

Project : Extending the Use of WebIDs

Project Background: The Web has a single global identification system—the URI. [Jacobs 2004]. URIs on the Semantic Web should fulfill two requirements [Sauermaun 2008]: a description of the identified resource should be retrievable with standard Web technologies (“de-referenceable” URIs), and a naming scheme should not confuse things and the documents representing them. With a “cool URI”, we get the document from the URI of the thing using either the 303 status code or “hash URIs”. HTTP content negotiation determines whether the document is for humans (HTML) or machines (RDF). A WebID is a cool URI that denotes an agent on the Web; it is in the address space controlled by the subject. When de-referenced, it resolves to a profile document with structured data in RDF (especially in the FOAF vocabulary). Access to a profile document may be constrained [Sambra 2014]. The WebID+TLS protocol is a decentralized and secure authentication protocol built from the profile information and the Transport Layer Security (TLS) client certificates available in modern web browsers [Story 2014a]. WebID is thus an open standard for identity and login. It is compatible with OpenID, but is much more extensible [Story 2014b]. For a web of trust based on WebID+TLS, see [Gamble 2010], and for WebAccessControl, a decentralized system (using WebIDs) for allowing users and groups various forms of access to resources, see [W3C 2014].

Research Objects (ROs) [Bechhofer 2010] are semantically rich aggregations of resources for the identification, aggregation and exchange of assets of reusable research and scientific knowledge. ROs provide a mechanism to associate together related resources about a scientific investigation (including the researchers) so that they can be shared together using a single identifier. Current implementations build upon existing Web technologies, especially Open Archives Initiative Object Reuse and Exchange (OAI-ORE) [Lagoze 2008], which builds on cool URIs and defines standards for describing and exchanging aggregations of Web resources. This project is led by Dr. Albert Esterline, assisted by the Dr. Kaushik Roy. It is derived from on-going research supported by the ARL.

Research Activities: We focus not on trust formation or access control but rather on what can be inferred from the profiles of a constellation of WebIDs, which may have wider implications. One challenge is to increase what can be inferred from the WebIDs. We may include some OWL but must consider performance and the limited sophistication of those using profiles. Another challenge is to develop guidelines for profiles of software agents and even computational resources in general. The foaf:friend relation is different here, and there should be a responsible human or organization. And we could have a WebID (and profile) for an organization. A further challenge is to consider the researchers referenced by WebID in an RO and, using their profiles, consider how they form a team relevant to the research. At greater scope, we consider a research community described by combining the profiles of those making it up, which requires named graphs [Carroll 2005] to distinguish the parts of the overall graph.

Outcomes: Students will experiment with OWL extensions to RDF subject profiles and more extensive information. They will also experiment with inference to derive useful explicit information from a constellation of profiles. They will investigate various guidelines for profiles of computational resources and organizations as well as various guidelines for amalgamating profiles into team or community profiles. The experiments and investigations will lead to suggested best practices regarding the different issues, possibly aiming at standards. The issues, analyses, and experience will be reported in peer-reviewed conferences and journals. Implications for trust and access control (as well as other application areas) will be noted.

References

- [Jacobs 2004] Ian Jacobs and Norman Walsh (Eds.), *Architecture of the World Wide Web*, Vol. One, W3C, 2004], <http://www.w3.org/TR/webarch/>.
- [Sauerermann 2008] Leo Sauerermann and Richard Cyganiak (Eds.), *Cool URIs for the Semantic Web*, W3C, 2008, <http://www.w3.org/TR/cooluris/>
- [Sambra 2014] Andrei Sambra, Henry Story, and Tim Berners-Lee, *WebID 1.0: Web Identity and Discovery*, W3C, 2014, <http://www.w3.org/2005/Incubator/webid/spec/identity/>
- [Story 2014a] Henry Story, Stéphane Corlosquet, and Andrei Sambra (Eds.), *WebID-TLS: WebID Authentication over TLS*, W3C, <http://www.w3.org/2005/Incubator/webid/spec/tls/>
- [Story 2014b] Henry Story, *WebID - Universal Login and Identity for the Web*, WebID Community Group, accessed 8-15-14, <http://webid.info/>
- [Gamble 2010] Gamble, Matthew and Goble, Carole (2010) Standing on the shoulders of the trusted web: Trust, Scholarship and Linked Data. In: *Proceedings of the WebSci10: Extending the Frontiers of Society On-Line*, April 26-27th, 2010, Raleigh, NC.
- [W3C 2014] W3C, *WebAccessControl*, 2014, <http://www.w3.org/wiki/WebAccessControl>
- [Bechhofer 2010] Bechhofer, S.; De Roure, D.; Gamble, M.; Goble, C.; Buchan, I. (2010). "Research Objects: Towards Exchange and Reuse of Digital Knowledge". *Nature Precedings*, posted 06 July 2010, <http://precedings.nature.com/documents/4626/version/1>
- [Lagoze 2008] Carl Lagoze & Herbert Van de Sompel, *Compound Information Objects: The OAI-ORE Perspective*, Open Archives Initiative – Object Reuse and Exchange, 2008, <http://www.openarchives.org/ore/documents/CompoundObjects-200705.html>
- [Carroll 2005] Jeremy J. Carroll, Christian Bizer, Pat Hayes, and Patrick Stickler, "Named graphs," *Journal of Web Semantics: Science, Services and Agents on the World Wide Web*, Volume 3 Issue 4, December, 2005, pp. 247-267.

Readings

- Andrei Sambra, Henry Story, and Tim Berners-Lee, *WebID 1.0: Web Identity and Discovery*, W3C, 2014, <http://www.w3.org/2005/Incubator/webid/spec/identity/>
- WebID Incubator Group (Henry Story, chair), *WebID specifications*, W3C, 2014, <http://www.w3.org/2005/Incubator/webid/spec/> (Links to the various specs for WebID)
- W3C WebID Incubator Group, <http://www.w3.org/2005/Incubator/webid/>
- Henry Story, *WebID - Universal Login and Identity for the Web*, WebID Community Group, accessed 8-15-14, <http://webid.info/> (Links and a video)
- Gamble, Matthew and Goble, Carole (2010) Standing on the shoulders of the trusted web: Trust, Scholarship and Linked Data. In: *Proceedings of the WebSci10: Extending the Frontiers of Society On-Line*, April 26-27th, 2010, Raleigh, NC. (For a web of trust based on WebID+TLS) (The PDF is available here.)
- W3C, *WebAccessControl*, 2014, <http://www.w3.org/wiki/WebAccessControl> (A decentralized system using WebIDs for allowing users and groups various forms of access to resources)
- Bechhofer, S.; De Roure, D.; Gamble, M.; Goble, C.; Buchan, I. (2010). "Research Objects: Towards Exchange and Reuse of Digital Knowledge". *Nature Precedings*, posted 06 July 2010, <http://precedings.nature.com/documents/4626/version/1> (The PDF is available here.)
- M. Stankovic, "Modeling Online Presence," *Proc. 1st Social Data on the Web Workshop*, Karlsruhe, Germany, October 27, 2008, <http://sunsite.informatik.rwth-aachen.de/Publications/CEUR-WS/Vol-405/paper9.pdf> (They introduce the notion of Online Presence, a concept related to user's presence on online services. They identify interoperability issues in the field of exchange of the online presence data and propose a

solution in building a common model for semantic representation of online presence data. They present the Online Presence Ontology OPO.)

Optional Readings

- Ian Jacobs and Norman Walsh (Eds.), *Architecture of the World Wide Web*, Vol. One, W3C, 2004], <http://www.w3.org/TR/webarch/>. (58 pages) (This includes the role of URIs.)
- Leo Sauermann and Richard Cyganiak (Eds.), *Cool URIs for the Semantic Web*, W3C, 2008, <http://www.w3.org/TR/cooluris/> (24 pages)
- Henry Story, Stéphane Corlosquet, and Andrei Samba (Eds.), *WebID-TLS: WebID Authentication over TLS*, W3C, <http://www.w3.org/2005/Incubator/webid/spec/tls/> (22 pages)
- Carl Lagoze & Herbert Van de Sompel, *Compound Information Objects: The OAI-ORE Perspective*, Open Archives Initiative – Object Reuse and Exchange, 2008. <http://www.openarchives.org/ore/documents/CompoundObjects-200705.html> (19 pages) (This is used to implement Research Objects.)
- Dan Brickley and Libby Miller, FOAF Vocabulary Specification 0.99, W3C, 2014, <http://xmlns.com/foaf/spec/> (38 pages) (The FOAF vocabulary is the standard for linking agents/users on the Web.)
- U. Bojārs and J. G. Breslin, *SIOC Core Ontology Specification*, W3C, 2010, <http://rdfs.org/sioc/spec/> (15 pages) (SIOC is a ontology for social interactions on the Web. It can be seen as a major enhancement of FOAF.)