Guidelines for Issuing Micro-credentials Digitally 3.0

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1. Scope of guideline

The following guidelines apply to the digital issuance of micro-credentials (MCs) in accordance with the Open Badges 3.0 specification.

2. Purpose of the guideline

This guideline for issuing micro-credentials digitally defines the correspondence between the descriptors of a micro-credential and the metadata of its digital issuing means. The guideline will facilitate a uniform description of digital certificates and facilitate the comparison, selection, and use of micro-credentials.

3. Definition of terms

3.1 Micro-credential

Micro-credentials comprise two aspects: the educational program itself and the proof of educational history within that program.

A micro-credential [1]:

(1) Is a record of focused learning achievement verifying what the learner knows, understands, or can do.

(2) Includes assessment based on clearly defined standards and is awarded by a trusted provider.

(3) Has standalone value and may also contribute to or complement other micro-credentials or macro-credentials, including through recognition of prior learning.

(4) Meets the standards required by relevant quality assurance.

3.2 Digital Badges

Digital Badges are digital proof of qualifications, skills, micro-credentials, awards, and participation. It is also a technology for digital certification.

3.3 Open Badges 3.0

Open Badges 3.0 is a digital badge and a technical specification for digital certificates defined by the 1EdTech Consortium [2].

4. Micro-credential reference framework

The Micro-credential Joint Working Group [3] developed the Micro-credential Reference Framework [4] after studying the compatibility of the micro-credential frameworks of various countries with the UNESCO and OECD research studies. The micro-credential descriptors presented therein were used to develop these guidelines.

5. Correspondence between micro-credential descriptors and digital badge metadata

Table 1 shows the correspondence between the descriptors of micro-credentials and the metadata used in Open Badges 3.0, which is one of the standards for digital badges.

The classification of descriptors as mandatory or optional is defined by the Micro-credential Framework. Descriptors designated as mandatory in the Micro-credential Framework must also be included as metadata in Open Badges 3.0.

The following metadata elements exist in Open Badges 3.0 but are not defined in the Micro-credential Framework. Their handling is defined as follows:

Open Badges 3.0 includes the metadata field "achievementType", in which the type of achievement—such as Bachelor's degree, Master's degree, Micro-credential, Certificate of Completion, or Award—can be specified. For micro-credentials, the value "MicroCredential" should be used in this metadata field.

Open Badges 3.0 also includes the metadata field "achievement":"alignment", which specifies the standards or frameworks the achievement aligns with. The name and URL of the Micro-credential Framework should be specified in this field.

Table 1. Correspondence between descriptors of Micro-credential Framework 1.0 and Digital Badge metadata

Micro-credential		Open Badges 3.0			
Descriptor	Mandatory / Option	Metadata	Schema hierarchy	Mandatory/ Option	Notes
-	-	@context	"@context":	Mandatory	The following must be specified: "https://www.w3.org/ns/credentials/v2", "https://purl.imsglobal.org/spec/ob/v3p0/context-3.0.3.json"
-	-	id	“id”	Mandatory	Uniform Resource Identifier (URI) of the Credential
-	-	type	“type”	Mandatory	The following must be specified: "VerifiableCredential","OpenBadgeCredential"
Awarding body	Mandatory	name	"issuer":"name":	Optional (but required in actual implementation)	
	—(1)	Id	"issuer":"id":	Mandatory	Use a Decentralized Identifier (DID) or a Uniform Resource Identifier (URI).
	—(2)	type	"issuer":"type":	Mandatory	Specify terms such as

					“University”.
Country/Region of the issuer	Option	address	"issuer":"address": {"type": ["Address"], "addressCountry":	Option	
Date of issuing	Mandatory	validFrom or issuanceDate	"validFrom": or “issuanceDate”	Mandatory	Specify the date and time in the format like 2025-04-01T00:00:00Z. Metadata varies depending on the version of the Verifiable Credentials Data Model specified in the "@context". VCDM 2.0 uses "validFrom", while VCDM 1.1 uses "issuanceDate".
Identification of the learner	Mandatory	identifier	"credentialSubject": "identifier":	Optional (but required in actual implementation)	Names, student ID numbers, or other identifiers may be used.
		id	"credentialSubject": "id":	Optional (but required in actual implementation)	Use a Decentralized Identifier (DID) or a Uniform Resource Identifier (URI).
	—(3)	type	"credentialSubject": "type":	Mandatory	The type "AchievementSubject" must be specified to indicate the learner

					who achieved the learning outcomes and is the recipient of the badge.
Title of the micro-credential	Mandatory	name	"credentialSubject": "achievement":"name":	Mandatory	Character strings.
	—(4)	id	"credentialSubject": "achievement":"id"	Mandatory	Uniform Resource Identifier (URI).
	—(5)	type	"credentialSubject": "achievement":"type":	Mandatory	Indicate as “Achievement".
	—(6)	achievement Type	"credentialSubject": "achievement":" achievementType ":	Optional	Indicate as “MicroCredential".
	—(7)	alignment	"credentialSubject": "achievement":"alignment": ["type","targetName", "targetUrl"]	Optional — if included, "type", "targetName", and "targetUrl" are required	Specify the framework to which it is aligned.
Content/ Description	Mandatory	description	"credentialSubject": "achievement":"description":	Mandatory	A concise description for display in a digital wallet.
Learning outcomes	Mandatory	criteria (The same applies to all	"credentialSubject": "achievement":"criteria": {"narrative":	Mandatory	The content of the criteria can be written as text or indicated via a URL. Both may be used.
Language	Option				
Form of participation	Mandatory				

Learner effort	Mandatory	items below)	"credentialSubject": "achievement":"criteria": {"id": (Same structure applies below)		
Type of assessment	Mandatory				
Type of quality assurance	Mandatory				
Level	Option				
Certification	Option				
Credit/ Other recognition	Mandatory				
Prerequisites needed to enroll	Option				
Stackability	Option				
-	-(8)	image	"credentialSubject": "achievement":"image":	Optional	In Open Badges 2.0, the "image" was mandatory, but in Open Badges 3.0, it has been made optional. It is recommended that the “image” of the digital badge representing the micro-credential, as well as its "caption", include the word "Micro-credential" in English.

Note:

(1) The Micro-credential Framework 1.0 does not define an “id” to identify the awarding body.

(2) The Micro-credential Framework 1.0 does not define a descriptor corresponding to the "type" field for specifying the awarding body.

(3) The Micro-credential Framework 1.0 does not define a descriptor corresponding to the "type" field for specifying the learner.
(4) The Micro-credential Framework 1.0 does not define an identifier “id” to uniquely identify a micro-credential.
(5) The Micro-credential Framework 1.0 does not define a descriptor corresponding to the "type" field for specifying the certificate. In Open Badges 3.0, this is fixed as "Achievement".
(6) Since the Micro-credential Framework 1.0 is intended only for micro-credentials, it does not require specifying a “achievementType” to distinguish among bachelor's, master's, doctoral degrees, micro-credentials, or qualifications.
(7) In the Micro-credential Framework 1.0, the standard to which a micro-credential conforms is described using the descriptor "Type of quality assurance." Therefore, there is no separate descriptor such as “alignment” to indicate the standard directly.
(8) The Micro-credential Framework 1.0 does not define a descriptor corresponding to the “image” field.

6. Explanation

(1) Relationship between micro-credentials and digital badges

While micro-credentials are a new system for education in each country or region, digital badges such as Open Badges are technical specifications (standards) for digital certificates established by international information technology organizations and are used for a wide range of digital certificates, not limited to education.

Using a metaphor to explain micro-credentials (MCs) and digital badges can be quite effective. In this analogy, if a micro-credential is like a letter, then a digital badge functions like registered mail. The primary role of the digital badge, akin to registered mail, is to ensure that the letter (or micro-credential) is delivered securely to the recipient. Each micro-credential, or "letter," is authored within the specific educational system of a country. Just as registered mail doesn't alter the contents of the letters it carries, a digital badge faithfully conveys the state of the micro-credential, whether complete or incomplete, to its recipient. This metaphor highlights the digital badge's role in reliably transmitting educational achievements, exactly as they are documented, to all relevant parties.

Trust in the MC consists of two elements: trust that the quality of the MC's education is guaranteed, and trust that the MC sent by the learner is genuine and not a forgery. The former is achieved through the quality assurance framework of the MC, while the latter is achieved through information technology such as digital badges.

(2) When inserting micro-credential descriptors into the metadata of a digital badge, multiple micro-credential descriptors should be included in a single metadata item called a criterion. To clearly identify these multiple descriptors, the descriptor name must be added to the beginning of the description, as shown below.

Learning outcomes：
Language：
Form of participation：
Learner effort：
Type of assessment：
Type of quality assurance：
Level：
Certification：
Credit/ Other recognition：
Prerequisites needed to enroll：
Stackability：

(3) The badge image on the digital badge representing the micro-credential should include the words "Micro-credential" in English.
(4) If the digital proof of the micro-credential conforms to this guideline, it should be noted in the descriptor of the micro-credential, "Certification".
(5) Information indicating that the issuing authority is a trustworthy authority, its URI, etc., may be included in the Profile indicating the authority information.
(6) "Content/ Description" is a very brief description, and Uniform Resource Identifier (URI) cannot be used. In addition, the descriptor "Content/ Description" is not used in some micro-credential framework in Europe and Asia, and this information may be left out in international distribution of Micro-credentials.

7. Example of describing a micro-credential using Open Badges 3.0

An example of a micro-credential described in JSON format in accordance with the Open Badges 3.0 standard specification is shown in Figure 1.

In Figure 1, the "@context" field indicates that the contents conform to the VC specification (W3C Verifiable Credentials Specification) and the Open Badges 3.0 specification. By referring to the context files designated by the URLs, systems can accurately interpret the meaning of each data item described.
The "id" represents the identifier of the credential itself, and a URI is provided.
The "type" declares that the data is both a VerifiableCredential and an OpenBadgeCredential.
The "issuer" contains information about the organization that issued the credential. The "id" field includes the issuer's identifier (e.g., https://example.com/issuers/876543), the "type" indicates the category of issuer (in this case, "Profile" meaning an organization or individual profile), and the "name" provides the name of the issuing body ("Awarding body").
The "validFrom" field shows the date the credential becomes valid, written in ISO 8601 format. For example: 2025-04-01T00:00:00Z.
The "credentialSubject" represents the recipient (learner) of the credential. The "id" uses a Decentralized Identifier (DID) to uniquely identify the recipient. The "identifier" provides learner-specific information (e.g., name, student number).
The "type" indicates the type of subject; The type "AchievementSubject" must be specified to indicate the learner who achieved the learning outcomes and is the recipient of the badge.
The "achievement" field describes the content (achievement) attained by the recipient.
The "name" field specifies the title of the micro-credential.
The "description" provides a concise explanation for display in wallets or badge platforms.
The "type" indicates the type of achievement; In Open Badges 3.0, this is fixed as "Achievement".

The "alignment" field shows the framework to which the credential conforms. Here, it refers to the Micro-credential Framework v1.0.

The "criteria" field specifies the conditions required for issuing the credential. The "narrative" is a text-based description of those conditions, and the "id" provides a URL for referencing detailed achievement criteria. Within the "narrative", multiple descriptors of the micro-credential (e.g., learning outcomes, learner effort, assessment method) are organized using a bulleted format (Markdown style).

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```
{
  "@context": [
    "https://www.w3.org/ns/credentials/v2"                    ,
    "https://purl.imsglobal.org/spec/ob/v3p0/context-3.0.3.json"
  ],
  "id": "http://example.com/credentials/3527",
  "type": ["VerifiableCredential", "OpenBadgeCredential"],
  "issuer": {
    "id": "https://example.com/issuers/876543",
    "type": ["Profile"],
    "name": "【発行機関 / Awarding body】",
    "address": {
      "type": ["Address"],
      "addressCountry": "【発行国/地域 / Country/Region of the issuer】"
    }
  },
  "validFrom": "2025-04-01T00:00:00Z",
  "credentialSubject": {
    "id": "did:example:ebfeb1f712ebc6f1c276e12ec21",
    "identifier": [
      {
        "type": "IdentityObject",
        "identityHash": "studen001t@example.edu",
        "identityType": "emailAddress",
        "hashed": false,
        "salt": "not-used"
      }
    ],
    "type": ["AchievementSubject"],
```

```
  "achievement": {
    "id": "https://example.com/achievements/data-science-2025",
    "name": "【マイクロクレデンシャル名称 / Title of the micro-credential】",
    "description": "【内容 / Content/ Description】",
    "type": ["Achievement"],
    "achievementType": "MicroCredential",
    "alignment": [
      {
        "type": ["Alignment"],
        "targetName": "Micro-credential Framework v1.0",
        "targetUrl": "https://micro-credential-jwg.org/wp-content/uploads/2024/04/MC_frameworkver1.0.pdf"
      }
    ],
    "criteria": {
      "narrative": "学修成果 (Learning Outcomes):¥n- データサイエンスの基本概念を理解する（Understand basic data science concepts）¥n- 統計手法を実世界の問題に適用する（Apply statistical methods to real-world problems）¥n- Python プログラミングを用いたデータ分析を実施する（Utilize Python programming for data analysis）¥n- データ可視化を通じて分析結果を伝える（Communicate findings through data visualization）¥n- データの倫理的取り扱いを実践する（Demonstrate ethical handling of data）¥n¥n 授業言語 (Language):¥n 日本語 (Japanese)¥n¥n 授業の方法 (Form of participation):¥n オンライン講義とワークショップ（Online lectures and workshops）¥n¥n 学習量（総学習時間） (Learner effort):¥n90 時間（90 hours）¥n¥n 評価の方法 (Type of assessment):¥n プロジェクト提出およびピアレビュー（Project submission and peer review）¥n¥n 質保証 (Type of quality assurance):¥n 大学内の質保証委員会による審査（Internal review by university QA committee）¥n¥n レベル (Level):¥n 学士レベル, 日本教育資格枠組みレベル 6 に準拠（Undergraduate, Aligned to Japanese Educational Qualifications Framework Level 6）¥n¥n 証明書 (Certification):¥n 修了証をデジタル発行（Certificate of Completion Digitally issued）¥n¥n 単位/その他認定 (Credit/Other recognition):¥nUCTS（UMAP 単位互換方式）2 単位相当、Professional Development Unit (PDU) 15 点（2 UCTS credits, 15 PDU）¥n¥n(受講)前提条件 (Prerequisites needed to enroll):¥n 統計学の基礎知識（Basic statistics knowledge）¥n¥n 積み上げ可能性 (Stackability):¥n データサイエンス・マイクロクレデンシャルに積み上げ可能（Can be stacked toward Data Science Micro-credential）",
      "id": "【達成基準の詳細 URL / Detailed Criteria URL】"
    }
```

```
    }
  }
}
```

Figure 1. Example of a Micro-credential Described Using Open Badges 3.0 (JSON Format)

References

[1] UNESCO, Towards a Common Definition of Micro-credentials, https://unesdoc.unesco.org/ark:/48223/pf0000381668, 2022, Accessed: 2025-4-30

[2] 1EdTech Consortium, Open Badges Specification Final Release Spec Version 3.0, https://www.imsglobal.org/spec/ob/v3p0/, Accessed: 2025-4-30

[3] Micro-credential Joint Working Group, https://micro-credential-jwg.org/, Accessed: 2025-4-30

[4] Micro-credential Joint Working Group, Micro-credential Framework (ver. 1.0), https://micro-credential-jwg.org/wp-content/uploads/2024/04/MC_frameworkver1.0.pdf, Accessed: 2025-4-30