

Event-Driven Privacy Aware Infrastructure for Social and Health Systems Interoperability: CSS Platform

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Abstract. Assistive processes in healthcare and socio-assistive domains typically span multiple institutions which usually communicate manually with the exchange of documents. Despite the needs of cooperation it is difficult to provide an integrated solution to improve data exchange and allow comprehensive monitoring of the processes due to the complexity of the domains and the privacy issues derived by the use of sensitive data. In this demo we show how we approached the problem in designing and deploying a platform for the interoperability and monitoring of multi-organization healthcare processes in Italy. Our solution provides an event-based platform that assures privacy enforcement with a fine-grained control on the data that is distributed and minimizes the effort required to join the platform providing components that automates the data exchange.

Keywords: EDA, interoperability, cooperation, privacy, business intelligence.

1 Introduction and Contributions

In this demo we describe a solution to manage and partially automate the integration between social and healthcare institutions to deliver social and health services. The work is the result of a large, multi-million dollar effort, the CSS (Cartella Socio-Sanitaria) project, undertaken by the autonomous province of Trento, Italy¹. The context in which CSS is born is characterized by many heterogeneous and very complex systems with different level of evolution and owned by different institutions with new partners joining the scenario over time. The data used in this domain is particularly sensitive and related to the health status of citizens. This imposes strict legal constraints on the way data is collected, stored, distributed and processed in a context with multiple data controllers collecting the data of citizens and their consent.

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We approached the analysis problem in a lighter way than for classical integration approaches. We analyzed processes of assistance isolating interesting events in a Business Intelligence (BI) and interoperability perspective. We used those events as unit of information and developed a platform based on SOA and EDA that enables the routing of data among involved institutions and also to the BI that becomes an Event Based BI. Privacy is assured via a fine-grained, purpose-based, two-phase access control mechanism: each source produces notification of events that are only partially specified (with no sensitive data) and CSS notifies them to interested consumers; each consumer must explicitly request the details to the source (along with a purpose statement) via the CSS platform; the source returns only the allowed details always via the CSS platform. This protocol allows sources to specify different visibility rules based on explicitly stated purposes in compliance with privacy regulations [1] and to CSS to trace the requests for auditing. The main contributions of CSS are:

- an event-based interoperability infrastructure that allows the different institutions to interoperate easily with minimum effort;
- a fine-grained privacy control over the exchanged information among involved partners;
- an event based Business Intelligence analysis over processes of assistance that span different organizations available to the Governance.

2 Demonstration Storyboard

In the demo we will explain the main concepts of the architecture (with some slides) and simulate some concrete usage scenarios of the event-base CSS platform. In particular, the demo will be as follow:

1. *Intro*: explains the real context, its challenges, CSS goals and contributions
2. *Approach*: presents our analysis approach and its points of innovation
3. *Architecture*: explains the CSS components and their interactions, simplicity of installation, privacy management visibility rule wizard to define privacy policies on events
4. *Event creation demo*: we simulate a patient using the tele-care and tele-assistance service requesting a rest home service. A social assistant approves the request and edits the social profile of the patient generating an event that is automatically notified by the platform to the destination rest home and tele-care/tele-assistance system for interoperability and BI module for reporting.
5. *Privacy-aware event routing*: explains the routing of notifications and the privacy-aware retrieval of the details
6. *Event consumption demo*: we show how the detailed acceptance event is accessed differently depending on roles and purposes. A doctor of the rest home can see all the details of the patient while the reception does not receive the social profile. We show the operator at the tele-care and tele-assistance service searching the events to know where the patient is and his destination rest home. Finally we show the BI module for the Governance receiving only aggregated data to create the report in a near real time fashion.
7. *Conclusions and future works*: a summary of the lessons learned and future extensions.

Reference

1. Armellin, G., Betti, D., Casati, F., Chiasera, A., Martinez, G., Stevovic, J.: Privacy preserving event driven integration for interoperating social and health systems. In: Jonker, W., Petković, M. (eds.) SDM 2010. LNCS, vol. 6358, pp. 54–69. Springer, Heidelberg (2010)