**DEVELOPMENT AND EXTENSION OF THE PERSONALIZED INFORMATION SYSTEM**

**Extension and maintenance of the patient's electronic health record, the development of an online choice of GP, developing a mechanism for daily reporting of the activities of the contractors of the National Health Insurance Fund (NHIF)**

**National Health Insurance Fund – Bulgaria**

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1. **Background information**

The National Health Insurance Fund (NHIF) receives, both medical and personal information about patients as a prerequisite for the payment of all the work that all the partners of the NHIF, have carried out. This information is stored centrally in NHIF and is used to build up a single patient file for all the health insured people in Bulgaria. The patient's record integrates and stores historic information about diseases, allergies and immunizations, as well as all other types of medical services, which have been provided by primary outpatient care providers, hospitals, pharmacies, laboratories and others. With this project, we are aiming to methodically and gradually move towards integration and extension of the capabilities of the already functioning Integration Information System ( IIS ) and this make our online services more accessible as well as do a full reporting of all our contractual partners.

The architecture of the Personalized Information System consists of:

* Database Server - responsible for the the collection and centralization of all data stored as well as the maintenance of the application modules of the system;
* Application Server - responsible for the execution of the application's presentation layer. The server communicates with the database through a direct connection in order to achieve optimal efficiency when the data is exchanged;
* The user interface is through the web services.

The users of the system connect to the application server throughout their internet browser and send their requests. The presenting layer handles the requests and submits them to the modules of the system which, on their behalf, retrieve the data from the database and send it back to the presenting layer to display to the user. The NHIF users have access to the system by a virtual private network (VPN).

Advanced technological tools were used for the development and realization of the project, based on the products and technologies of Oracle.

The personalized system is implemented as a system from the Medical Data Hub type – for an automatic acceptance, storage, distribution and access to the medical information. It bring together and expands on the functionality of previously created Datawarehouse with additional services for online admission and routing of the medical information.

The built up architecture provides maximum security for accessing the stored medical information. The system provides secured access to the contractors as the data is being protected during the transportation with SSL and is also secured from a data change with the universal electronic signature. The web service is protected by WS Security ( XML Security and XML Encription)

The web interface is using a web service that provides double protection and prevents the direct access to data in the database.

The web services have been developed by using the standard Java tools, which doesn't impose any restrictions on the platform on which the client's programme, that uses the web services, is developed.

The web user's interfaces are developed by using the Oracle Application Express (APEX). Those interfaces provide access to the systems of medical care providers, pharmacies, hospitals, health insured persons, experts from the NHIF and RHIF.

Administration of the application, implementation, tuning of the meta data, business regulations, supplementation of references, adding (enabling and disabling) of checks is done through an interface which has been developed with APEX as well. Access to the administrative functions of the system is given only to trained IT professionals in NHIF and RHIF.

The most important functions and features implemented :

An accessible user interface for all the contractors, through which , data for underlying medical/dental services is being submitted in a specified format, signed with an electronic signature;

An implemented web service for the exchange of data and messages between IS of the NHIF and those of medical and dental care providers and pharmacies;

Developed user interface for accessing NHIF's and RHIF's data received from contractors;

Extraction of a historical reference, about the submitted information, from medical care providers, dental care specialists and pharmacies;

Generating reports to medical and dentist care providers and pharmacies concerning the submitted data to NHIF ( automatically generated and predefined by the system);

A chance for e-mail notifications sent to the contractual partners of the results of the data transfer;

Opportunity for the submission of data to IIS of NHIF;

Information is being received via e-mail or a text to your mobile phone if there is some kind of change in the patient's record;

Notification by e-mail or a mobile text for upcoming immunizations and upcoming medical examinations in a certain format and frequency of the message;

Keeping up to date lists of names, addresses and telephone numbers of the practices of the certain GP's;

A user interface that enables the electronic submission of registration forms for the selection of a General Practitioner and the visualization of the status of an application of health insured persons;

A possibility for a notification by an e-mail sent to the General Practitioner when a new choice is made by health insured person;

Control of the information on choosing a new GP and the mechanisms for the protection of the transmitted data;

Implementation of a web-service for the exchange of data and messages between the NHIF and the hospitals, and a possibility of a re-submission of data in the unlike case of errors;

An opportunity for e-mail notifications to the hospitals on the results of the data transfer;

Integration with the NHIF module that processes all claims of the hospitals which provide medical care;

Provision for training and technical support for the Personalized Information System after its introduction to an actual operating process, a system for the back up and recovery of data.

**II. Goals & timeframe**

The main objective of the project is to develop an extention of the already existing functionalities in the Personalized Information System (PIS) concerning:

* Expansion of the patients eletronic health record;
* Development of an online mechanism for choosing a general practitian (GP);
* Development of a day-to-day mechanisim for reporting all the activities carried out by the contractors of the National Health Insurance Fund (NHIF);

The business objectives are realized by extending the functionality of the already existing modules in PIS and the development of new modules to implement on:

* Expanding the volume of the data that is to be transferred and stored in PIS;
* Implementation of the opportunity to provide an unique access code to the patients file as an alternative to the existing ( through an universal electronic signiture) way of accessing PIS;
* Provide mechanisms for subscription to online notifications by SMS;
* Provide an opportunity for an online selection of GP;
* Provide an opportunity for recieving and storing of up to date information for all the medical procedures carried out by health care providers, dental care providers, pharmacies, laboratories, hospitals, etc.

Development of PIS functionalities related to:

* The exchange of data in standardized formats with other information systems in Bulgaria and countries from the EU;
* E-services for the integration of modules from IIS of the NHIF with public institutions in Bulgaria and countries from the EU.

Start Date 01.03.2012

End Date 01.04.2013

Both hardware and licenses for the technological infrastructure of the project were delivered too..

1. **Project’s added value and importance**

This project can be seen as an essential instrument for the provision of effective functioning of the Bulgarian Health Insurance System. A key measure, as mentioned in the project for National Health Strategy 2020 and e- Health action plan are the integration and connectivity in the Bulgarian healthcare sphere by building up a national health information system and providing the public with an access to it. This is the basis, on which the development of the e- Health with its main parts, will be able to step on - electronic health record, electronic profiles, electronic prescriptions, electronic transmission of prescriptions or e-referrals, etc. Linking and uniting all the processes in the national healthcare to one national system that can be able to control and exchange information in real time through module for monitoring all the key indicators of the healthcare system, can guarantee and ensure a two-way connection of all the processes in the system and gives the opportunity for an adequate analysis and interventions.

The implementation creates opportunities for carrying out more online administrative and health services in the health sector, provides access to the patients file by following all of his/hers medical history, improves the relationships between different levels of the system, improves the quality of the medical sevices and the effeciency of public spending on health care.

This is a prerequisite in order for the fiinancial funds to be as transparent as possible as wel as easy to analyze and control.

1. **Challenges**

Introduction of a national health information standard for health realated information and statistics;

Introduction of an Interoperability for the information system in the healthcare;

Establishment of the EU programme on Interoperability solution for Europian public administrations (ISA) programme is a key contributor to the EU eGovernment action plan 2011- 2015 within the famework of the digital agenta, by facilitating electronic cross- border and cross- sectorial interaction between Europеan public administrations;

Establishment of a united National health informational system and more electronic services for the citizens, data protection and security;

Provide connectivity to all medical suppliers of medical services;

Awarness and training;

Financial and tecnological capacity to build , maintain and develop a centralized electronic records and database;

Changes in the legal and regulatory frameworks.

**V. Relevance of the project to the respective Action Line**

**VI. Conclusion**  After the full implementation of the PIS, an opportunity to carry out more online administrative and health services in the health sector, to provide an access to the patients information, to impove the inner connections between the different levels of the system as well as the quality of the medical services, was created.