

TIESシンポジウム 2018
『ブロックチェーンが教育を変える』

次世代電子学習環境(NGDLE) の可能性とその問題点

放送大学 山田恒夫

The Next Generation Digital Learning Environment

A Report on Research

Malcolm Brown, EDUCAUSE Learning Initiative

Joanne Dehoney, EDUCAUSE

Nancy Millichap, Next Generation Learning Challenges

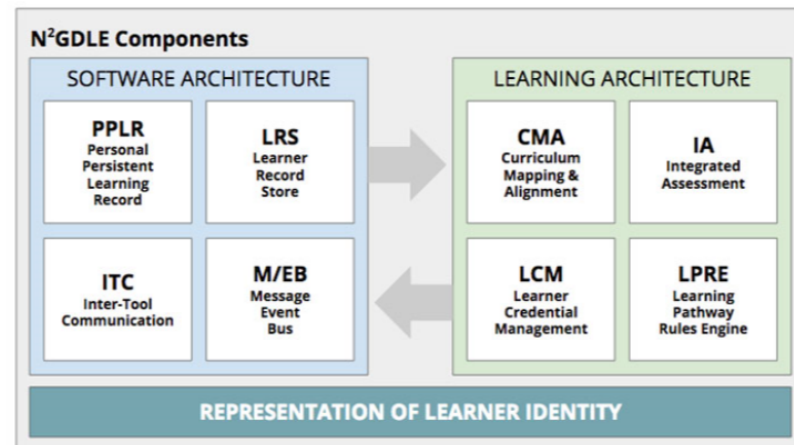
ELI Paper

April 2015

NGDLE ?

- “The next generation digital learning environment “
- 「次世代電子学習環境」
- ありていにいうと、「LMSの次」

N²GDLE (EDUCAUSE Review, August 2017)



前時代の学習・教育システム



LMS

教務情報システム

電子教科書
電子図書館

教室映像録
画システム

クリッカー
システム
(リアルタイム
フィードバック)

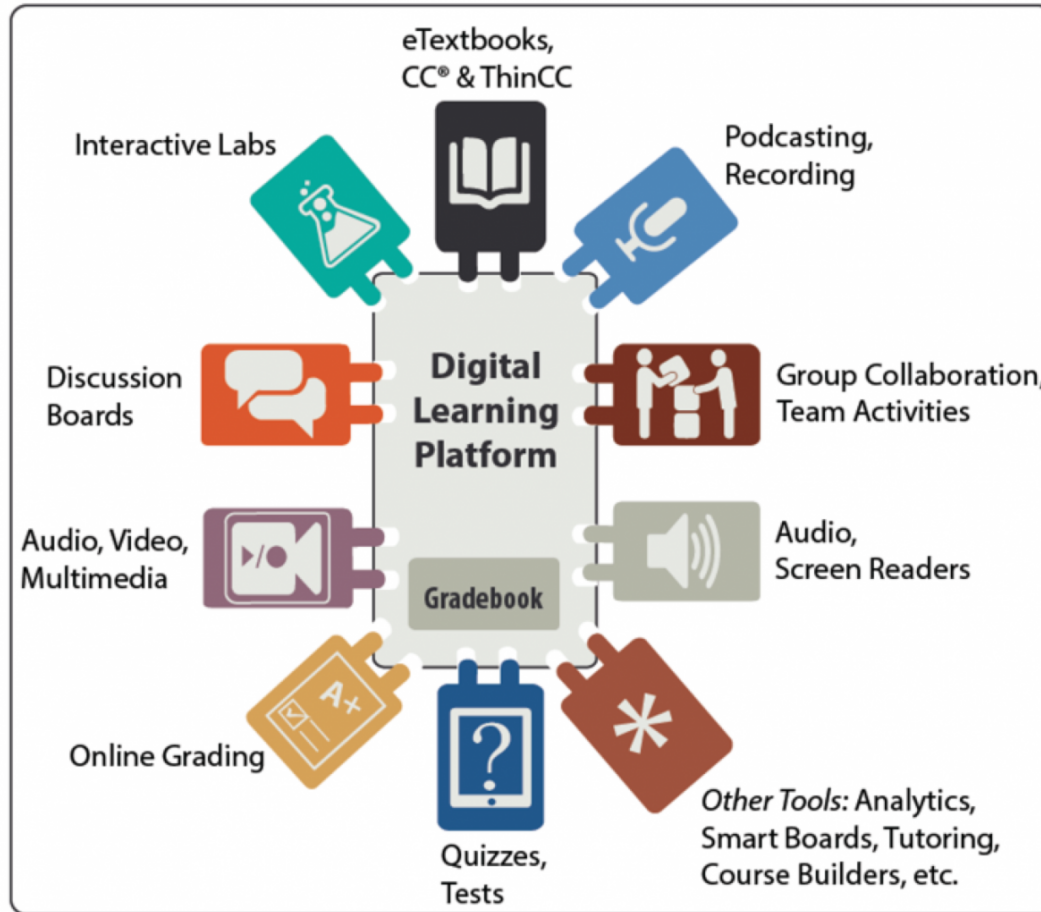
評価システム

時代の変化

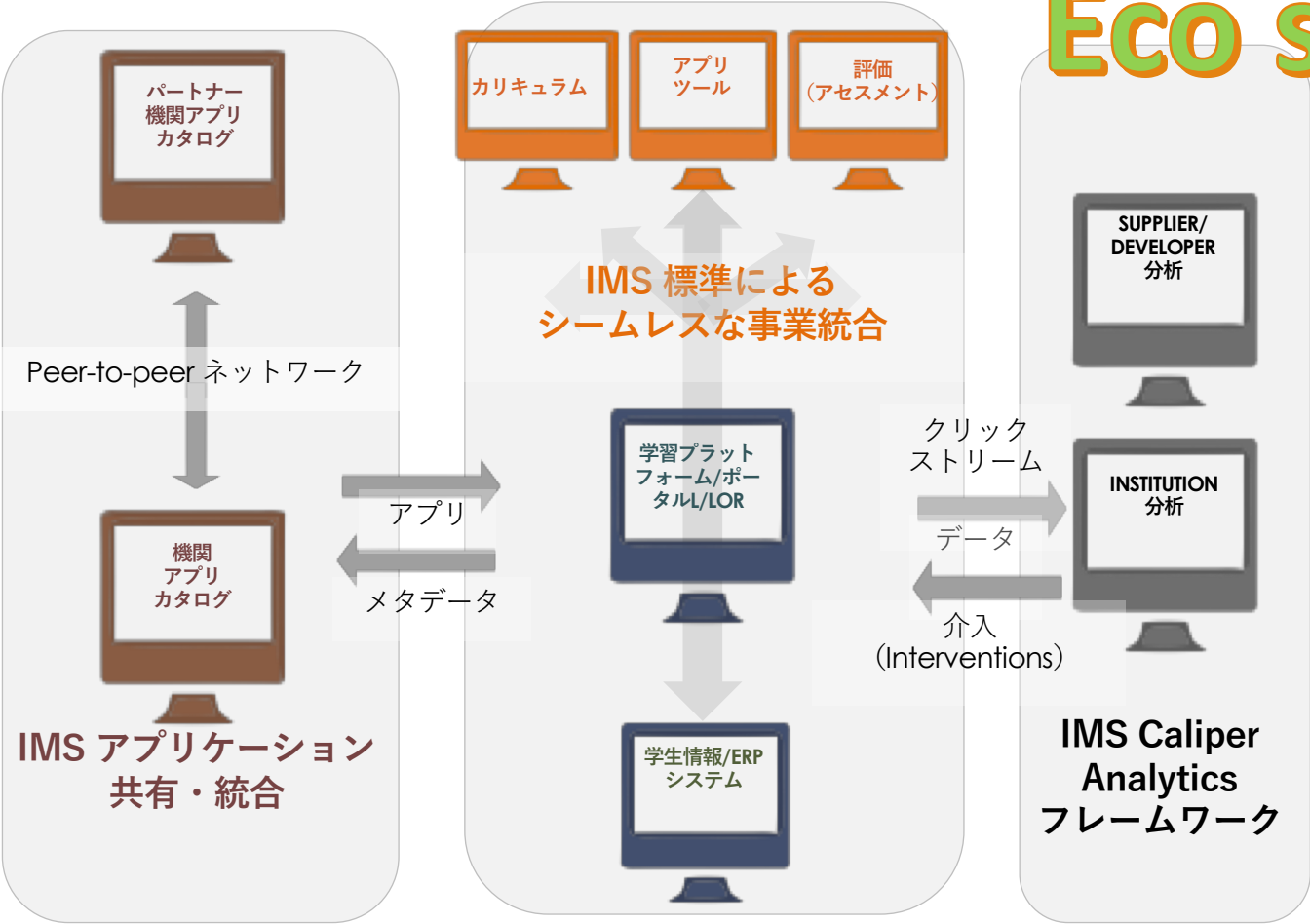
アーキテクチャー

- ◆ システム連携 (IoT, Open Architecture...
 - ◆ SOA (Service Oriented Architecture)
 - ◆ API (Application Programming Interface)
- ◆ 開発方略 (手法)
 - ◆ Object指向
 - ◆ Agile Software Development
 - ◆ Mash-up

ツールのPlug & Play



Eco system



LOR: Learning Object Repository (学習オブジェクトレポジトリ)
ERP: Enterprise Resource Planning (経営資源計画)

教育イノベーションのための
IMSアーキテクチャー



NGDLE: 目標



Dimensions of the NGDLE

- ☑ Interoperability and Integration
- ☑ Personalization
- ☑ Analytics, Advising, and Learning Assessment
- ☑ Collaboration
- ☑ Accessibility and Universal Design

IMS Globalとは

- ✓ e-Learning / ICT活用教育分野における国際標準化団体
- ✓ 技術標準の策定ばかりでなく、その実用を通して、ICTによる教育改革を進める国際コミュニティ
- ✓ 会員（Membership）による会費で維持
- ✓ 規模拡大中
- ✓ 20年以上の歴史、440以上の機関会員、25の標準

高等教育ITコンソーシアムと 国際標準化団体

EDUCAUSE

1995, the Instructional Management System project at National Learning Infrastructure Initiative



1999 NPOとしてスピンオフ

IMS Global Learning Consortium

2003-NIME –GLOBE Seminar
2008 NIME-EDUCAUSE Seminar

2011設立



AXIES

2016設立



日本IMS協会

大会部会セッション後援



IMS Global:理念



**The Leading
Member-
based
Learning
Technology
Standards
Consortium
in the World**



**Better
Learning
from
Better
Learning
Technology**



Annual Report 2015

2015 Fiscal Results & Progress



50
NET NEW MEMBER ORGANIZATIONS
ADDED IN 2017



\$4,777,615
RECORD LEVELS OF REVENUE GROWTH
FOR THE 12TH YEAR IN A ROW



379
PRODUCT CERTIFICATIONS
IN 2017

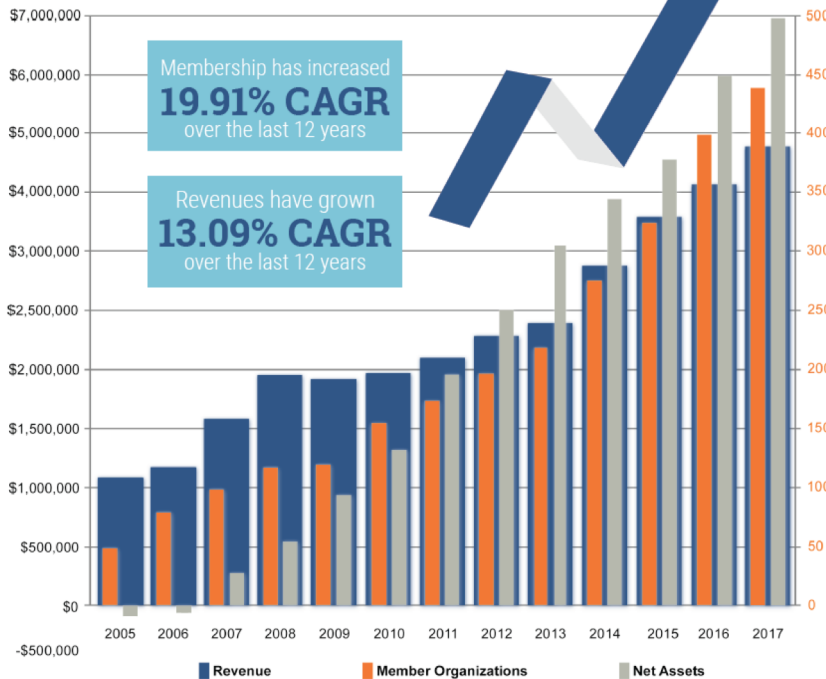


\$6,935,682
2017 NET ASSETS



442
MEMBER ORGANIZATIONS (AND GROWING)

Revenue, Membership Totals and Net Assets 2005-2017



IMS is nearing the size of W3C in terms of members and resources. 10x any other standards activity in education.

(Rob Abel & IMS Global, 2018)

事業：25以上の標準

<http://www.imsglobal.org/sites/default/files/imsglobal2014annualreport.pdf>



日本IMS協会とIMS Globalの関係

独立した法人

日本IMS協会

IMS Global

Global 開発中
文書へのアクセス

IMS Global
Contributing member

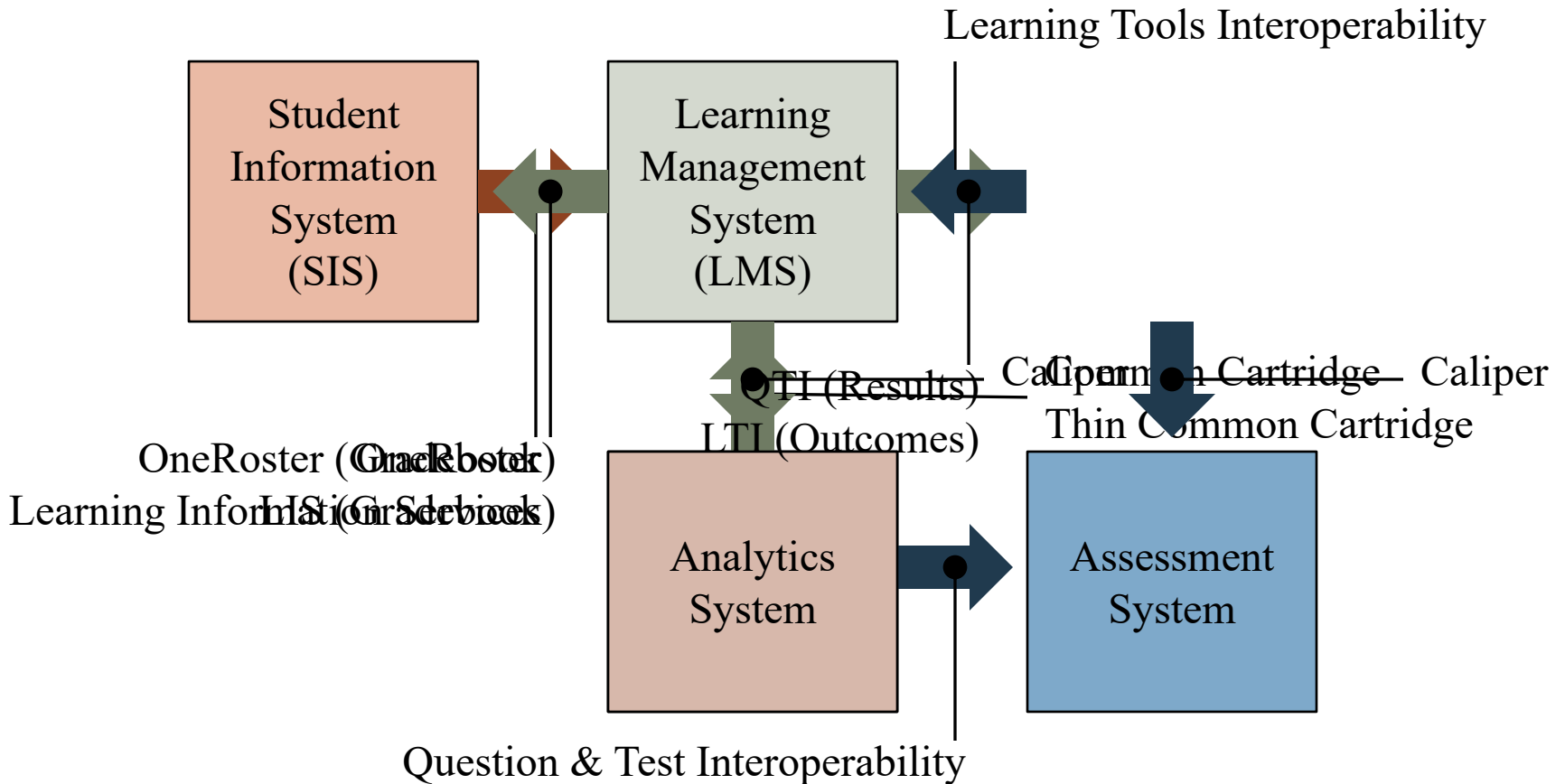
日本IMS協会
正（幹事）会員

特典：
Global CM
50% off

例：IMS Japan賞とIMS LIA
のリンク
One Roster日本版の立ち上げ

共同事業 「IMS Japan Project」

A Learning Architecture





Download IMS Interoperability Standards

IMS Interoperability Standards

All IMS Global standards are free to download and free to use. To claim conformance to an IMS standard an implementing organization must complete the certification process indicated and join the relevant IMS Alliance community. Each Alliance community serves as the developer and conformance certification community for the particular standard(s). IMS Affiliate and Contributing Members are eligible for participation in all Alliances.

All products that have achieved IMS conformance certification of any kind are listed and updated here: [Conformance Certification Status](#).



Release Date	Specification	Release	Alliance
2016-May-24	LTI Membership Service	Version 1.0 Final	Learning Tools & Content
2016-May-24	LTI Content-Item Message	Version 1.0 Final	Learning Tools & Content

Specifications & Adoption Practices

- Accessibility
- Accessible Portable Item Protocol®
- Caliper Analytics®
- Competency Definitions
- Content Packaging
- Common Cartridge®
- Course Planning and Scheduling
- Digital Repositories
- Enterprise
- Enterprise Services
- ePortfolio
- General Web Services
- Interactive WhiteBoard/ Common File Format
- Learner Information
- Learning Design
- Learning Information Services
- Learning Object Discovery and Exchange
- Learning Tools Interoperability®
- Meta-data
- OneRoster®
- Question and Test Interoperability
- Resource List Interoperability
- Shareable State Persistence
- Simple Sequencing
- Student Induction to e-Learning
- Tools Interoperability
- Vocabulary Definition Exchange

IMS Global's Standards

データ定義型

データのフォーマットのみ規定

- Common Cartridge & Thin Common Cartridge: 一般
- Question & Test Interoperability (QTI): テスト・試験・クイズ
- Comprehensive Student Record : 成績証明ほか

サービス定義型

データのフォーマット＋データ交換の方式も規定

- Learning Tools Interoperability (LTI): 一般
- OneRoster: 学籍簿
- Caliper Analytics: 学習解析
- Digital Credential/Badge: バッジ・修了証
- Competencies and Academic Standards Exchange[®] (CASE[®]): カリキュラム標準

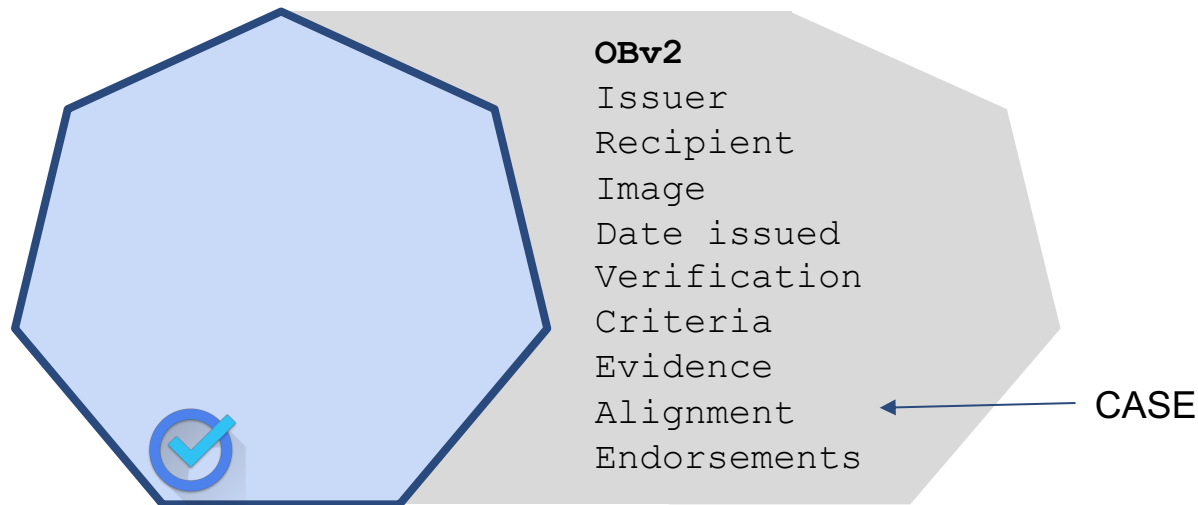
Open Badge共有流通のための情報
基盤：BlockchainとLTI Advantage

Digital Badge/Credential/CASA

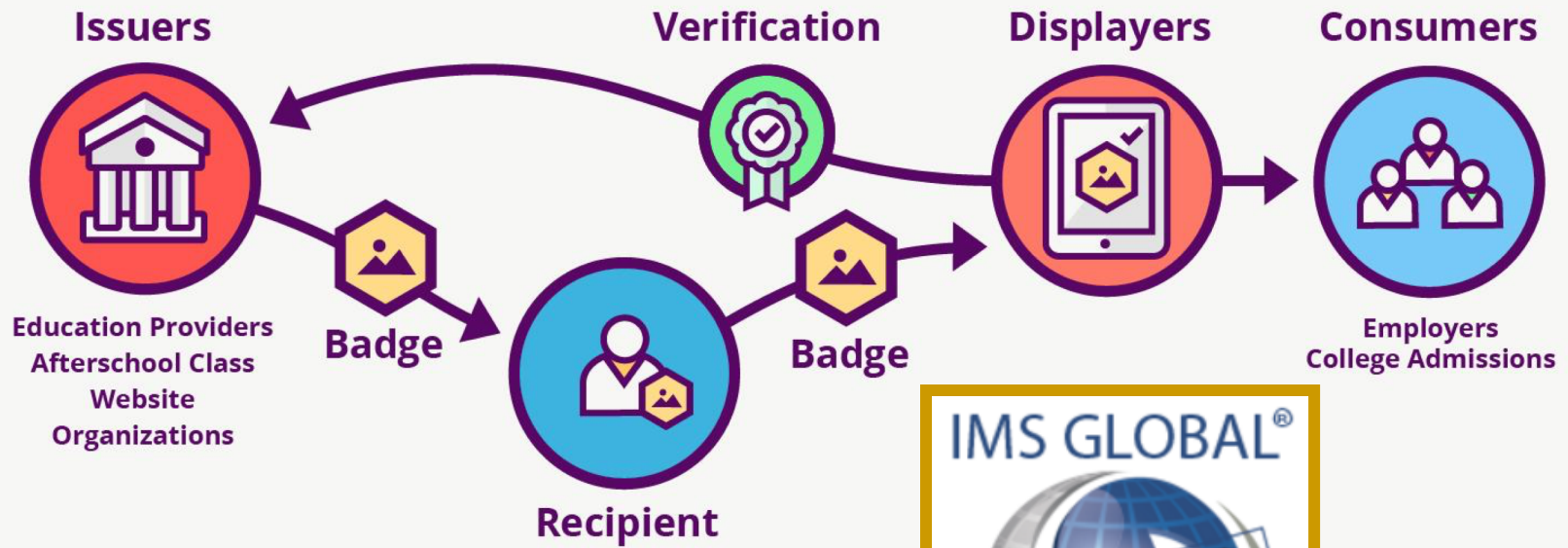
- **Digital Badges**
 - Open Badge Version 2 (OBv2)
- **Digital Credentials (電子成績証明)**
 - Extended Transcript (成績証明書)
 - Comprehensive Learner Record
- **CBE (コンピテンシー型教育) Interoperability**
 - CASA (Competency and Academic Standards Exchange)

Open Badges v2

Open Badges are **verifiable**, **portable** digital badges with **embedded metadata** about skills and achievements.



Badge Ecosystem



Comprehensive Learner Record

包括的学習者記録 (CLR)

雇用可能性スキル (employability skills)

コンピテンシー

課外活動

科目

体験的/事
前学習

デジタルバッジ、電子修
了証、学位、ライセンス





Competencies and Academic Standards Exchange™ (CASE™)

Standard
Format for
Competencies



Rubrics



Relationships
Among
Standards



The CASE standard has three components

デジタルバッジのためのセキュアで持続可能な流通基盤とは？

LTI Advantage

AND/OR

Blockchain