ICS-FORTH **1997**

Seamless Care in the Health Region of Crete: the Star☆ Case Study

Michalis Blazadonakis[1], Vassilis S. Moustakis[1,2] and Giorgos Charissis[3]

[1]Institute of Computer Science, Foundation for Research and Technology - Hellas, Science and Technology Park of Crete, Vassilika Vouton, P.O Box 1385, 71110 Heraklion Greece
[2]Department of Production and Management Engineering, Technical University of Crete, 73132 Chania Greece
[3]Director, Pediatric Surgery Clinic, University Hospital of Crete

URL: http://www.ics.forth.gr/ICS/acti/cmi_hta/publications/papers.html

pp. 157-161

MIE'97

Medical Informatics Europe
14th International Congress, Porto Carras, Greece

May 25-29, 1997

Abstract: Seamless collaboration and medical information exchange among health care experts is an open question on existing health care systems. The patient record is usually scattered all over the health care network making access to crucial medical information troublesome. The Star☆ (Seamless Telematics Across Regions) project provides a set of solutions towards this direction which will soon be applied at Crete. Initially two health care structures will be involved in the process but later on and after tests have been completed successfully in real world applications, results will be defused over the whole health care region of Crete.

Seamless Care in the Health Region of Crete: the Star☆ Case Study

Michalis Blazadonakis[1], Vassilis S. Moustakis[1,2] and Giorgos Charissis[3]
[1]*Institute of Computer Science, Foundation for Research and Technology - Hellas, Science and Technology Park of Crete, Vassilika Vouton, P.O Box 1385, 71110 Heraklion Greece*
[2]*Department of Production and Management Engineering, Technical University of Crete, 73132 Chania Greece*
[3]*Director, Pediatric Surgery Clinic, University Hospital of Crete*

Abstract: Seamless collaboration and medical information exchange among health care experts is an open question on existing health care systems. The patient record is usually scattered all over the health care network making access to crucial medical information troublesome. The Star☆ (Seamless Telematics Across Regions) project provides a set of solutions towards this direction which will soon be applied at Crete. Initially two health care structures will be involved in the process but later on and after tests have been completed successfully in real world applications, results will be defused over the whole health care region of Crete.

1. Introduction

In our days care for patients is increasingly more demanding and should meet the needs of reliability and effectiveness. In most health care networks immediate supply of medical information and experience is troublesome causing waste of valuable time to health care experts, and economic deficit to the resource providing authorities. The same situation also applies at Crete which consists of a lot of remote and rural areas where immediate access to main health care providers located at urban sites is some times difficult and time consuming. On the island, there exist four prefecture Hospitals, one University Hospital located at Heraklion and several Health Care Centers which are scattered across the various sites. A patient may enter the health care network contacting various points of reference, sharing medical information and expertise among the various health care experts involved in such a process, is more than necessary. Lack of such information may cause waste of time to health care experts not to mention the fact that a lot of results may be reproduced across the various sites of the health care network.

At Crete, we approach seamless care through the use of Star☆ (Seamless Telematics Across Regions) project. The Star☆ is a 4th Frame Work European project that has selected key regions across the Europe to demonstrate the benefits of information sharing among one or more hospitals and their surrounding health care providers [1].

2. What does Seamless Care mean?

Unfortunately there is a gap when it comes to communicate among the various health care experts and institutions while information still flows on paper fax and telephone. With the increased use of specialist care and pressure of immediate access to valuable medical

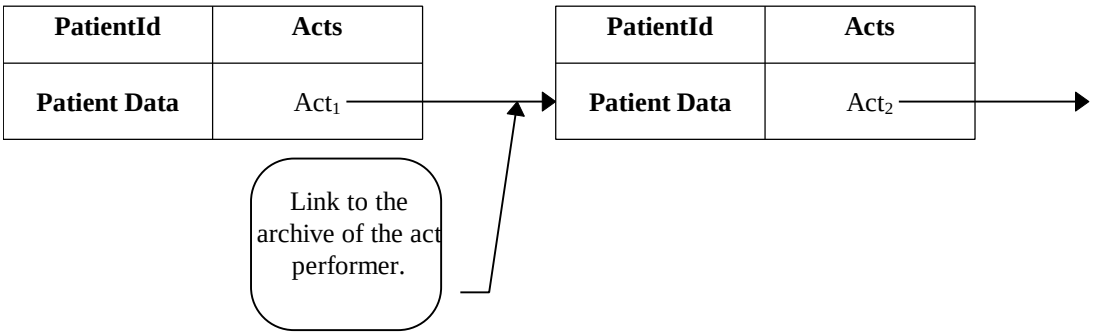

Figure 1: Management of Acts

information there is a clear requirement to replace the paper-based communication with something more efficient. We need a technology where experts will be able to inter-work with each other seamlessly, that is, they should be able to access information independent on where the information is located on as well as be able to publish information anywhere within the health care network.

The term Seamless is used to describe the inter-working of linked information systems. Based on the principles of act management and distributed patient dossiers, the Star☆ servers provide the mechanisms for act negotiation and patient record event linkage across different enterprises. Seamless access to data merits special interest in the following situations:

1. Each time a patient enters the health care network, an act has been initialized with a specified life cycle which ends when the patient eventually exits the health care network. The life cycle of an act then may be viewed as a succession of events within the health care network (see Figure 1).
2. Health care experts involved in the process should be able to follow the links and access information. This is achieved within the Star☆ project through the Act Management Server.
1. The health care experts should also be able to view the various parts of the patient dossier which may be scattered across the health care network through a set of links to the appropriate locations. This is achieved within the Star☆ project through the Patient Reference Dossier (Figure 2).

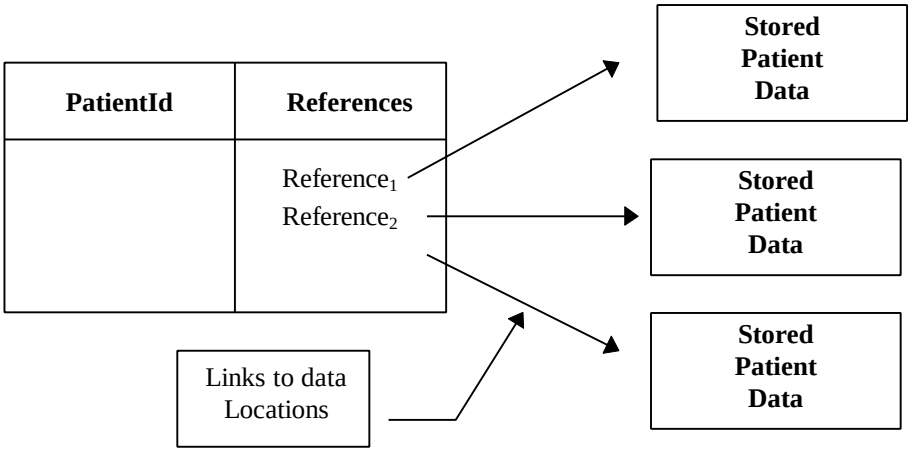

Figure 2: Management of Patient References

3. The Star☆ project Structure and mission statement

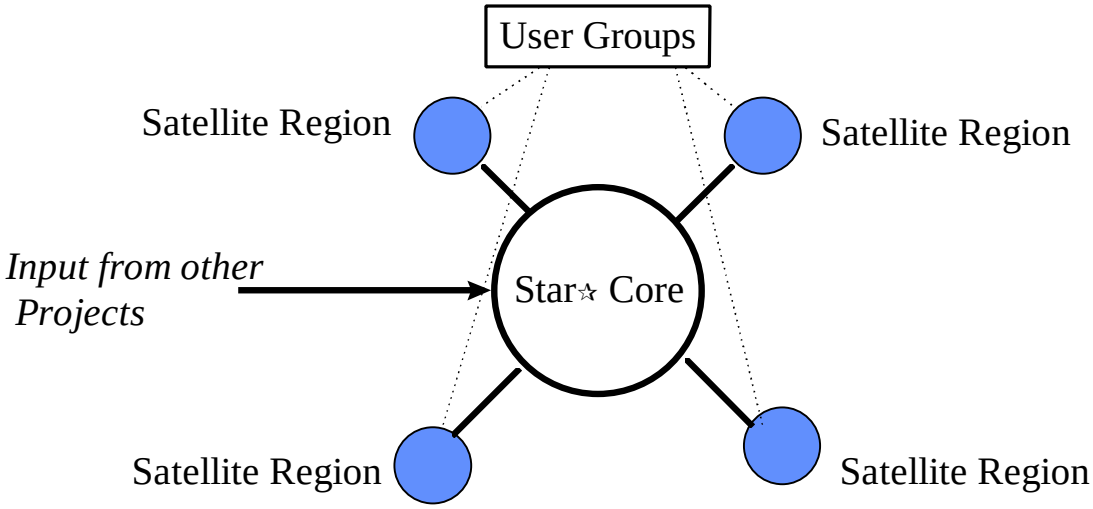

Figure 3: The Star☆ Project Structure

The mission of Star☆ is *to develop and validate open common telematic systems and services that enable a continuum of care for patients.* This overall goal breaks down into four main objectives:

1. To understand and deliver through demonstrations, the benefits of seamless care to patients and providers.
2. Integrate and develop close to market telematic service products.
3. Produce generic open system solutions for heterogeneous legacy systems
4. Produce publish and promote protocols and guidelines for interoperability.

The Star☆ demonstrator sites are called Satellites. This reflects the project structure and also shows that all the developments (within the core of the project) are driven by the user and business requirements of the satellite demonstrator sites. The overall project structure is shown in Figure 3. For more information on the users requirements at Crete, refer either to the Star☆ home page on the WWW [3], or to the home page of the Institute of Computer Science, FORTH [2]

4. An Architecture for implementing seamless care based on Star☆.

As presented in section 3 the Star☆ core group provides a set of services for remote access and interoperability to the Star☆ satellites which are then called to integrate their implementations using those services. The services provided by Star☆ core group are the following (see also Figure 4):

1. *The Authorization Server (AS):*
- Provides Controlled access to the Star☆ telematic Services
- Provides security and privacy to the data
- Provides control in the access of services.

2. *The Patient Reference Dossier (PRD):*
- The Patient Dossier is seen as a set of acts performed for a given patient.
- Provides links to the various acts performed for a given patient (See Figure 1and Figure 2).

3. *Act Manager Server (AMS):*
- Concerns the management and keeping track of the activities within the health care network.

- Provides links to data of the various activities concerning a patient, in most of the cases the data is distributed across the health care network.

4. *Enterprise Manager Servers (EMS), Local or Regional***:**

- Describes the health resources provided at local or regional level.
- Management of resources at local or regional level.
- Describes the health care activities that may be performed in the health care organization of the health care service provider.

5. *Patient Reference Manager (PRM):*

- References to the acts performed for a specific patient are maintained by the patient reference manager.

6. *Booking Server (BS):*

- Provides interactive process demands for appointments.

For more information on Star☆ project, refer to Star☆ home page [3].Figure 4 shows the general Star☆ architecture.

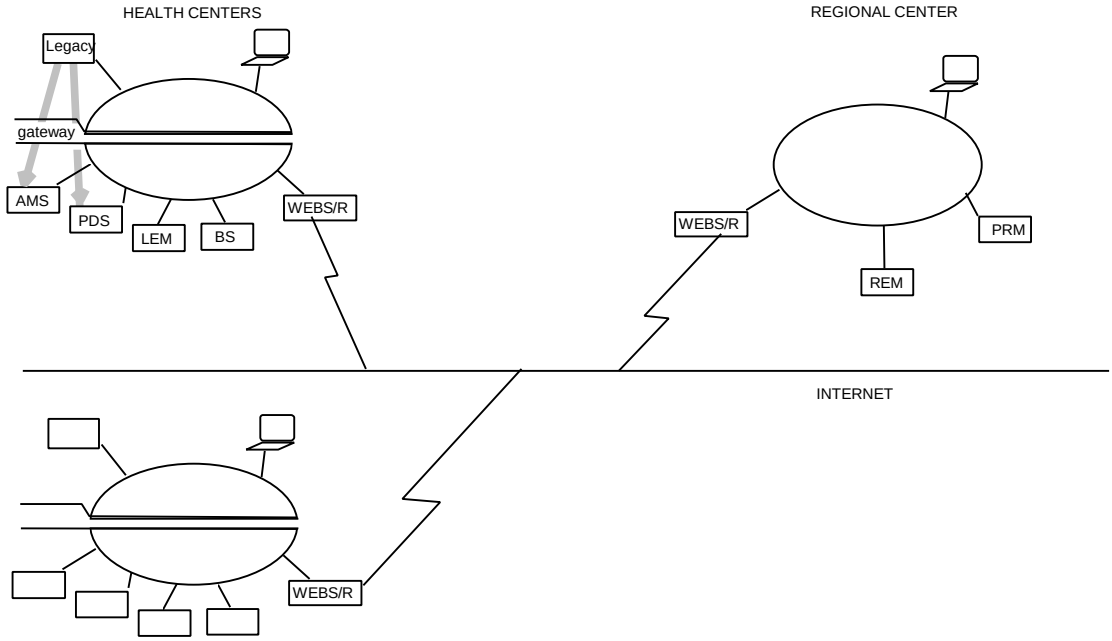

Figure 4: The Star☆ Architecture

5. Case study Pediatric Care at Crete

The Star☆ architecture will be applied and tested on the island of Crete to provide telematic services for the Pediatric Surgery Clinic of the University Hospital of Crete at Heraklion and the Health Care Center of Kastelli Kissamou at Chania.

The Pediatric Surgery Clinic is already using an electronic patient dossier software, which runs in Macintosh environment on the Omnis Data Base and is now migrating in ORACLE. The health care center of Kastelli at Chania will be in short time using an electronic patient dossier software implemented also in ORACLE. The main goal of Star☆ at Crete is to make those health care structures to inter-operate with each other. The Internet will be used to connect those two sites together while information exchange will be achieved via SQL, HTML and CGI scripts. SQL stands for Structured Query Language, HTML refers to Hypertext Mark-up Language and CGI to Common Gateway Interfaces.

This main goal breaks down into the following sub-goals:

1. An expert located at Kastelli Kissamou (Requester) should be able to refer a child to the Pediatric Surgery Clinic.
2. An expert located at the Pediatric Surgery Clinic(Performer) should be able to receive the referral and have access to the contents of the patient record located at Kastelli.
3. After the referral has been conducted and the child has entered the surgery clinic the requester should be able to view the contents of the patient record located at Heraklion.
4. An expert located anywhere at those two sites should be able to view and search for a patient located anywhere within this network.
5. An expert should be able to view specific contents of the patient record independent from its location

Work for the first year of the project have been conducted towards 1st and 2nd sub-goals. The Star✰ servers involved for the accomplishment of the above task are the Patient Reference Dossier (PRD), the Patient Reference Manager (PRM) and the Act Manager Server (AMS).

6. Conclusions

Evolution on technology has a direct impact on the way health care has been delivered. There is an urgent need for the synchronisation of health care, a very crucial social factor, to be able to meet the needs and requirements of a modern society. At Crete there is a clear requirement to replace the paper-based communication, between health care experts, with something more efficient. The Star✰ project seems to be a good solution towards this direction. Our main interests in future work is to implement and test in real world applications all the tasks referred in section 5 and when proven to be successful to expand this implementation to include more Hospital, Departments and Health Care Centers located across the island.

References

[1] B. Frandji and P. Cooper, Seamless Telematics Across Regions-Star✰, evolution and practical approach of open, modular, patient based health care solution, *In proceedings of MIE* '96, Copenhagen.
[2] Reference material mey be found on the World Wide Web at: http://www.ics.forth.gr
[3] Reference material mey be found on the World Wide Web at: http://www.compulink.co.uk/~haystacks/star/