EMRs in a centralized data center. Each patient will have only one single EMR that will be regularly updated with every hospital visit. This EMR will contain:

- A unique ID assigned to every patients EMR.
- The patients finger print.
- The patients personal, and contact details.
- An updated database containing the patients medical history.

**Evaluation**

- The cloud data center improves time efficiency of data and patient handling by 50%
- The data center has unlimited scalability unlike hospitals, limited only by budget
- Security for hardware and software of the datacenter and EMRs is maximized.
- The solution saves hospitals millions of dollars spent on EMR storage and management.
- The cloud data center is cost efficient in the long term as shown in Table 4.

**Conclusion**

- The cloud-based solution for EMRs delivers the highest quality of healthcare at better efficiency and lower cost. It promotes health through the use of the latest technologies.
- Instant access to all patients data and elimination of paper costs save time and money.
- Cloud data centers host flexible network along with secure storage and open architecture, to provide optimal level of efficiency, mobility, availability and healthcare utility.

**References**


**Table 1: Cost of implementation**

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<th>Quantity</th>
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<th>Total cost</th>
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</table>

**Figure 2: Data Center**

**Figure 3: A typical EMR**

**Figure 4: Cloud data center vs. hospital data center**

**Figure 4: System schematic**