SRDC

E-HEALTH ACTIVITIES

9 July 2019

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SRDC IN A NUTSHELL

SRDC Corporation was founded by a professional team of engineers in the Middle East Technical University (METU) Technopolis in 2007. SRDC is a spin-off company of the METU Software Research and Development Center, which was founded in 1991 with the support of The Scientific and Technological Research Council of Turkey (TUBITAK) and METU Faculty of Engineering. A majority of the team hold PhD and MSc degrees in Computer Engineering at METU.

SRDC enjoys strong backing from the university for transferring the R&D efforts to the industry and public administrations. We perform R&D activities both for developing brand new products and services and for innovative improvement of existing products and services. We have extensive expertise in large-scale software development, interoperability standards and enabling technologies, semantic Web technologies, interoperability solutions for e-health, e-government and e-business domains, data analytics, conformance and interoperability testing, and mobile application development.

E-HEALTH SOLUTIONS & PROJECTS

SRDC Team has been actively working in e-health domain since 2003, by developing interoperable, standard based e-health applications that have been validated through field studies proving their added value to physicians, patients and health citizens. SRDC has worked in different fields of e-health, including mobile health applications, interoperability among diverse e-health Systems, chronic disease management through wireless medical sensors, automation of clinical guidelines, clinical decision support systems, cross-border, cross-enterprise exchange of medical summaries, patient empowerment, personal health records, and pharmacovigilance.

The team has vast experience in international e-health standards and Terminology systems including:

- HL7 Messaging Architecture
- HL7 Clinical Document Architecture (CDA)
- HL7 Fast Healthcare Interoperability Resources (FHIR)
- DICOM

- Integrating Healthcare Enterprise (IHE) interoperability profiles
- ISO/IEC 11073 – Health informatics – Medical / health device communication standards
- Continua Health Alliance Specifications
- CDISC Standards
- SNOMED CT
- LOINC
- ICD9, ICD10
- RxNorm
- ATC
- MedDRA

SRDC has coordinated many FP7/FP6 e-health projects (SALUS, iCARDEA, SAPHIRE, RIDE and Artemis) and participated in several other international / national e-health projects. A brief summary of major achievements is provided below:

- The first open source implementation of the ICT-PSP **epSOS** specifications for cross-border patient data exchange, which later turned into a multi-national effort (OpenNCP)
- Implementation of the Turkish pilot in epSOS for **cross-border patient summary exchange** on top of the national infrastructure SağlıkNet ("HealthNet")
- Development of a standards based PHR system named **e-SağlıkKaydım**, supported with patient guidance services (e.g. dietary, pregnancy, diabetes, migraine) and integrated with both EHR sources (e.g. SağlıkNet) and wireless medical sensors
- Development of a **medical device interoperability gateway** that communicates with both standards based (ISO/IEEE 11073, Continua Health Alliance) and proprietary devices
- Development of a general purpose Business Intelligence and Predictive Analytics Platform, called **mantIQ**. Specialization of this platform to health domain has been achieved and deployed to large scale hospitals in Turkey.
- Personalized remote monitoring of the cardiac patients with electronic implant devices through execution of clinical guidelines in the **iCARDEA** project

- Intelligent monitoring of cardiac patients for providing decision support to healthcare professionals, via wireless medical sensors and already available patient data in home-care and hospital settings in the **SAPHIRE** project
- Development of a Virtual Arthritis Clinic Service connected with EHR / PHR systems and healthcare professionals in ICT-PSP **PALANTE** project for empowerment of arthritis patients
- Development of a Recommender Engine connected with EHR / PHR systems and healthcare professionals in **EMPOWER** project for empowerment of diabetes patients
- Development of a mobile application for **personalized diet management** in cooperation with Acıbadem Hospital Group and Turkish Telecom, which currently has thousands of users
- Development of a standard-based interoperability framework on top of heterogeneous EHR systems for achieving real-time post-market safety studies in the **SALUS** project
- Creation of a pan-European roadmap for semantic interoperability of national/regional e-health systems in the **RIDE** project
- As the leader of validation work package, coordinating the **interoperability testing** activities of all epSOS nations for cross-border electronic patient summary and prescription exchange
- Consultancy services to the **Turkish Ministry of Health** on implementation and testing of the gigantic national health information system, namely SağlıkNet, since 2007
- Consultancy services to tens of **Hospital Information System** vendors for achieving their conformance to national / international standards, e.g. HL7 CDA R2, IHE profiles, DICOM supported through the TestBATN Platform when required
- Active involvement in **e-health standardization** activities.
- Development of **security and privacy** solutions for e-health applications including Anonymization and De-Identification methods, Audit mechanisms (IHE ATNA Profile) and Consent Management Tools

Further information about our e-health products and projects is provided in the following pages.

mantIQ

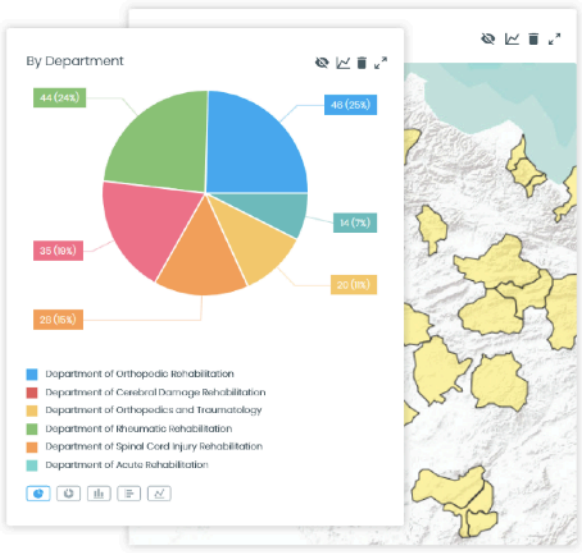
Your Intelligent Assistant

mantIQ is a Business Intelligence platform that helps you give meaning to your big data and take better decisions through its high-tech data analysis and visualization tools.

mantIQ is backed by artificial intelligence algorithms to predict future events. Decision-makers can make use of the fundamental insights provided by mantIQ to extract knowledge from data and plan the future.

FEATURES

- Effective data analysis through performance indicators and their dimensions. Faster and detailed data analysis capability by use of automatically generated data cubes.



- Personalized templates that can satisfy any data analysis requirements, interactive graphics that help analysis and user friendly design.
- User specific notifications on any type of communication medium for performance monitoring.
- Target, average and past value comparisons for performance indicators.
- Ability to run artificial intelligence algorithms on big data and capability to predict future events.
- Ability to run geographic queries on map. Detailed analysis and visualization with dot and heat maps.
- Ability to report analysis results in institution-specific Word, Excel and Powerpoint formats.

TARGETED END-USERS

Regional/national health authorities, public/private hospitals, clinics

RATIONALE

Do you need an intelligent, tireless assistant to manage your healthcare facility? mantIQ is there to continuously monitor your systems for financial analysis, service quality analysis and efficiency analysis.

mantIQ provides a data model, which contains a comprehensive list of possible performance indicators for healthcare sector. With the provided management panels, these performance indicators can be easily bound to existing data in the

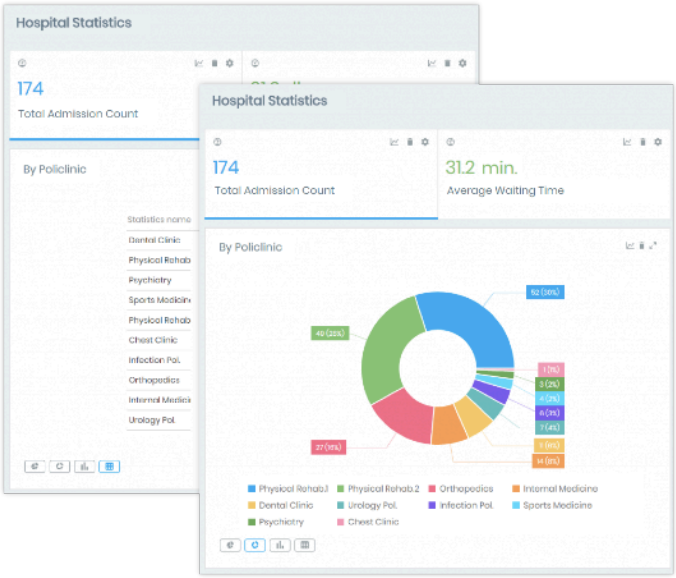
databases. In case more complex performance indicators are needed, you can edit the automatically generated scripts through easy-to-use graphical interfaces.

It is crucial to continually monitor the financial status of the medical institutes. It requires quite an extensive effort to harmonize all cumulative data from disparate data sources, performing analysis with all details and relate cost data with other sources of the institute.

- The goal of mantIQ is to facilitate this challenging process for managers and decision makers in a way that they can perform these tasks easily in their daily routines.

Quality in medical institutes is an important factor for being able to comply with national and international standards as well as to provide community health and economic development as the return of services provided clinically. It is important to analyze the entire database in a fast and accurate way in order to track the quality of the services provided in different departments of hospitals, to associate service items with financial data, and to make correct decisions.

- mantIQ provides the appropriate indicators for evaluating the quality of service provided at the hospital by the Indicators and their Dimensions to support managers in their administrative decisions.



Along with the rapid demographic and economic developments in recent years, high costs in the health sector have necessitated efficient and effective use of resources that are allocated to healthcare. For this reason, it is of utmost importance to use systems that ensure that resources are used correctly, with a primary focus on efficiency.

- With mantIQ, cost analysis makes it easy to follow how much money is spent, while at the same time to analyze how much the spent amounts and the resources are used efficiently.

REFERENCES

mantIQ is being actively used by large public hospitals in Turkey.

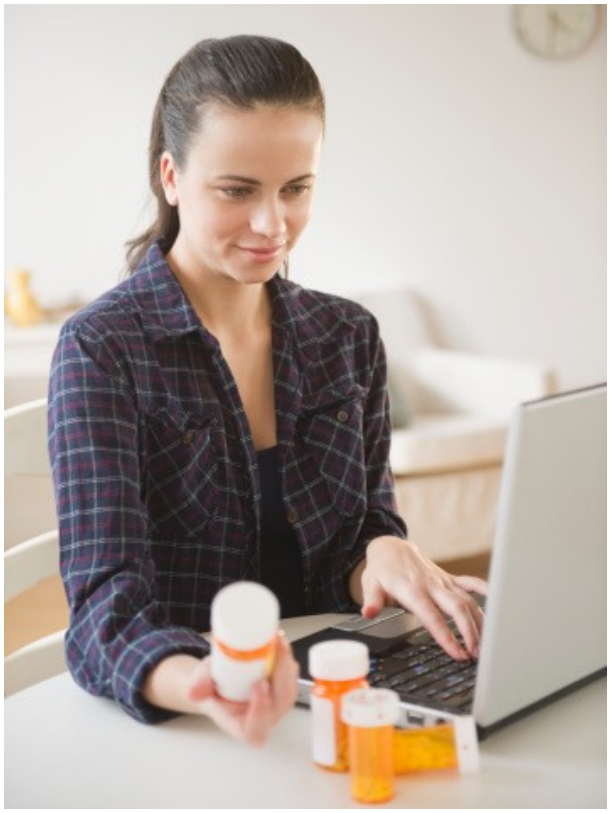
eSağlıkKaydım

Empower your patients with a personal health system

FEATURES

eSağlıkKaydım is basically a personal health record system (PHR) that is integrated with other clinical information systems like Turkish National Health Information System (SağlıkNet). It is a cloud service that enables patients to access and manage their personal health history.

- Enables patients to access medical records (e.g. lab results, diagnosis, prescriptions, etc) securely over the web interface
- Prevents data loss by enabling patients to save their lifestyle diaries (exercises, dietary info) measured in home, medical diaries (medications used, symptoms, etc) and physiological measurements (e.g. blood pressure, blood sugar, etc.)
- Provides integrations with wireless medical sensors to retrieve the physiological measurements automatically.
- Enables patients to take their medication or measure their measurement in time by adding reminders
- Enables patients to involve their treatment process actively
- Provides several chronic disease management modules that allow patients and physicians to manage the chronic diseases remotely by providing necessary guidance services
- Enables both patients and doctors to save their times by making data access easier and presenting the patient summary with graphical analysis, calendar view etc.
- Enables doctors to establish more accurate diagnoses and treatment methods by providing the patient's summary easily



TARGETED END-USERS

Regional/national health authorities, public/ private hospitals, clinics

RATIONALE

Do you want your patients to access their health data existing in your clinical information system?

- eSağlıkKaydım is a standard based personal health system so that it can easily be integrated with any other clinical information system. By using eSağlıkKaydım, you can provide access to your patients for their health data.

Do you want to provide guidance services for chronic patients in your region/hospital?

- eSağlıkKaydım currently provides chronic disease management and monitoring services for diabetes, hypertension and migraine as well as lifestyle management services for dietary and pregnancy. New modules for other chronic diseases can quickly be implemented in eSağlıkKaydım.
- These modules enable your patients to involve in their treatment process and helps them to perform the required periodic activities (e.g. measurements, lab tests, examinations, medication plans, exercise plan, dietary plans, etc) based on the care pathways. In the mean time, the modules enable your physicians to remotely monitor the progress of the patient and evaluate his/her health situation.

REFERENCES

- Development of the complete mobile version for the Turkish Telecom
- Development of a mobile application for personalized diet management in cooperation with Acıbadem Hospital Group and Turkish Telecom, which currently has thousands of users
- Usage in a number of European Commission supported projects such as epSOS and PALANTE

FAIR4Health

Improving Health Research in EU through FAIR Data

PROJECT DURATION

December 2018 – December 2021

PROJECT BUDGET

2,999,053 €

GOAL

In 2016, the "FAIR Guiding Principles for scientific data management and stewardship" were published in Scientific Data. The authors intended to provide guidelines to improve the findability, accessibility, interoperability, and reuse of digital assets. The principles emphasize machine-actionability (i.e., the capacity of computational systems to find, access, interoperate, and reuse data with none or minimal human intervention) because humans increasingly rely on computational support to deal with data as a result of the increase in volume, complexity, and creation speed of data.

Following the so-called FAIR principles, the overall objective of FAIR4Health is to facilitate and encourage the European Union Health Research community to FAIRify, share and reuse their datasets derived from publicly funded research initiatives through the demonstration of the potential impact that such strategy will have on health outcomes and health research.

Specific objectives of the FAIR4Health project can be listed as in the following:

- To design and implement an effective outreach strategy at EU level based on trust building and shared benefit to encourage research institutions to join the FAIR4Health community and FAIRify, share and reuse their publicly funded health research datasets.
- To produce a set of guidelines to inform a number of Research Data Alliance (RDA) recommendations in order to set the foundations for a FAIR data certification roadmap to guarantee high quality in EU open data derived from

publicly funded health research initiatives.

- To develop and validate an intuitive, user-centered FAIR4Health platform and FAIR4Health agents to enable the translation from raw (meta) data to FAIR (meta) data and its anonymization, curation, validation, mapping to standard health domain vocabularies, authoring, preservation, sharing, reusability and actionability of datasets derived from publicly funded health research initiatives.
- To demonstrate the potential impact that the implementation of such FAIR data strategy will have in terms of health outcomes and health research through the development and validation of 2 pathfinder case studies: (i) supporting the discovery of disease onset triggers and disease association patterns in comorbid patients, and (ii) a prediction service for 30-days readmission risk in complex chronic patients.

OUR ROLE

As an SME with extensive expertise in large-scale software development, semantic Web technologies and interoperability solutions for e-health, among others; we are one of the two key technical partners in the FAIR4Health project. FAIR4Health aims to achieve TRL7 for two different pathfinder use-cases and TRL7 means high-quality software development for the FAIR4Health Platform and its agents, for which we will play an important role. Our tasks in the project can be summarized as follows:

- design and development of the FAIR4Health platform and the FAIR4Health agents
- design and development of the security layer for the FAIR4Health platform. De-identification/anonymization methodology for FAIR data, the FAIRification with respect to data types (images, biosignals and continuous monitoring of health parameters), the design of the data and metadata curation methodology to be implemented in the FAIR4Health agents, the design of the data provenance model to be implemented in the FAIR4Health agents
- research, design and development of Privacy-Preserving Distributed Data Mining (PPDDM) mechanism so that globally interesting associations and patterns, i.e. the knowledge, can be extracted from large amounts of distributed data while protecting the sensitive information
- design of the continuous integration testing plan
- comprehensive examination of EU policy actions to ensure transformation of health care in the Digital Single Market
- develop of a business model and marketing strategy for innovative products and services built upon the FAIR4Health platform oriented towards

its exploitation in the EU Digital Single Market

- cover the identification of IPRs generated within the project, and the development of IPR agreement and commercialisation agreements for the project outcome

PARTNERS

1. Servicio Andaluz de Salud (SAS), Spain
2. Instituto Aragonés de Ciencias de la Salud (AICS), Spain
3. Universidad Carlos III de Madrid (UC3M), Spain
4. ATOS, Spain
5. Private University for Health Sciences, Medical Informatics and Technology (UMIT), Austria
6. HL7 International Foundation (HL7), Belgium
7. The Institute for Medical Informatics, Statistics and Epidemiology (IMISE), Germany
8. The Academic Medical Centre Amsterdam (AMC), Netherlands
9. The University of Geneva (UNIGE), Switzerland
10. Peter L. Reichertz Institute of Medical Informatics, Teknische Universität Braunschweig (PLRI), Germany
11. The Università Cattolica del Sacro Cuore (UCSC), Italy
12. The European Federation for Medical Informatics Association (EFMI), Switzerland
13. University of Edinburgh The Digital Curation Centre (UEDIN), United Kingdom
14. Garrigues (GAR), Spain
15. **Software Research and Development Consultancy A. S. (SRDC), Turkey**
16. University of Porto (UPORTO), Portugal
17. The Institute for Pulmonary Diseases of Vojvodina (IPBV), Serbia

Trillium-II

Reinforcing the Bridges and Scaling up EU/ US Cooperation on Patient Summary

PROJECT DURATION

January 2017 – June 2019

PROJECT BUDGET

1,104,547 €

GOAL

The Trillium-II project aims to:

- Improve international interoperability of Health systems in Europe, the United States, and globally
- Accelerate adoption of interoperability standards in eHealth with validated open source interoperability assets and tools sharing experiences and lessons learned among standards organizations and patient initiatives
- Identify key use cases for secure, seamless sharing of patient summaries at personal and population levels

MOTIVATION

Trillium-II continues the efforts of Trillium Bridge to achieve progress on its recommended actions and advance adoption of the International patient summary supported by broadly and consistently implemented standards. Starting point for Trillium-II is establishing its global community fostering the practice of digital health innovation. Concrete community actions aim to bridge,

harmonize, evaluate and guide existing and emerging patient summary initiatives, leading the way toward one international patient summary standard.

OUR ROLE

SRDC roles in the project can be summarized as follows:

- Identifying the security and privacy risks of the selected patient summaries exchange scenarios and providing guidance to the pilot implementers about realizing the required security and privacy measures
- Participating to the piloting studies of the selected Patient Summary Exchange Scenarios

PARTNERS

1. MedCom, Denmark
2. HL7 International Foundation, Belgium
3. NEN/CEN Technical Committee 251 Health Informatics, Netherlands
4. Integrating the Healthcare Enterprise, Belgium
5. The European Institute for Innovation through Health Data, Belgium
6. empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Germany
7. GNOMON Informatics SA, Greece
8. Reseau Phast Association, France
9. **Software Research and Development Consultancy A. S. (SRDC), Turkey**
10. OFFIS e.V., Germany
11. Lombardia Informatica S.p.A, Italy
12. Terveyden Ja Hyvinvoinnin Laitos, Finland
13. Agence eSante, Luxembourg
14. Fundacio Ticsalut Social, Spain
15. Servicos Partilhados Do Ministerio Da Saude Epe, Portugal
16. Connected Health Alliance, United Kingdom
17. Advanced Digital Innovation Ltd, United Kingdom
18. Reliant Medical Group Inc., United States
19. LANTANA Consulting Group, United States
20. Healthcare Services Platform Consortium, United States
21. Prosocial Applications Inc., United States
22. Healtheway Inc. DBA The Sequoia Project, United States
23. Kaiser Foundation Hospitals, United States

epSOS

Smart Open Services - Open e-health Initiative for a European Large Scale Pilot of Patient Summary and Electronic Prescription

PROJECT DURATION

July 2008 – June 2014

PROJECT BUDGET

36,000,000 €

GOAL

The aim of the epSOS Project is to provide an interoperability platform at the European level for healthcare data, and on top of this platform realize the exchange of electronic patient summary and prescription documents among the European countries. Supported by the FP7 ICT Policy Support Programme (PCP), epSOS is an enormous and prestigious project composed of 50 beneficiaries from 25 European countries. The first phase of the project started in July 2008. Together with the Turkish Ministry of Health, SRDC became part of the epSOS Project in its second phase starting January 2011.

During the project, many European countries have realized cross-border patient data exchange on top of their actual national/ regional infrastructures. The project is completed as of June 2014, however its outcomes and impact are prolonged through many new projects, such as e-SENS, EXPAND and Trillium Bridge.

MOTIVATION

Basically, epSOS targets the availability of a travelling European citizen's healthcare data in the European countries he is visiting. Such data is already available in many European countries via the regional and national healthcare information systems. The motivation of the epSOS project is to further benefit from this data by making it accessible to authorized healthcare professionals all over Europe to provide better and accurate care to the patient. As the most vital healthcare data to be exchanged cross-border, electronic patient summary and prescription documents have been identified.

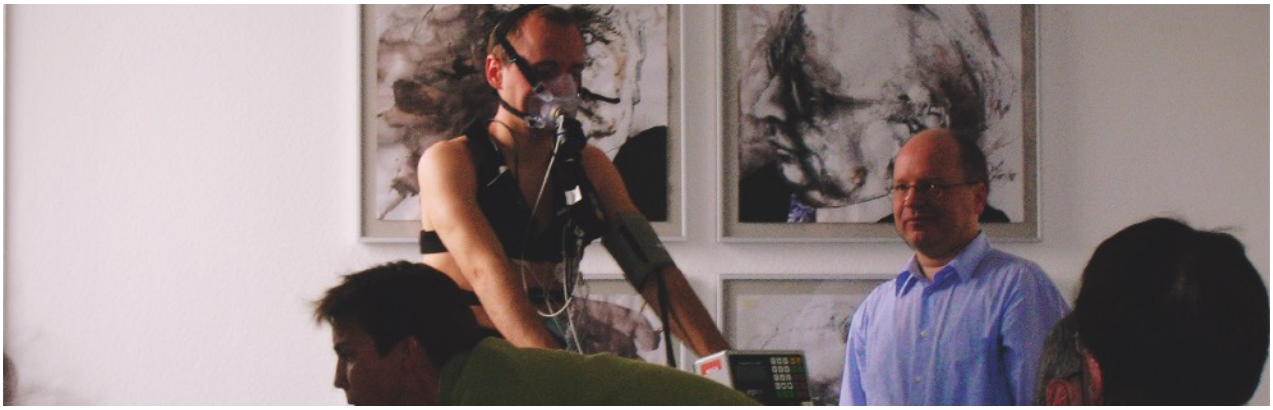
For example, when an Austrian citizen visiting Turkey goes to a healthcare provider for a health problem, before applying any

medical procedure, with the consent of the Austrian citizen the responsible physician is able access the basic healthcare data (e.g. diagnoses, allergy, surgery, medication history; medical device usage, vital signs) of the citizen normally defined in German, in Turkish language within seconds; and this way before arriving to any decision the physician has access to necessary data.

OUR ROLE

Although SRDC became part of epSOS in its second phase starting from January 2011, we have provided significant contributions to the project with our national and international activities. Our achievements can be summarized as follows:

- The first and only open source implementation of the epSOS interoperability specifications for cross-border patient data exchange with our internal resources in 2011, which turned into a multi-national open source effort named OpenNCP in 2012, followed by donation of our own implementation. This article entitled “Young Turks” presents a brief summary of our achievements in this respect.
- Implementation of the Turkish pilot for cross-border patient summary exchange on top the National Health Information System twice; first on top of the first version in SağlıkNet (“HealthNet”), and second in SağlıkNet 2.0, which is an improved system developed from scratch
- Exchange of electronic patient summary documents with tens of European countries
- Integration of Turkish epSOS Pilot with our Personal Health Record system eSağlıkKaydım
- Leading the Validation Work Package
- Revising the epSOS Testing Strategy to make it compliant with the CEN Global Interoperability Test Bed (GITB) (HREF: GITB page) initiative, and cooperation with IHE-Europe for update of Gazelle testing tools according to this revised Testing Strategy
- Coordinating the interoperability testing activities of all epSOS nations for cross-border electronic patient summary and prescription exchange. There are two types of these testing activities: (i) Projectathons that are organized physically in conjunction with the IHE-Europe Connectathons, and (ii) online Pre-Pilot Testing slots.
- Supporting with our expertise a number of European countries in their national pilot implementation
- Contribution to requirements analysis and design activities at the international level



SAPHIRE

Intelligent Healthcare Monitoring based on Semantic Interoperability Platform

PROJECT DURATION

January 2006 – June 2008

PROJECT BUDGET

2,917,016 €

GOAL

The aim of the SAPHIRE project is to develop an intelligent healthcare monitoring and decision support system on a platform integrating the wireless medical sensor data (e.g. ECG, blood pressure, SpO2) with patient data from hospital information systems. Intelligent monitoring and decision support provided to the healthcare professionals is based on automation of the state-of-the-art clinical guidelines, which are implemented as computer-executable models. These clinical guideline models are executed by a number of intelligent software agents, and access to variety of sensor data and medical data is handled through semantically enriched Web services. Real-time monitoring of clinical guideline execution is realized through user-friendly graphical interfaces, which is supported by mobile and Web based notification mechanisms for the healthcare professionals.

The achievements of the project was successfully demonstrated through two pilot applications: (i) for monitoring of cardiovascular patients (specifically patients with Acute Coronary Syndrome and patients with Heart Failure) in Emergency Hospital of Bucharest in Romania, and (ii) for homecare monitoring of cardiovascular patients (specifically patients suffering from ischemic heart disease followed by a revascularization therapy) in Schüchtermann-Klinik in Germany.

OUR ROLE

In addition to coordinating the project, SRDC Team was the main R&D partner of the project. Our achievements can be summarized as follows:

- Extension of the Guideline Interchange Format (GLIF) to bind the virtual data points to actual patient data sources,

such as Hospital Information System data, and hence to make it executable by computers

- Modelling of the state-of-the-art clinical guidelines for cardiovascular diseases in the extended GLIF format in collaboration with the healthcare professionals
- Development of the agent based intelligent monitoring and decision support system
- Development of the user-friendly clinical guideline execution graphical interface
- Development of semantically enriched Web services on top of hospital information systems, for standards based interoperable access to patient data
- Development of the alert and notification mechanism to notify healthcare professionals when necessary through SMS, email or Web
- Developing standard based security and privacy mechanisms to ensure protection of patient data
- 1 PhD, 3 MSc theses and several publications

PARTNERS

1. **METU Software Research and Development Center, Turkey**
2. Cyberfab, France
3. OFFIS e.V., Germany
4. ALTEC S. A. Information and Communication Systems, Greece
5. Institute for Automation Bucharest, Romania
6. The Internal Medicine and Cardiology Department of the Emergency Hospital of Bucharest, Romania
7. Schüchtermann-Klinik, Germany
8. Tepe Technology, Turkey

iCARDEA

An Intelligent Platform for Personalized Remote Monitoring of the Cardiac Patients with Electronic Implant Devices

PROJECT DURATION

February 2010 – January 2013

PROJECT BUDGET

3,613,448 €

GOAL

According to consensus statement prepared jointly by the Heart Rhythm Society and the European Heart Rhythm Association, more than 800,000 patients in Europe have Cardiovascular Implantable Electronic Devices (CIEDs) for the treatment or secondary prevention of cardiac arrhythmias. In addition, the number of follow-up visits for patients with an implanted cardiac device exceeds 5.8 million visits each year, and that number will continue to increase as more devices are implanted. The exponential growth rate of cardiac device implantation calls for new methods of long-term surveillance with a view to optimizing patient safety and care, alleviating the burden of caregivers, and lowering health care costs through ICT support.

Due to their limited processing capabilities restricted by their size, CIEDs need to be supported with software running on the data centers. Currently, the data center processing is standalone with their custom software and proprietary interfaces. iCARDEA exposes CIED data through standard interfaces to develop an intelligent platform to semi-automate the follow-up of CIED patients with context-aware, adaptable computer interpretable clinical guideline models. The computer interpretable guideline models are designed from re-usable building blocks to facilitate personalization of the patient care and follow-up workflow. The CIED data are exposed through standard interfaces based on the HL7, ISO/IEEE 11073 standards and the IHE IDCO Profile. EHR interoperability is achieved by exposing legacy EHR systems through standard HL7 CDA interfaces so that information about patients' medical history such as the non-cardiac conditions denoting contraindications to the proposed

therapies can be obtained from the patient EHR data and used in the clinical follow-up workflow. The clinical guidelines automates the risk assessment and hence support medical professionals by automatically assessing the situations and generating alarms. The patients are empowered with Personal Health Records (PHR) to enable informed and responsible participation in the process and for their education. iCARDEA platform provides comprehensive security and privacy mechanisms and has been validated in Salzburg Clinic in Austria with CIEDs from two major vendors, namely Medtronic and St. Jude.

OUR ROLE

In addition to coordinating the project, SRDC Team was the main R&D partner of the project. Our achievements can be summarized as follows:

- Development of the iCARDEA CIED based adaptive care planner based on clinical guidelines
- Development of EHR Interoperability Layer- Code System Mapping API
- Development of Security and Privacy mechanisms including consent Management System
- Integration of iCARDEA components
- 2 PhD, 2 MSc thesis and several publications

PARTNERS

1. **SRDC, Turkey**
2. OFFIS e.V., Germany
3. Salzburg Research Forschungsgesellschaft m.b.H, Austria
4. Foundation for Research and Technology Hellas – Institute of Computer Science, Greece
5. Salzburger Landeskliniken Betriebsges m.b.H, Austria
6. St. Jude Medical Medizintechnik Ges m.b.H, Austria
7. Medtronic Ibérica, Spain
8. Hospital Clinic I Provincial de Barcelona, Spain

SALUS

Scalable, Standard based Interoperability Framework for Sustainable Proactive Post Market Safety Studies

PROJECT DURATION

February 2012 – January 2015

PROJECT BUDGET

5,077,781 €

GOAL

Electronic health records (EHRs) provide a huge but still under-utilized source of information on the real world use of medicines. Although EHRs are primarily utilized for patient care, they also contain a broad range of clinical information highly relevant for safety analysis. EHR data available in clinical care systems can clearly complement and strengthen existing post-marketing safety studies based on data from spontaneous reporting systems. Relative to spontaneous reports, EHRs cover extended parts of the underlying medical histories, include more complete information on potential risk factors, and are not restricted to patients who have experienced a suspected Adverse Drug Events (ADEs).

The SALUS project is exploring new ways of accessing and analyzing data found in Electronic Health Records to provide an infrastructure that enables the execution of safety studies for mining and analyzing real-time patient data. In this way, patient safety can be ensured through early detection of rare adverse events; the pharmaceutical industry can provide faster medication innovation by decreasing time to market for new, safe and effective drugs, and at the same time the load of overwhelmed medical practitioners can be reduced.

SALUS aims to provide:

- Functional interoperability profiles enabling exchange of EHRs
- Semantic interoperability solutions enabling meaningful interpretation of the exchanged EHRs
- Security and Privacy mechanisms ensuring EHRs are shared in an ethical and safe way

- A novel framework for open-ended temporal pattern discovery for safety studies on top of EHR Systems
- Implementation of high potential use cases enabling secondary use of EHRs for post market safety studies

OUR ROLE

SRDC is the coordinator of the SALUS Project; hence the primary role of SRDC is to coordinate the administrative activities and ensure that the project is on track with the harmony of all project partners. Apart from coordination, SRDC is the main responsible of the design of the SALUS architecture together with the integration of different tools and components.

PARTNERS

1. **SRDC, Turkey**
2. European Institute for Health Records, France
3. UMC, Sweden
4. OFFIS, Germany
5. AGFA Healthcare N.V., Belgium
6. Electronic Record Services BV, Netherlands
7. Lombardia Informatica S.p.A., Italy
8. Institut National de la Sante et de la Recherce Medical, France
9. Technische Universitaet Dresden, Germany
10. F. Hoffmann-La Roche AG, Switzerland

WEB-RADR

WEB-RADR Recognising Adverse Drug Reactions

PROJECT DURATION

September 2014 – August 2017

PROJECT BUDGET

2,270,000 €

GOAL

Adverse drug reaction (ADR) reporting by healthcare professionals (HCPs) and patients by means of mobile devices and social media platforms to National Competent Authorities (NCAs) and marketing authorisation holders (MAHs) with subsequent transmission to EudraVigilance is a new and unexplored concept. In addition, the vast amount of information generated through social media requires a well-defined approach as regards monitoring, reporting, analysing and evaluation of potential adverse reactions and other medical insights related to medicines.

Social media also brings a new dimension to pharmacovigilance as it offers a tool for regulators and pharmaceutical industry to communicate about latest developments related to medicines and safety issues with the possibility of potentially improving health outcomes. It also provides a mechanism for collaboration between users and is a social interaction mechanism, requiring ethical, societal and personal data protection aspects to be addressed. Whilst there are numerous benefits of the use of social media, the impact on HCPs and patients and their behaviour towards prescribing, dispensing and usage of medicines needs to be further analysed. WEB-RADR addresses these issues.

WEB-RADR aims to set policy & guidance and deliver robust information technology tools to address the potential for the reporting of ADRs through mobile applications and the recognition of drug safety signals from user comments in social media and the internet. The policies, guidance and tools delivered through WEB-RADR will be underpinned by extensive academic research and user testing to

ensure the project meets the needs of all stakeholders.

OUR ROLE

As SRDC, we will leverage our existing efforts to create tools that will allow for the generation of pre-filled individual case safety reports (ICSR) by extracting fields from EHRs, such as past and active medications and problems of the patients. This will allow for gathering more patient context from the EHRs of the patient to be put in to the ICSR. We will also conduct a pilot to assess the feasibility of exchanging data between the app and EHR systems.

We have recently co-authored data exchange profile standards for the exchange of this type of information, including Integrating the Healthcare Enterprise (IHE) Data Element Exchange (DEX) profile, and have experience in existing IHE Retrieve Form for Data Capture (RFD) and IHE Drug Safety Content (DSC) interoperability profiles.

PARTNERS

1. **Novartis Pharma, United Kingdom**
2. MHRA, United Kingdom
3. Epidemico, Ireland
4. European Organisation for Rare Diseases, France
5. Academisch Ziekenhuis Groningen, Netherlands
6. University of Liverpool, United Kingdom
7. SRDC, Turkey
8. University College London, United Kingdom
9. HALMED, Croatia
10. Stichting Lareb, Netherlands
11. European Medical Agency, United Kingdom
12. Uppsala Monitoring Centre, Sweden
13. Janssen Pharmaceutica, Belgium
14. Bayer Pharma, Germany
15. AstraZeneca, Sweden
16. Sanofi-Aventis Research & Development, France
17. UCB Biopharma SPRL, Belgium
18. Amgen, Belgium

PALANTE

PAtients Leading and mANaging their healThcare through E-health

PROJECT DURATION

February 2012 – January 2015

PROJECT BUDGET

6,364,002 €

GOAL

The main goal of PALANTE is to empower patients so they are able to make informed decisions about their health, take an active role in their care and collaborate effectively with their healthcare team thanks to the use of information and communication technologies.

The PALANTE Project considers 7 new pilots in different European regions (Andalusia, Lombardy, Turkey, Norway, Austria, Czech Republic and Basque Country) and 2 additional on-going experiences in France and Denmark. The pilots have been carefully selected to cover different levels of patient empowerment and chronic disease management. Pilot teams of public – private partnership ensure all the key stakeholders are involved in the e-health provision. Through these pilots the PALANTE project aims to maximize the potential of ICT technologies by validating at a large scale a significant number of pilots so all the mechanisms involved in patient empowerment are addressed.

Patients on all social levels across Europe are targeted by the project as they are increasingly demanding access to their health information records and participation in the process of their health information records and participation in the process of their healthcare delivery. Certain pilots are specially focused on chronic patients, who need more personalized care/assistance, and tool to improve their self-care and self-management.

MOTIVATION

Patient empowerment enables patients to take an active role in their own healthcare provision which allows them to stay easily informed and “self-manage” their own health services. In the context of ageing population and increasing number of chronic patients,

patient empowerment is considered a key tool to reduce healthcare costs and improve quality and efficiency of the health delivery process. Patient empowerment has become an element of high priority in the EU health strategy, supported by national and regional health authorities.

OUR ROLE

Together with Republic of Turkey Ministry of Health (MOHTR) and Turkish League Against Rheumatism (TLAR), SRDC manages the Turkish pilot of project. Turkish pilot mainly focuses on patients' learning about their diseases. Being knowledgeable about disease is considered as a key point on taking an active role in treatment process. After necessary information are provided to patients, patients are aimed to have sufficient knowledge about general treatment plan, options in care period and it's outcomes, current situation of disease, treatment period, effects on the course of live etc.

Turkish pilot focuses on Ankylosing Spondylitis (AS) disease which requires regular treatment. AS patients are able to manage their health through Virtual Arthritis Clinical Service (VACS) on eSaglikKaydim platform provided by SRDC. AS patients are also able to communicate with healthcare professionals and other patients through this service. One one hand VACS provides information to patients about their diseases, on the other hand it provides necessary tools by which patients can regularly store important health data like their feelings, encounters, effects of medications or exercises etc. Thanks to this information, healthcare professionals are able to be kept up to date on patients' situation and interfere quickly when necessary.

PARTNERS

1. **Fundación Progreso y Salud, Spain**
2. Servicio Andaluz de Salud, Spain
3. Indra Sistemas, Spain
4. Lombardia Informatica, Italy
5. Politecnico di Milano, Italy
6. Republic of Turkey Ministry of Health, Turkey
7. SRDC, Turkey
8. Turkish League Against Rheumatism, Turkey
9. Oslo Universitetssykehus HF, Norway
10. CSAM Health AS, Norway
11. EMPIRICA, Germany
12. KAGES, Austria
13. Gesundheitsfonds Steiermark, Austria
14. FH Joanneum GmbH, Austria
15. IZIP, Czech Republic
16. European Health Management Association, Ireland
17. Servicio Vasco de Salud Osakidetza, Spain
18. ASIP, France
19. SUNDHED, Denmark
20. Fondazione Politecnico di Milano, Italy
21. BIOEF, Spain

RIDE

A Roadmap for Interoperability of e-health Systems in Support of COM 356 with Special Emphasis on Semantic Interoperability

PROJECT DURATION

January 2006 – December 2007

PROJECT BUDGET

1,156,000 €

GOAL

RIDE is a roadmap project for interoperability of e-health systems leading to recommendations for actions and to preparatory actions at the European level. The project delivers a roadmap for EU counties for establishing semantic interoperability for clinical data models, terminology systems, clinical practice and EHR systems for their national health information systems. The roadmap is used to prepare the ground for future actions as envisioned in the action plan of the e-health Communication COM 356 by coordinating various efforts on e-health interoperability in member states and the associated states.

OUR ROLE

SRDC was the coordinator of the project and work on the proposed methodology for semantic interoperability mechanisms for clinical data models and terminology systems.

PARTNERS

1. **METU Software Research and Development Center, Turkey**
2. OFFIS e.V., Germany
3. Institute for Formal Ontology and Medical Information Science, Germany
4. European Institute for Health Records, France
5. National Council of Research, Institute for Biomedical Technology, Italy
6. National Technical University of Athens, Institute of Communication and Computer Systems, Greece
7. National University of Ireland, Digital Enterprise Research Institute, Ireland
8. Integrating the Healthcare Enterprise, Germany
9. Office Line Engineering NV, Belgium

EMPOWER

Support of Patient Empowerment by an intelligent self-management pathway for patients

PROJECT DURATION

February 2012 – February 2015

PROJECT BUDGET

4,280,000 €

GOAL

Funded by European Commission in FP7 Programme, EMPOWER aims to support the self-management of diabetes patients through a standards-based Patient Empowerment Framework. It helps sufferers of diabetes with observing daily patterns of living and with managing personalized action plans. EMPOWER focuses the efforts on a patient-centric perspective that also involves healthcare professionals. EMPOWER provides Self-Management Pathways for diabetes patients and this includes:

- Services for the specification and execution of actions to change behavior according to diabetes-specific health care needs and
- Services for monitoring of vital, physical, mental parameters as well as physical and lifestyle activities based on health standards.

EMPOWER addresses long-term goals and short-term activities in order to facilitate the self-management of patients with diabetes and thus the treatment of chronic diseases. The pilot applications in Germany and Turkey demonstrate that patient-centric approach of EMPOWER can improve disease management by personalized self-management services helping diabetes patients to cope better with their condition.

OUR ROLE

In the EMPOWER Project, SRDC implemented the consent management mechanism for patients and recommender engine which will execute machine processable diabetes guidelines and helps the doctors in their treatment processes. Furthermore, SRDC lead the pilot application in Turkey.

PARTNERS

1. **Salzburg Research Forschungsgesellschaft mbH, Austria**
2. Intracom Telecom, Greece
3. Università della Svizzera italiana, Switzerland
4. Helmholtz Zentrum München, Germany
5. Ministry of Health, Turkey
6. SRDC, Turkey
7. GO IN Integrationsmanagement- und Beteiligungs-GmbH, Germany

ARTEMIS

A Semantic Web Service-based P2P Infrastructure for the Interoperability of Medical Information Systems

PROJECT DURATION

January 2004 - June 2006

PROJECT BUDGET

2,957,604 €

GOAL

European Commission FP6 funded ARTEMIS Project aims to achieve interoperability in eHealth through Web Services. To the best of our knowledge ARTEMIS is the first project that proposes Web Services in eHealth and achieved deployment in real-life.

OUR ROLE

In the ARTEMIS Project we enabled the Web Services semantically meaningful. An AMEF (Artemis Message Exchange Framework) is developed to provide the exchange of meaningful clinical information among healthcare institutes through semantic mediation. The framework involves first providing the mapping of source ontology into target message ontology with the help of a mapping tool which produces a mapping definition. This mapping definition is then used to automatically transform the source ontology message instances into target message instances. Through a prototype implementation, we demonstrate how to mediate between HL7 Version 2 and HL7 Version 3 messages. However, the framework proposed is generic enough to mediate between any incompatible healthcare standards that are currently in use.

PARTNERS

1. **METU Software Research and Development Center, Turkey**
2. OFFIS e.V., Germany
3. SEBT, United Kingdom
4. ALTEC, Greece
5. Tepe Teknoloji, Turkey
6. IT Innovation Center, United Kingdom