PROPOSAL OF INTEROPERABILITY OF THE DIFFERENT HEALTH INFORMATION SYSTEMS, AS A STRATEGY TO IMPROVE THE HANDLING OF INFORMATION AND DECISION-MAKING

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ABSTRACT

Health systems are in constant change, either due to technological progress or due to the same need produced by external agents such as COVID-19, which have caused an analysis of all the information systems dedicated to the various procedures in the health area, from clinical information management, information from health insurers, image information management, drug supply management, medical supplies and supplies management, among other systems specific to each health institution. It is in this environment where a lot of vital information for decision-making is produced that in most cases is impossible to manage, because it is found on different platforms and in most cases in different institutions. The present research presents a methodology for the exchange of information between systems based on the interoperability of systems and using the XML standard, very similar to what the HL7 protocol advises, the implementation of the methodology can be synchronous or asynchronous depending on the degree. of need that is required to use and depending on the different users who require to share their information. The results show the practicality of the implementation and that these can be implemented in the shortest time possible using communication between messages following the protocol presented, which will depend on the information required, the implementation can be done by reading the message and loading the case system Contrary to being able to enter the system directly, its application will depend on the ease of being able to update the information systems that are running.

KEYWORDS: Systems, XML, Interoperability, Message

INTRODUCTION

With technological development, various services have been implemented in hospital centers, starting with administrative services where the issues of hospitalization days, medication management, appointment management and medical consultations, among others, as well as matters related to the systematization of services related to the clinical information of patients, in this universe of systems we find commercial systems and systems that have been developed by the hospital centers themselves, in that variety a problem arises, where faced with the need to share information, these systems are not in the capacity to carry it out, arising a challenge to solve this difficulty. One of the last processes to be systematized are those related to the Electronic Medical Record where the need forces to digitize all the information related to the patient in such a way that they can be shared by all

areas of the health center [1]. Among the different interoperability mechanisms, various options are presented to make it possible for information to circulate between the different systems [2]. Interoperability is directed with the Electronic Medical Record for the exchange of information between health centers [3] [4]. In the development to improve the information that can be shared between the different systems, we find solutions where we try to share information from different medical teams, for which ISO-13606 [5] was considered as a reference, as well as computer solutions using different methodologies for software development [6]. In the present work we propose to implement interoperability based on the use of messages following the XML standard, which can be implemented synchronously as well as asynchronously, depending on the need and availability of health center resources..

METHODS & MATERIALS

The methodology presented is based on good practices for the design and manufacture of medical-level equipment, taking into account the regulations that govern medical equipment, which are responsible for guaranteeing its operation and ensuring the continuity of the life of the patient, as in the case of life support equipment. Below we present the methodology to be developed in order to design the strategy for the development of medical equipment at the local level.

Blocks Diagram

In the proposed methodology, different processes are considered in a general way that make it possible to choose the system, the information and the information that is required to be shared.
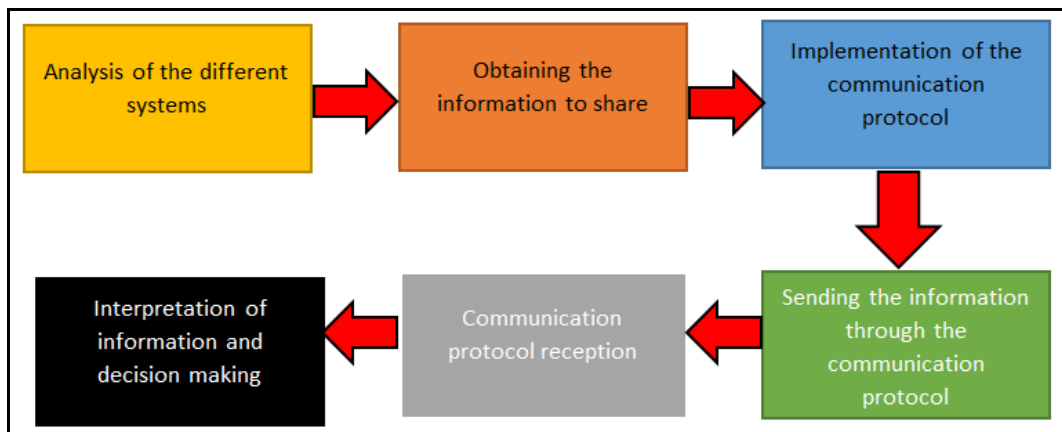

Figure 1: Block Diagram of the Proposal.

Analysis of the Different Systems

In the analysis of the different systems, the systems that require sharing information and those that require information from other systems are involved so that they can provide information for better decision-making. Among the various systems that we can find in the health sector are those in charge of managing: Los pacientes internados.

- Patients who come to appointments.
- Doctors and health personnel.
- Medical equipment available.
- Maintenance of medical equipment.
- Hospitalization rooms.

- Operating rooms.

- Medications.

- Medical procedures.

- Electronic medical record.

- Information on the agencies that provide insurance.

- Suppliers of medical goods and services.

- Medical imaging.

- Among others.

Obtaining the Information to Share

The information that is required to be transmitted and received must be declared in a special field, therefore it must contain the necessary information and in an amount necessary for ease of reading and that it is essential and easy to read. Depending on the system and information, it is necessary to define a greater number of fields, here is an example:

You want to know the name of a patient's insurer, for which the request message must be sent from the medical center to the insurers, the required field both for the request and for the receipt of the information must be:

Request

<insurance_affiliation_ request >

patient identification number

</insurance_affiliation_ request >

Reply

<answer request affiliation insurance >

patient identification number

insurance name

</answer request affiliation insurance >

In this way, both in the request and in the response, only the relevant and indispensable information should be considered.

Implementation of the Communication Protocol

The communication protocol that is proposed is characterized by determining the order of the data that is required, for this it will depend on the information and the assignment of priorities, as an example we indicate a list of fields required for the information request :

- Information of the patiente
- Name
- Last name
- Document number

- Information regarding the área

- Company that is insured

- Maximum amount of insurance

- Basic clinical information

- Blood type

- Allergic

- Information on hospitalization

- Internship days

- Reason

- Treatment

- Information on medication based on treatment

- Medication name

- Dose

Sending the Information through the Communication Protocol

The protocol for sending the message will consist of an XML file for both the request and the response, being at the discretion of the developers to indicate the code or some identifier as the file name, it is recommended that the structure of the XML file is as follows :

PATIENT_INITIALS_DATE_TIME

Example:

Name: Juan Perez Perez, the day: 08/07/2020, the time: 14:10

File Name: JPP070820201410

Communication Protocol Reception

Sending the XML file will allow the exchange of information, this can be sent by any available electronic means, it will depend on the ease and availability of resources or the need and urgency of the information, among the ways to use we can indicate by email, message with attached file, among others.

It is recommended that between both entities, the one that emits the message and the one that receives, have to work with the same protocol both for the generation of the information, and for the reading of the information in order to comply with the integrity of the information avoiding loss or misinterpretation of the data sent.

Interpretation of Information and Decision Making

The last part of the proposed methodology is characterized by the interpretation of the data sent, as mentioned, these can be sent from any electronic means, therefore if the XML file is read from a system, it can interpret the protocol, recover the information and that can be loaded into the corresponding system. Similarly, if the XML file is read from a user on some system, this person can read the file, interpret the information, and manually load or report the sent data. It is available to users if the generation and interpretation process is automatic or manual, as well as asynchronous or in real time.

RESULTS

The results presented are related to the structure of the protocol as well as to the generation of the message in XML. The following is the design of the protocol for the generation of the information:
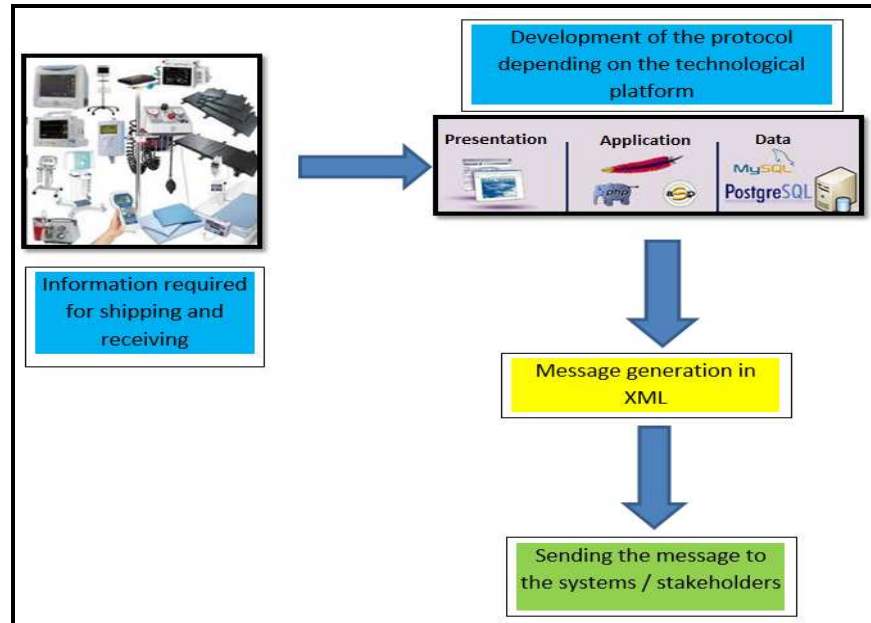

Figure 2: Design of the XML Message Generation Protocol.

In a similar way, we can indicate that the message must be considered the necessary information to be requested and sent, it is recommended that if at first information was requested and later more information is required from the same patient, the information requested in the first message and compose another for additional information. Below is a sample message for both the information request and response:

Example: patient information is required, the name of the insurance, its coverage, if it is authorized and the name and telephone number of the insurance broker in order to be treated in a medical center, the name and identity number of the patient.

Request

< insurance_affiliation_ request>

< personal_information>

Juan Perez perez

555555555

</ personal_information>

< insurance_data>

<secure_name>

</ secure_name>

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< coverage>

</ coverage>

< state>

</ state>

< Contact>

</ Contact>

</ insurance_data >

</ insurance_affiliation_ request>

Reply

< insurance_affiliation_ request>

< personal_information>

Juan Perez perez

555555555

</ personal_information>

< insurance_data>

<secure_name>

 positiva

</secure_name>

< coverage>

10000

</ coverage>

< state>

active

</ state>

< Contact>

Jorge castro

968985698

</ Contact>

</ insurance_data >

</ insurance_affiliation_ request>

The information that is answered in the message contains the name of the insurance that is positive, the coverage that is 10,000, the status of the insurance that is active, and the name of the insurance representative for contact purposes is Jorge Castro with telephone number 968985698.

CONCLUSIONS

The conclusions reached at the end of the research show that in the face of an urgent need to require information corresponding to the health area either from different institutions, it can be obtained through the generation of messages in XML, thereby achieving interoperability in the management of hospital information, required for decision making at critical moments.

It was found that the messages can be generated automatically and manually as well as the reading and interpretation, which will depend on the availability of the entities' resources, the proposed methodology helps as much as possible to get out of an emergency situation, Ideal and recommended, is that this mechanism of messages with medical information through XML can be developed and implemented in the systems themselves in such a way that it is automatic and in real time, achieving the integrity of the information because in health it is important that the data be The right ones.

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