Credential Engine Background
Credentialing Partners
Credential Engine Technologies
Credential Transparency Description Language
Credential Registry & CTDL Editor
Workit™ Search App Prototype
Q & A
Credential Engine Background
Transitioning to Scale

Credential Transparency Initiative (CTI) was a pilot project to engage key stakeholders in designing, developing, and piloting a Credential Registry, common terms (CTDL), and prototype application (Workit™)—and evaluating the potential for scaling the initiative under non-profit management.

Credential Engine (CE) is a 501(c)(3) non-profit organization whose mission is to improve transparency in the credentialing marketplace, building on the CTI pilot. Credential Engine will pursue this mission by (1) scaling the web-based, open-licensed Credential Registry (CR), (2) maintaining the Credential Transparency Description Language (CTDL), (3) maintaining Workit, the prototype open-source credential search app to demonstrate the power of the registry, and (4) promoting an open applications marketplace.

Three years of funding have been secured and planning is underway for long-term sustainability.

Sponsors are Lumina Foundation and JP Morgan Chase & Co.

- Key metrics and outcomes through 2020 have been identified.
Board and Advisory Groups

Credential Engine Board of Directors (11 Members)

Business Advisory Group (13 Members)

Certification and Licensure Advisory Group (20 Members)

Higher Education Advisory Group (30 Members)

Quality Assurance Advisory Group (14 Members)

Technical Advisory Group (57 Members)
Transparency through Technology

- Develop common terms for credential Transparency Description Language (CT DL) to describe key features of:
  - Credentials
  - Credentialing organizations
  - Quality assurance (QA) bodies

- Create & populate voluntary, web-based credential registry with credential issuers and QA bodies

- Bring the registry to scale under non-profit governance

- Develop, test, & deploy prototype search app to facilitate use of the registry by stakeholders

- Foster competitive app marketplace

Credential registry, descriptors, and applications are open-source.
Credentials Addressed by Credential Engine

Registry Includes All Kinds of Credentials, Credentialing Organizations, and Quality Assurance Bodies
Timeline: Transitioning to Scale

Prior to Jan. 2017
- Pilot CTDL, registry, app
- Recruit/add participants
- Evaluate results
- Fine-tune registry & Workit app

2017
- Scale-up with registry participants, provide assistance as needed
- Identify state partners to demonstrate state applications

April - forward
- Credential Engine Board & Executive Director in place; advised by advisory groups
- Test process to allow credential issuers to self-publish to the registry
Credentialing Partners
Profile of Current Registry Participants

Participant Organizations (April 2017)

- Private Colleges & Universities
- For Profit Colleges & Universities
- Public Colleges & Universities
- Community Colleges
- Industry Certification Bodies
- Industry Certificate Granting Institutions
- Quality Assurance Organizations
- Other

Credentials (as of April 17, 2017 = 209)

- Associate's Degree: 89, 41%
- Bachelor's Degree: 8, 4%
- Master's Degree: 4, 2%
- Certificate: 23, 10%
- Certification: 6, 3%
- Total Participants: 99
Benefits to Participants

Gain greater visibility to vast market of students, employers, others.

Demonstrate commitment to credential and QA transparency.

Be at forefront of groundbreaking technology effort driving new credentialing ecosystem.

Receive suite of services beneficial to short—and long-term technology planning, including:

- technical and non-technical materials
- information about Web 3.0 technologies
- roadmap document showing where they are now and what steps can be taken to enable W3C vision for Linked Data

Influence initiative by providing feedback throughout the process.
Moving to a Web of Linked Data: Improving Web Formats

World Wide Web is moving from a web of “linked” documents to “linked data.”

Google, job and travel aggregators use common terminology (metadata) that has been accepted as web standard (e.g., Schema.org)

Using consistent metadata for key features of credentials, the registry enables job seekers, students, workers, and employers to search for and compare credentials, just as travel apps are used to compare flights, rental cars, and hotels.
Credential Engine Technologies
Credential Engine (CE) Technologies

Credential transparency Description Language (CTDL) – Metadata Infrastructure

CTDL Editor – Transforms Partner’s credential and quality assurance information to CTDL and publishes it to the Registry.

Credential Engine Registry – Set of services and repository.

Credential Find Search App Prototype – Basic search to demonstrate, review, and get feedback.
bolded hyphens next to CTDL and CTDL Editor for consistency

David Reischman, 5/1/2017
Example Stakeholder Relationships

- **Credentialing Organizations**
  - Certification Bodies
  - Community Colleges
  - Licensing Bodies
  - Universities

- **Quality Assurance Entities**
  - ANSI
  - National Accreditors
  - Regional Accreditors
  - Specialized/Professional Accreditors
  - State Agencies

- **Employers / Industry**
  - Companies
  - Industry Associations
  - Regional Collaboratives

- **Credential Registry**
  - Offer credentials & learning opportunities.
  - Require or prefer competencies & credentials.

- **Apps**
  - Accredit, approve, endorse, recognize credentials and/or credentialing organizations.

- **Students**
  - Require or prefer competencies & credentials.

- **Job Seekers**
  - Offer credentials & learning opportunities.

- **Employers**
  - Accredit, approve, endorse, recognize credentials and/or credentialing organizations.
How it Works Now

- Credential Transparency Description Language (CTDL) – Metadata infrastructure
- Credential Engine Registry – Set of services and Registry.
- Credential Finder Prototype App – Basic search to demonstrate, review, and get feedback.
- Partners Review, provide feedback, fill gaps.

CTDL Editor – Converts Partner’s credential and quality assurance information to CTDL and publishes it to the Registry.

Make updates.
Pilot Period

- Design/Develop CE technologies and garner feedback

Moving from “sandbox” to “live” 2017
Maintaining Quality on the Registry at Scale

Denotes CE quality control already in place or in planning.

What are key quality indicators (apparent on the 'face' of the data)?

- Existence of recognized QA.
- Explicit statements of competencies.
- Metadata level of completeness.

What are key quality indicators (not apparent on the 'face' of the data)?

- Accuracy of the assertions.
- Currency of the credential information.

Automated quality mechanisms:

- Data validation including minimum expected data.
- Forward notification of 3rd party assertions (e.g., "accreditedBy") (notify/embargo assertion).
- Periodic reaffirmation of credential currency (embargo/notify).
- Reports.
- Systematic link checking (embargo/notify).

Community, Capacity & Consensus:

- Advisory/Stakeholder input.
- Code of Ethics.
- Crowd “reporting” (from broken links to spam).
- Crowd rating & ranked ordering of displays.
- Data auditing review service.
- Expert/peer review of credentials.
- Open CTDL with guidance.
- Technical assistance & training.

Everything must scale.
Credential Transparency Description Language & Competency Frameworks
Credential Transparency Description Language (CTDL)

**About:**
CTDL is a dictionary of terms for descriptions of credentials offered.

Enables simple statements and rich descriptions of entities in the credentialing ecosystem.

Modeled as a directed graph using the W3C's Resource Description Language [RDF] for describing data on the Web. RDF extends the linking structure of the Web to use URIs to name the relationship between things as well as the two ends of the link (this is usually referred to as a "triple"). Using this simple model, RDF allows structured and semi-structured data to be mixed, exposed, and shared across different applications.
CTDL Continuous Review

CTDL is updated periodically through "releases" (stable snapshots).
Next release is June 30, 2017
The CTDL is developed based on important tenets:

- The CTDL is modeled using W3C specifications for Linked Data.
- Build off schema.org.
- Harmonize with key standards bodies and promote wide adoption.
tabbed title to be at the same level as the others
**Credential Transparency Description Language (CTDL)**

<table>
<thead>
<tr>
<th>Credentialing Organization Identification</th>
<th>Declaring What Is Inside the Credential</th>
<th>Declaring Other Key Characteristics and Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credential organization type</td>
<td>Credentialing eligibility requirements</td>
<td>Primary scope of application: subject/discipline area</td>
</tr>
<tr>
<td>Credential type</td>
<td>Competencies/learning outcomes required to attain credential</td>
<td>Primary scope of application: career preparation and advancement</td>
</tr>
<tr>
<td>Other credential</td>
<td>Assessments required to attain credential</td>
<td>Role of occupational regulation and licensing</td>
</tr>
<tr>
<td>Where credentialing is offered</td>
<td>Education and training for the credential</td>
<td>Geographic portability of credential use</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>Time required to attain credential</td>
<td>Connections to other credentials</td>
</tr>
<tr>
<td></td>
<td>Credentialing costs</td>
<td>Career Pathway Connections*</td>
</tr>
<tr>
<td></td>
<td>Maintaining credential</td>
<td>External quality assurances</td>
</tr>
<tr>
<td></td>
<td>Credential removal</td>
<td>Employer recognition</td>
</tr>
<tr>
<td></td>
<td>Credential holder authentication</td>
<td>Number and characteristics of credential holders*</td>
</tr>
<tr>
<td></td>
<td>Version management</td>
<td>Employment and earnings of credential holders*</td>
</tr>
<tr>
<td></td>
<td>Employer engagement</td>
<td>*Italicized descriptors are not yet in use</td>
</tr>
</tbody>
</table>

*Italicized descriptors are not yet in use*
### Purpose & Scope of the QA Body

<table>
<thead>
<tr>
<th>Purpose/Objectives</th>
<th>What is accredited, endorsed, approved, recognized?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main purpose</td>
<td>How is QA used?</td>
</tr>
<tr>
<td>Missions/Objectives</td>
<td>Maximum period of approval, recognition, endorsement, accreditation?</td>
</tr>
<tr>
<td></td>
<td>Year body began operating</td>
</tr>
</tbody>
</table>

### QA Process

- Activities used to assess credential in QA process
- Process used to validate quality criteria?
- Quality criteria, standards, and requirements used in QA process
- Outcomes reviewed as part of QA process
- Stakeholders involved in developing quality criteria
- Criteria for selecting and evaluating assessors and reviewers?

### Public Information about QA Decisions

- Types of decisions made and how they are defined
- Directory of accredited, approved, recognized and/or endorsed providers and their current status
- Information about QA body made public with request
- Information about QA body made public without request

### Additional Information

- General Information
- Policies and procedures for managing conflicts of interest, complaints, appeals
- External recognition

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**Credential Transparency Description Language (CTDL)**

**Quality Assurance**
CTDL Dictionary to Applications

CTDL Dictionary
(The Credentialing Community’s Domain Model)

Open & Unconstrained Vocabulary

Tightly Constrained, Selective Use of CTDL Vocabulary Terms

1-n APPLICATION PROFILES

Credential Engine Registry
Learning Management System
Verifiable Claims Service
Transcript / Portfolio Service
University Credential Offerings
Board Certifications

Examples of Content Management System Records
Examples of Webpage Markup
CTDL Profile of ASN-DL

DL application profile for the description of competency frameworks using the Achievement Standards Network Description Language (ASN-DL).

Developed through NSF funding between 1999-2013

What is ASN-DL intended to do?

- Designed to consistently describe any assertion of knowledge, skill, and ability.
- Serves as a data representation of the canonical (official) version.
- Supports the Semantic Web and Linked Data processes through its basis in W3C's Resource Description Framework (RDF).
- Supports cross-framework comparison and linking by means of a common abstract data model.
- Supports design of profiles through refinement and extension:
  - Refinement through creation of subproperties and subclasses to meet local/national needs;
  - Extension thorough the judicious addition of new properties and classes.
- Express competencies at any (arbitrary) level of granularity.

Profiles exist for the U.S., Australia, and Canada—this work will be the CE-ASN Profile
ASN model...

**Two-Entity Model:**

**Standards Document**

The competency framework as a whole including provenance information

**Statement**

The individual competencies of which a competency framework is comprised. Each concept is declared using "isPartOf" to be a member of one (or more) competency frameworks.
5.1.31 Proficiency Level
5.1.34 Skill Embodied

* Includes additional core properties from Dublin Core
Competency-to-Competency mapping...

Competency Framework ‘A’

asn:Statement

asn:StandardsDocument

asn:alignTo
asn:alignFrom
asn:exactAlignment
asn:narrowAlignment
asn:broadAlignment
asn:majorAlignment
asn:minorAlignment
asn:prerequisiteCompetency

Competency Framework ‘B’

asn:Statement
Flat "list" concept scheme...
Credential Registry & CTDL Editor
CE Team Works with Partners to Populate CTDL Editor
Co-Designing Automated Updating

**Pushing**
Credentialing organization pushes their CTDL descriptions to the *Credential Registry*.

**Pulling**
The *Credential Registry* pulls (harvests) the data from the credentialing organization either as page markup or as records.

**TDL Editor**
- Small Quantity
- Stable

**Automated**
- Roadmap Guidelines
  - Large Quantity
  - Dynamic

http://credreg.net/registry
End-to-End Partner Work Flows

Step 1: Identify the Type(s) of Data

Step 2: Local Data Analysis & Mapping to CTDL

Step 3: Data Serialization & Storage

Step 4a: Data Publication

Step 4b: Data to Registry

Linked Data on the Web and to Credential Registry
Workit™ Search App Prototype
DISCOVER CREDENTIALS

[Credential Finder Prototype App] is the ultimate toolkit for students, job-seekers, professionals, and employers who want to build a path toward the right career or new hire.
Participants view information about the small number of credentials they have selected for testing on the registry in the context of an app.

Shows the credential information from the Registry.

Provides context for understanding the Credential Transparency Description Language (CTDL) and why it’s important to have transparent and comparable credential information.

Requires a password.
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BetterCreds