Data Sharing Agreements: how to glue Definition, Analysis and Mapping together

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An electronic Data Sharing Agreement (DSA) is a human-readable, yet machine-processable contract, regulating how organizations and/or individuals share data. Its smooth definition and fluid lifecycle management are key aspects for enabling data protection in various contexts, from e-government to, e.g., the provision of business and healthcare services.

MAIN TEXT
Sharing data among individuals and organizations is becoming easier and easier with the support of highly-connected ICT systems. Data sharing, however, poses several problems, including privacy and data misuse issues, as well as uncontrolled propagation of data. Additionally, due to reduction of costs and provided functionalities, citizens, private and public companies prefer to use cloud infrastructures to store their data. Thus, a secure and private way for data exchange, storage, and management becomes essential. The aim of the Coco Cloud project[1] is to fulfill these security and privacy issues, by providing a framework that permits the exchanging of data by enforcing privacy policies to access and use data in a controlled way. This is supported by the concept of Data Sharing Agreement (DSA). DSAs specify policies that are applied for accessing the data they are linked to.

Here, we introduce the Coco Cloud DSA system, able to manage different phases of DSA design, development, and use: DSA Authoring Tool, DSA Analysis and Conflict Solver Tools, and a DSA Mapper Tool, glued together by the DSA Lifecycle Manager [1]:

- **DSA Authoring Tool** is in charge of creating and managing DSAs. The rules included in the DSA are created using a language called Controlled Natural Language for DSA [2], or, more concisely, CNL, which is based on specific dictionaries (ontologies). The tool is available as a web application that provides a user-friendly experience.

- **DSA Analyzer and Conflict Solver** analyze the rules in a DSA and solve potential conflicts. A conflict exists when two policies simultaneously allow and deny an access request under the same contextual conditions. In case a conflict is revealed, the Conflict Solver prioritizes the rules to be enforced. The Analyzer is available as a web service application and it exposes its functionalities through APIs (Application Program Interfaces).

- **DSA Mapper** translates the DSA policies from CNL into an enforceable XACML-based language. The mapping process takes as input the analyzed DSA rules, translates them in the machine-processable language, and combines all rules in line with the conflict solver strategy. The outcome of this tool is an enforceable policy. Such policy will be evaluated at each request to access and/or use the target data.

- **DSA Lifecycle Manager** orchestrates all the DSA System components. When a user logs into the DSA Lifecycle Manager, this provides her specific functionalities of the DSA System, according to the specific user’s role (described below). Thus, users do not interact directly with the DSA System components tools, but via the DSA Lifecycle Manager.

The DSA System allows different typologies of users to edit DSAs. Users can log in the DSA system under three different roles, each role with specific features, goals, and functionalities [3]:


• **Law expert** is familiar with legal and contractual perspective content of the agreement, for example she is a lawyer. Such a user is in charge of creating and managing the initial version of a DSA through the DSA Authoring Tool, instantiating legal rules.

• **Policy expert** is responsible to define business policies and DSA metadata, for example a company policy expert that has to set up company specific agreements.

• **End user** can either extend, if requested, the DSA of the Policy expert with her user-specific input or simply review and accept a DSA created by a Policy expert for being used for her data. An example of such a user is a patient in a hospital.

The Coco Cloud solutions to manage Data Sharing Agreements are assessed through the three project use cases, featuring the need of secure and private data sharing within the Public Administration, Healthcare, and Mobile scenarios.

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**USEFUL LINKS**

1 http://www.coco-cloud.eu

**REFERENCES**


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