DCPAPERS

Proc. Int'l Conf. on Dublin Core and Metadata Applications 2017

Metadata for Improving Transparency in the Credentialing Marketplace
Presentation

Jeanne Kitchens	Stuart A. Sutton	Robert G. Sheets
Southern Illinois University, USA	University of Washington, USA	George Washington University, USA
jeannekitchens@siu.edu	sasutton@uw.edu	bobgsheets@gmail.com

Abstract

Summary

The Credential Transparency Description Language (CTDL) is a family of Resource Description Framework (RDF) specifications for describing and relating resources in the Web's credentialing ecosystem. The goal of the development is to bring transparency to a chaotic, ill-defined, high-stakes environment of credentials by means of rich metadata descriptions and equally rich linking of resources. The CTDL definition of "credential" is broad and includes subclasses ranging from certifications through formal college and university degrees to micro-credentials and badges. In addition to credentials, the family of specifications includes RDF schemas for credential-related classes such as learning opportunities, assessments and competencies. The family of specifications builds on schema.org types (hereafter classes), their associated properties, and schema.org's intentionally weak semantics. While the focus of the CTDL is solely on the description of credentials and related entities as abstract works; it is anticipated that CTDL descriptions may be used by others to definitively identify and verify credential instances awarded to individuals.

Discussion

Credential Engine[1] is a U.S. 501(c)(3) non-profit organization whose mission is to improve transparency in the credentialing marketplace by making it possible to discover and compare credentials in an exploding across the credentialing ecosystem. In the *Credential Engine* context, credentials are broadly defined on a continuum from university degrees, through certificates and certifications to digital badges. *Credential Engine* pursues its mission by promoting an open applications marketplace through maintenance of the open-licensed Credential Registry (CR) and the Credential Transparency Description Language (CTDL). *Credential Registry* uses both the open metadata infrastructure of the CTDL and open-licensed software to continuously capture, connect, archive and share metadata about credentials, credentialing organizations, quality assurance organizations, and competency frameworks, as well additional metadata as needed to support an open applications marketplace.

Credential Engine grew out of the Credential Transparency Initiative (CTI), which began in 2013. Supported by the Lumina Foundation, CTI was led by the George Washington University's Institute of Public Policy (GWIPP), Workcred—an affiliate of the American National Standards Institute (ANSI), and Southern Illinois University (SIU) Carbondale's Center for Workforce Development. CTI worked closely with an Executive Committee, a Technical Advisory Committee, and hundreds of diverse credentialing stakeholders that provided feedback focused on three components: (1) development of the CTDL, (2) development of a prototype Credential

---

[1] https://www.credentialengine.org/

DCPAPERS

Proc. Int'l Conf. on Dublin Core and Metadata Applications 2017

Registry, and (3) development of a prototype interface to the Registry called Workit[TM] that is scheduled for launch in December 2017.

The primary classes and their general relationships are illustrated in Figure 1.
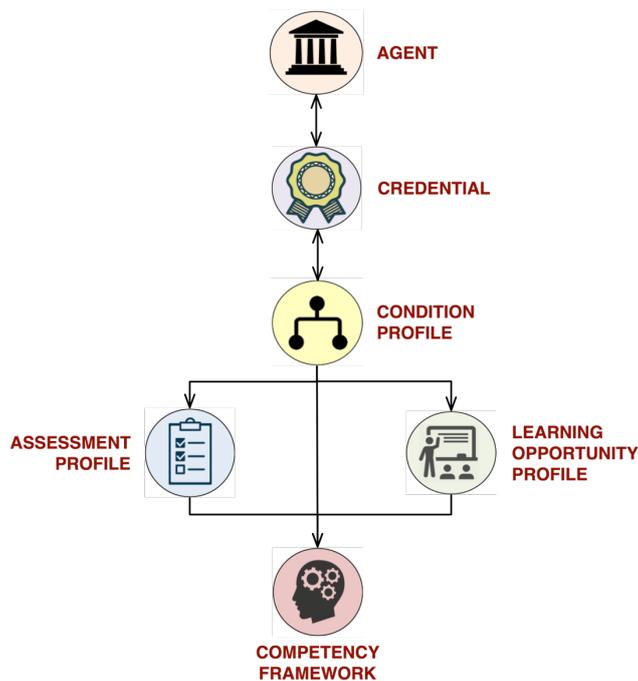

FIG 1. Primary CTDL classes

The CTDL family of RDF specifications is comprised of approximately 50 classes, 236 properties, 18 concept schemes and 128 concepts. The credential class, its array of subclasses, and its associated learning opportunities, assessments and supplemental profiles are expressed using the CTDL description language.[2] Competencies are expressed using a *Credential Engine* profile[3] of the Achievement Standards Network description language.[4] Currently, metadata describing credentials and related classes are serialized and available in JSON-LD and Turtle.

The management of the RDF specifications is handled using a Neo4J application that, from a single console: (1) manages updates to the schemas; (2) generates all of the human readable schema documentation pages with the exception of the narrative user guides; (3) generates the schema serializations; and (4) generates the JSON schemas validating credential metadata destined for the Credential Registry. In the first quarter of 2018, the application will be updated to handle validation through ShEx[5] and SHACL[6] expressions.

The CTDL was first released on November 17, 2016 through a collaborative process with a large Technical Advisory Committee and based on information and feedback from over 100 credentialing organizations throughout the United States. There have been several subsequent releases that both extend and refine the vocabulary. The CTDL Schema Terms, Namespace Policy, Schema Serializations, and Guide are all available for public use under an open license from the *Credential Engine's* technical planning website (see listing of relevant project URLs in the Resources section of this text).

---

[2] http://credreg.net/ctdl/terms
[3] http://credreg.net/ctdlasn/terms
[4] http://standards.asn.desire2learn.com/
[5] http://shex.io/shex-primer/
[6] https://www.w3.org/TR/shacl/

DCPAPERS

Proc. Int'l Conf. on Dublin Core and Metadata Applications 2017

CTDL development needed to satisfy two requirements: (1) sufficiently rich description of credentials and their context to support meaningful comparisons based on key factors such as cost, preparation time to award; locations, levels of quality assurance and specified competencies; and (2) the means for creating lightweight descriptions sufficient to support discovery. The first requirement is loosely illustrated in Figure 1. There are myriad ways in which a credential may relate to assessments and learning opportunities depending on certain conditions. For example, cost of a learning opportunity may depend on the type of person seeking the credential such as an in or out of state resident, veteran or military dependent. Costs may also vary across the regions in which it is offered. The Condition Profile makes it possible to capture these varying conditions. The second requirement is also reflected in Figure 1 by removing the Condition Profile entity and allowing instances of the credential class to make direct assertions about assessments, learning opportunities and competencies.

The presentation includes a review of the CTDL resources and development processes and will demonstrate how the CTDL schema is used for publishing RDF metadata to the Credential Engine Registry (CER), how an application profile of the CTDL is used by the CER to validate the quality of incoming metadata, and how the open application marketplace can evolve by demonstrating the Workit Search App prototype that consumes metadata from the CER. The presentation will include discussion of the planned development of CTDL-Lite as an addition to schema.org.

Resources

Credential Engine Informational Site: http://credentialengine.org

Credential Engine Technical Website: http://credreg.net/

Technical Advisory Committee http://credreg.net/tac

CTDL Schema: http://credreg.net/ctdl/terms

CTDL Guide: http://credreg.net/ctdl/handbook

CTDL Mapping Reference: http://credreg.net/ctdl/mapping

CTDL ASN Schema: http://credreg.net/ctdlasn/terms

CTDL ASN Terms (competency frameworks): http://credreg.net/ctdl/frameworkschemahowto

Credential Registry Guide: http://credreg.net/registry/handbook

Registry Assistant API Guide: http://credreg.net/registry/assistant

Credential Registry Search Query Builder Tool http://credreg.net/registry/search

Use Cases http://credreg.net/tac/usecases

Workit Search App Prototype (December launch): http://credentialfinder.org