



Authoring of Data Sharing Agreements

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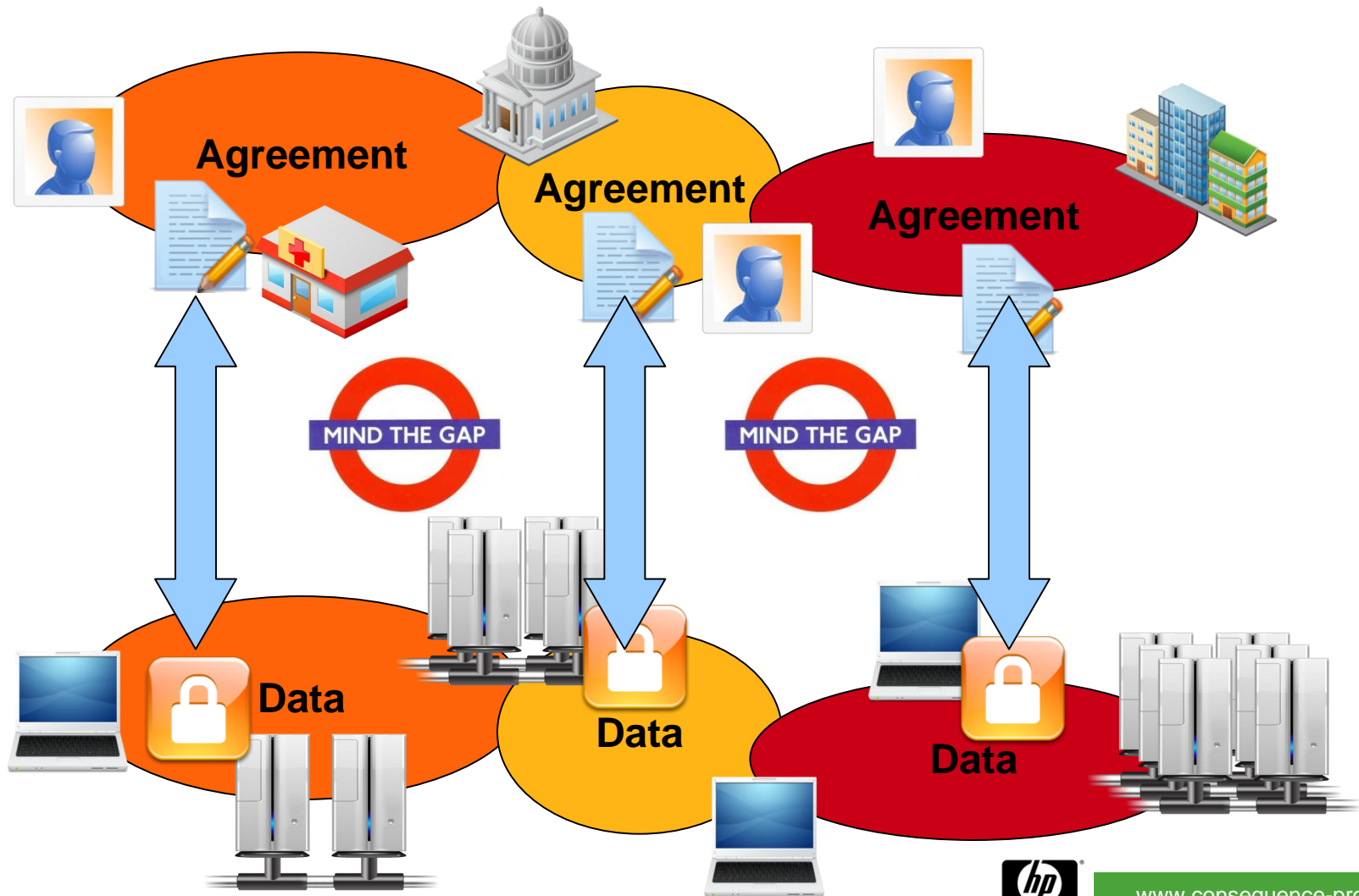
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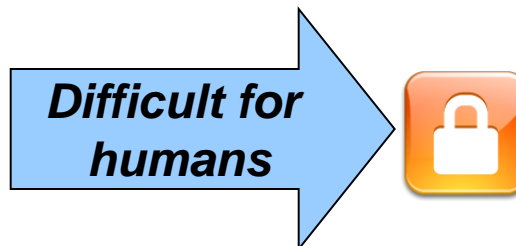
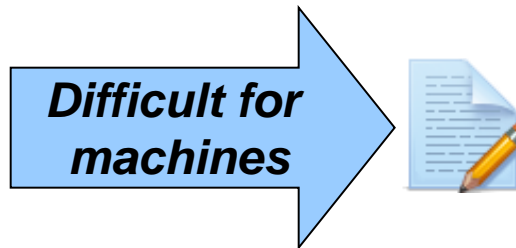
Introduction

Scenario

Modern society and business rely on **sharing of data** among organizations and/or individuals



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- At the human level, **traditional legal contracts** control sharing of data
 - Complex
 - Ambiguous
- At the software infrastructure level, **data policies** control sharing of data
 - Formal
 - Low level
- There's a **gap** between human-readable contracts and machine-processable data policies

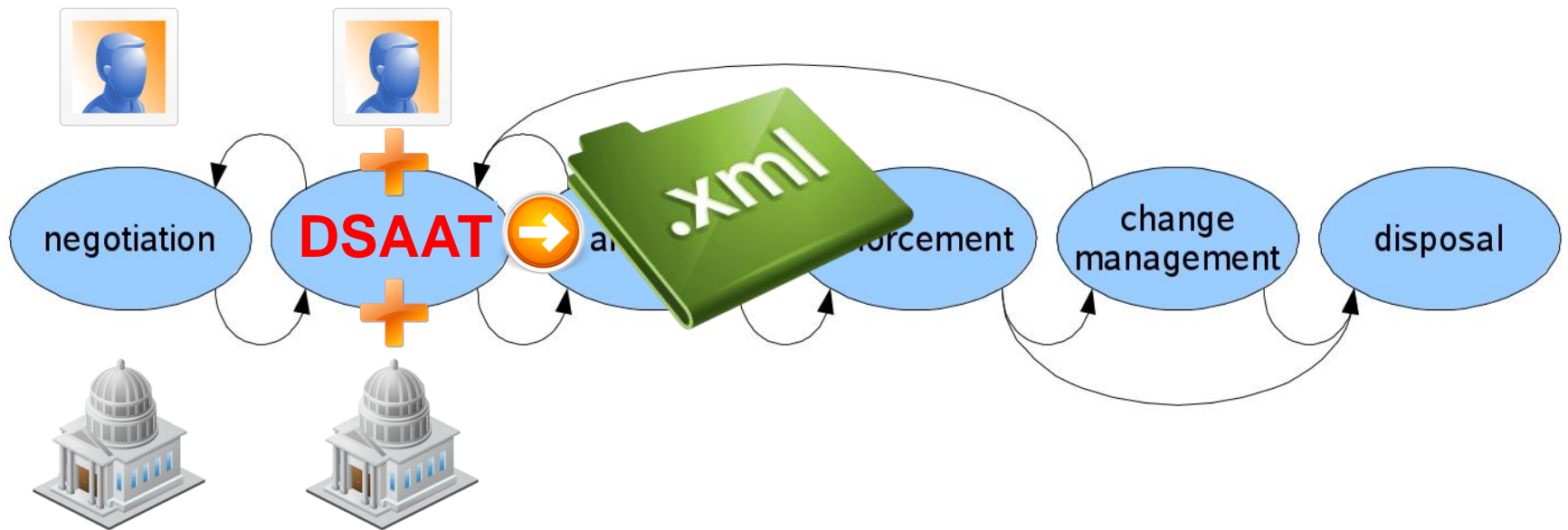


Solution

The **DSA Authoring Tool (DSAAT)** aims at bridging the gap between traditional legal contracts and low level data



DSA life cycle

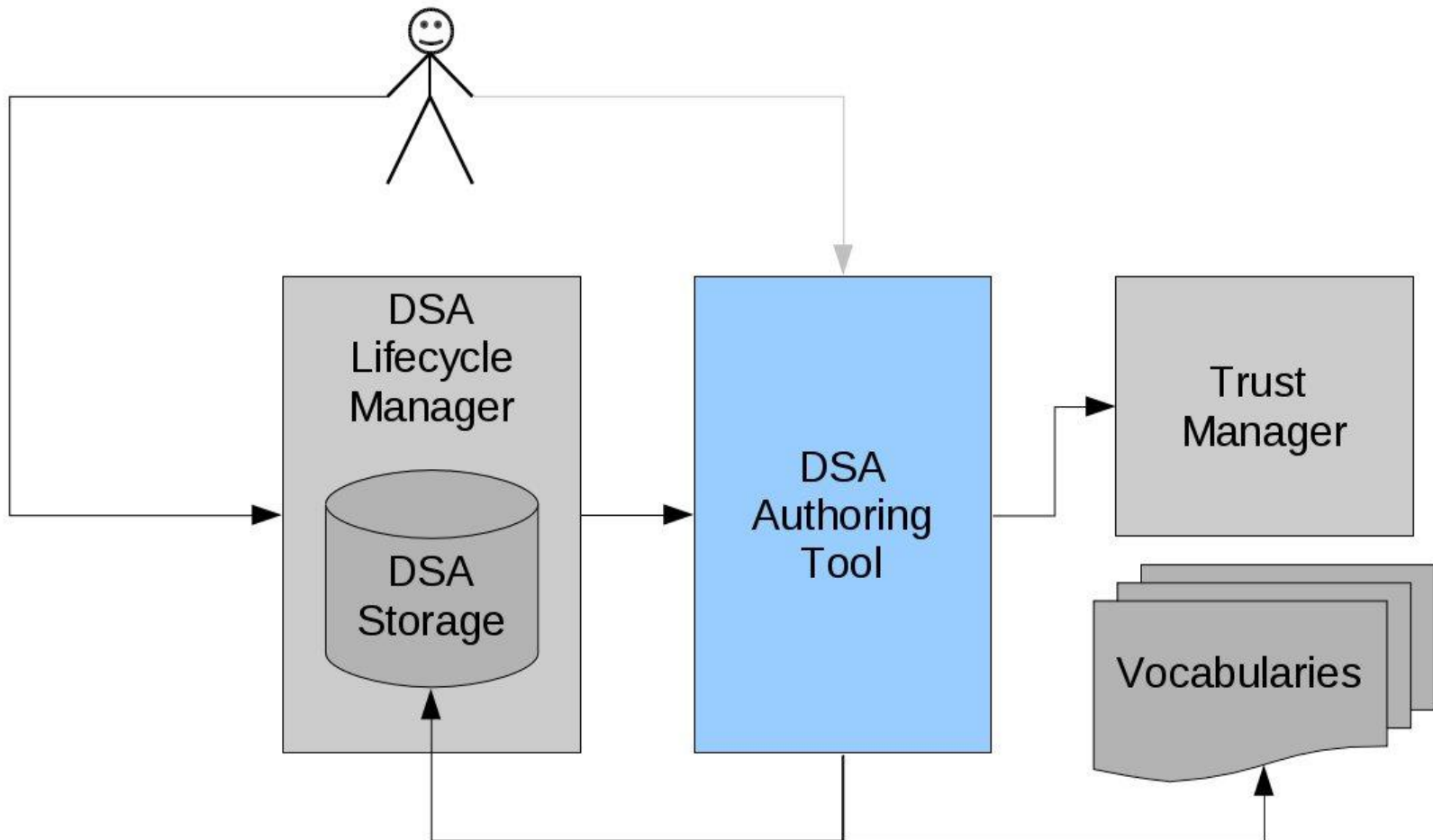


HP DSA Authoring Tool

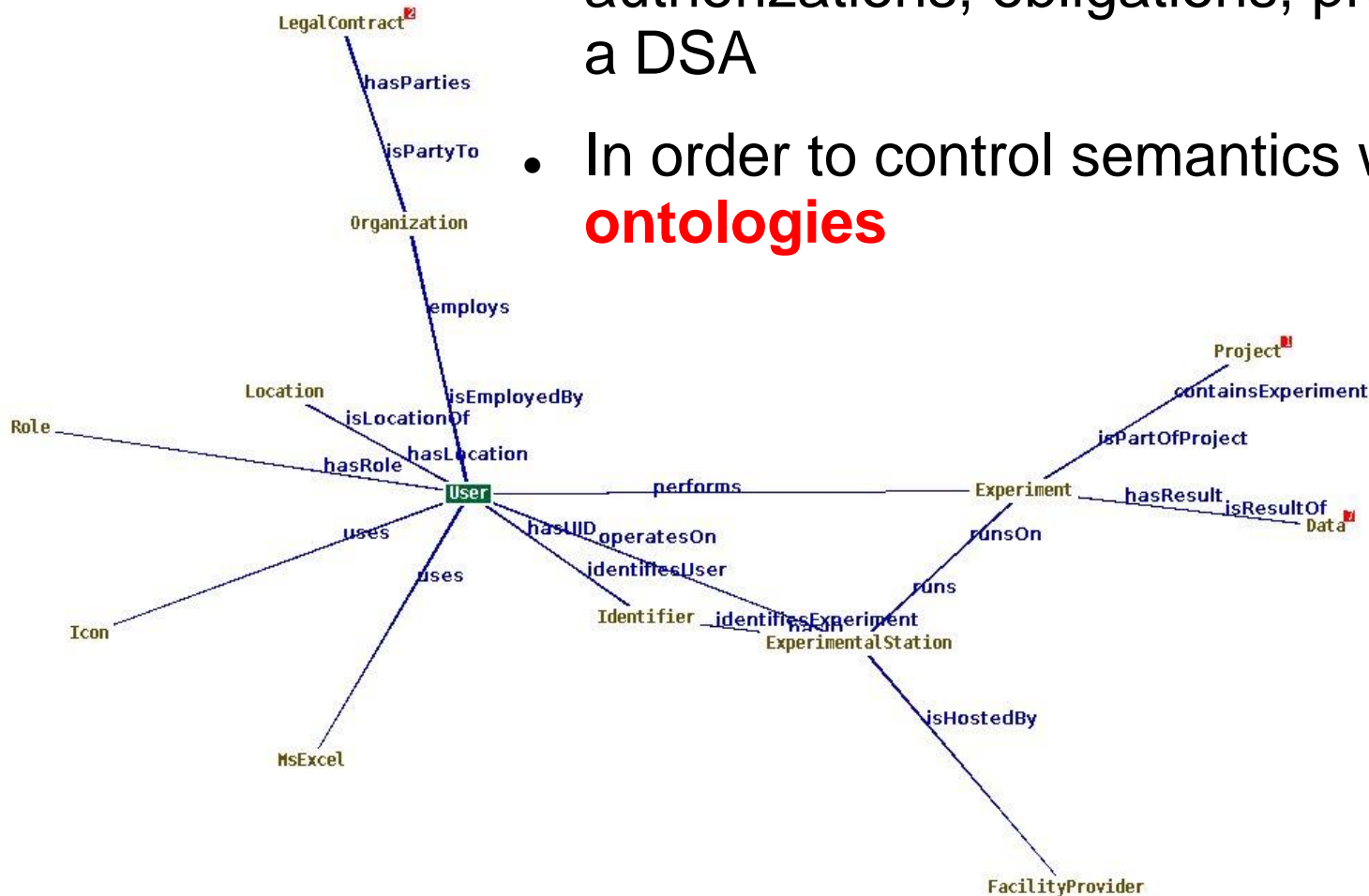
- The **DSA Authoring Tool** is a lightweight Web 2.0 application that
 - Allows intuitive and interactive creation/editing of DSAs
 - It uses controlled natural language
 - It saves DSAs into XML
- **Benefits:**
 - Non-technical users can edit a DSA
 - A DSA is both human-readable and machine-processable
- **Applications:**
 - Definitions of high-level documents from which usage policies can be automatically derived
 - Domains: crisis management, sensitive data sharing, Health Care, Web 2.0 data sharing, Cloud Computing, ...



Component Diagram



- Provide **terms** for authoring authorizations, obligations, prohibitions in a DSA
- In order to control semantics we use **ontologies**



Authoring

Controlled English

CNL4DSA-E

CNL4DSA

XML Parser  Translators



MAUDE

POLPA

...

EPL

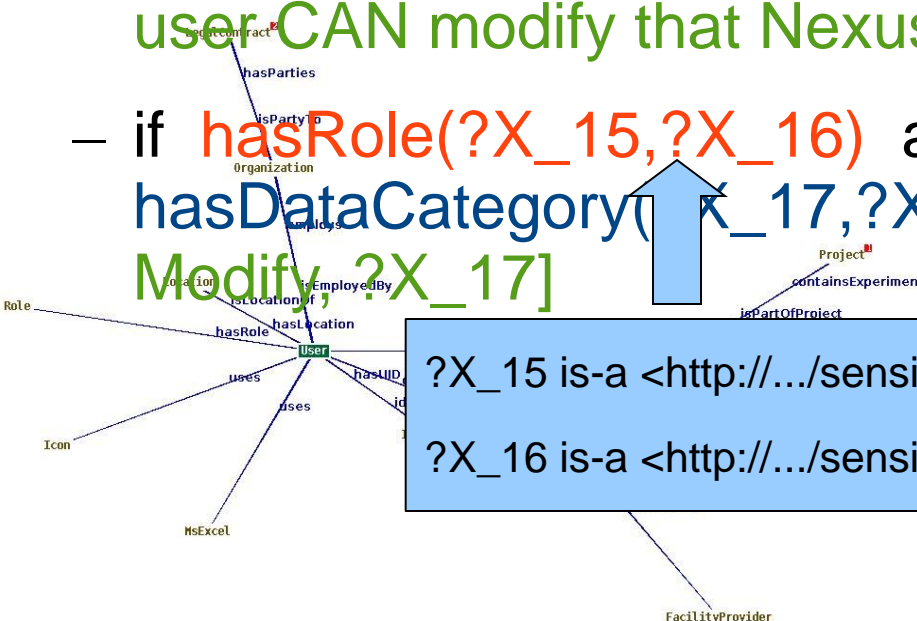
PONDER

...

Analysis

Enforcement

- Syntax patterns for authorizations and obligations
- Formal syntax and semantics
- Example:
 - IF a user has role a principal investigator AND a Nexus File has as data category a numerical data THEN that user CAN modify that Nexus File
 - if `hasRole(?X_15,?X_16)` and `hasDataCategory(?X_17,?X_18)` then can [`?X_15, Modify, ?X_17`]



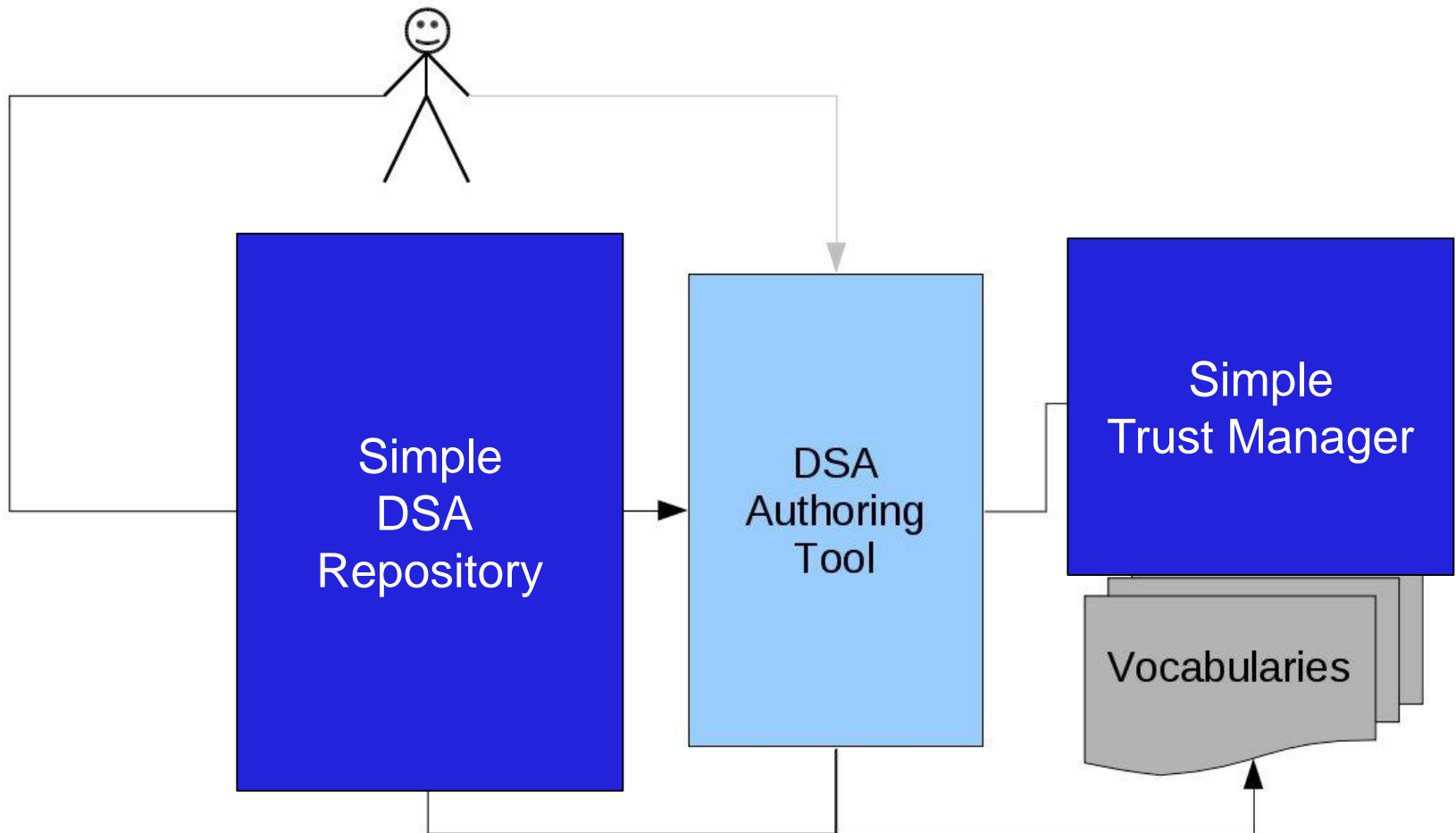
`?X_15` is-a `<http://.../sensitive_data_vocabulary.owl#User>`
`?X_16` is-a `<http://.../sensitive_data_vocabulary.owl#PrincipalInvestigator>`

- Atomic fragment $f := \langle s, a, o \rangle$
 - where s (subject), a (action), and o (object) are defined in external vocabularies – ex. User, Modify, NexusFile
 - Meaning: “ s performs a on o ”
- Fragments are contextualized with predicates:
 - $C := c \mid C \text{ and } C \mid C \text{ or } C \mid \text{not } c$
 - Where c is a basic context predicate – ex. hasRole(...)
- Context and fragments combine into composite fragments
 - $F := \text{nil} \mid [\text{can} \mid \text{must}] f \mid \text{if } C \text{ then } F \mid \text{after } f \text{ then } F \mid F$

Ilaria Matteucci, Marinella Petrocchi, and Marco Luca Sbodio. 2010. **CNL4DSA: a controlled natural language for data sharing agreements**. In Proceedings of the 2010 ACM Symposium on Applied Computing (SAC '10). ACM, New York, NY, USA, 616-620. DOI=10.1145/1774088.1774218 <http://doi.acm.org/10.1145/1774088.1774218>

Demo

Demo set up



Thank you!