TreC – a REST-based Regional PHR

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The context

• In a view of citizen empowerment, there has been growing interest in the Personal Health Record (PHR) in the last few years as a tool allowing people the manage and share their health data.

• TreC project started in 2009, with the aim of developing a PHR for the 400,000 citizens of the Province of Trento (Northern Italy).
The Personal Health Record

• PHR: the laypeople’s counterpart of EHR, but with important differences.

• EHRs are typically designed to support the work of healthcare professionals in specific contexts.
  o Patterns of actions can be studied and formalized to build an EHR supporting the workflow.

• Typical citizen workflow on health-related activities can hardly be defined.
  o Citizens may record any kind of data and organize them according to individual patterns.

• Which are the citizens’ requests for the management of their health data as well as data produced by healthcare organizations?
Requirement analysis

• PHR requirements:
  o Access to relevant medical information produced elsewhere.
  o Collection and management of heterogeneous data: health data as well, lifestyle data, etc.
  o Flexible organization of data in higher level context-dependent concepts.
  o Interfacing of heterogeneous devices and applications to collect and visualize data, to provide support through alert, reminders, etc.
Requirement analysis

- PHR requirements:
  - Access to relevant medical information produced elsewhere.
  - Collection and management of heterogeneous data: health data as well, lifestyle data, etc.
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TreC Architectural solution

• REST (Representational State Transfer) based architecture
  o Clients, which initiate requests and servers, which process requests and return responses.
  o Transfer of representations of resources, i.e. any coherent and meaningful concept of interest identified by an URI.

• Advantages:
  o Resource representation format (JSON, XML) independent from the DB.
  o Uniform interface between clients and servers, with a small set of general methods to identify and manipulate resources. (e.g., GET, PUT, POST, DELETE for HTTP).
  o Maximization of pre-existing interfaces and capabilities of the network protocol.
TreC data model

- REST resources are “atomic” concepts:

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<th>URI</th>
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<th>Code</th>
<th>Value</th>
<th>Unit</th>
<th>Time</th>
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- Indepency from context and application.
- The task of aggregating REST resources in higher level concepts is left to client applications (widgets).
- Third parties information (e.g., hospital reports) managed as REST resources whose representation is a ‘blob’ of different kind of information.
TreC Architecture

TreC Clients

TreC Web Portal

TreC on Smartphone

TreC on iPad

MIDDLEWARE

TreC Clients

TreC Web Portal

TreC on Smartphone

TreC on iPad

TreC DB

HCST

Personal data

HCST

Clinical Reports

External Service Providers

Services, Accounting, Authorization Control

PSC

REST Controller (HTTP request Manager)

REST Core

OTP

Single Sign-On Services, Accounting, Authorization Control

TreC BETA

La tua cartella clinica

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Scheda sanitaria

Inserisci visita

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Misura pressione sanguigna

Misura peso

Indica farmaci assunti

Vedi tutti i dati

Calcolo colesterolo LDL

Misura frequenza cardiaca

Inserisci vaccinazione

Aggiungi/Rimuovi funzioni

Peso

Pressione

Sintomi

Farmaci

Altro

Note

Vedi dati

Alarmi

Terapia

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Conclusion and future work

• First TreC version released in the last part of 2010: REST core, DB, Web Portal.
  o 450 registered users.
  o Retrieval and management of documents produced by the healthcare organization (lab test results, discharging letters).
  o Structured personal health diary: familiar history and measures (pressure, weight, allergies, etc.).

• User satisfaction and usage patterns survey was carried out by interviewing the 15 users who accessed the system most frequently.

• Pilot studies will focus on TreC access through mobile devices for the personal management of chronic diseases (diabetes, asthma).
Thank you for your attention

• Fondazione Bruno Kessler: www.fbk.eu
• TreC portal: www.trec.trentinosalute.net