# Competency Management Profile Version 1.1

**Narrative:**

Competency is a concept that means different things to different people. However, data systems should treat them as simply data. Whether an evaluation of competence represents knowledge, skill, ability, or even a task, it can be structured as a unique competency definition (also just called “a competency”). The competency definition takes on various forms using standards, but it is essentially a unique identifier for the purposes of this xAPI Profile / standard.

A competency, for the purposes of aligning it to xAPI data, is considered an object with type “activity”. While the competency is actually gained, lost, or mastered to some level within a more traditional learning or evaluation activity, it is still represented by an object and the only appropriate type within xAPI is “activity”. The object as type activity allows it to have a unique (and hopefully resolvable) identifier as well as a definition (metadata). This means an LRS will keep a canonical form of that competency within it and ideally that intelligently designed systems can grab data from the identifier resolution and assist the learner. It is also important to determine a competency as an activity for the purposes of using context activities for Statements that may be created outside of the context of this profile.

What data is actually within a competency definition is beyond the scope of this profile. However, to understand the common use of the competency, it is important to establish context. It is expected that some kind of rubric within the competency dictates how exactly it is gained, lost, or changes in mastery level. The rubric will also determine, if necessary, how the competency is evaluated as knowledge, a skill, an ability, a task, etc. It could also be the case that each of those types are considered separate competencies. Mastery levels could also be individual competency objects or self-contain those levels. It is expected that competencies are contextualized within a competency framework. Both competencies and frameworks are either owned or accepted by those who use them, such that an granting of competence is done in full accordance with the controller of that competency (see roles). Finally, various learning resources could be aligned with a competency definition, likely in a way that the rubric references them (specifically or generically).

For the purposes of defining xAPI Statements around competency, it is just an object with “objectType” of “Activity” and a “type” (sometimes referred to as Activity type due to its inclusion only when the object is of “objectType” is “Activity”) of “https://w3id.org/xapi/tla/activity-types/competency”. This is true whether the object is identified as the object of the statement or as a context activity. Any other definition or contextualization of the competency is seen as an extension of this profile. Use cases were considered to bring in that context but was seen as low value as the extrapolation and evaluation of the competency rubric is not data that necessarily needs to be brought into xAPI. This profile recommends against bringing in entire rubrics, contextualization of competencies in the entire framework, or….

Learners have an active role in competencies. They are likely operating in a way that they themselves or with assistance of members of their organization or technology, create a “pathway” such that they seek out and experience learning and evaluation activities to gain competencies. This planning, for the sake of this document, is goal setting. A “goal” is not a specific object or activity type in xAPI, it is purely conceptual. While a goal can be considered a job, a career, a duty, a degree, a certification, a credential, a microcredential, etc., this profile will only use competencies ( “https://w3id.org/xapi/tla/activity-types/comeptency”) as goals.

A learner’s competence or the competency itself may dictate expiration or revocation conditions. This can be a set expiration date, a degradation function, or specific conditions that it is revoked. These will likely be handled in the rubric or other logic not enforced in this specification, but the xAPI data may be the only way the Statements can expose this information to sources that only have access to the xAPI data and most likely will be the only mechanism for real-time updates relayed from adjusting the competency to individual granting and verifications of that competency.

Competencies may change over time. The rubrics can also change. How this affects an individual’s competence is beyond the scope of this document. The structure of competencies within frameworks, whether they are reclassified, moved, removed, or changed could potentially affect competencies being granted. The connected nature of competencies should indicate a path forward for that organization. Whether an organization chooses to change an expiration date or instantly revoke competencies is up to that organization. Large changes should likely instead use new competencies and introduce those as requirements rather than simply revoking competencies. Smaller changes are up to the organization to ignore, add supplemental competencies, or introduce additional learning resources as goals (not covered in this document).

**xAPI Profile Validity to xAPI Profile Specification and Conformance**

This document will result in the creation of a JSON-LD schema for validation purposes, according to the [xAPI Profile Specification](https://github.com/adlnet/xapi-profiles). The data described in this document uses concepts, Statement Templates, and patterns, even if not specifically called out that are formalized as requirements (MUST/SHOULD/MAY) in the rest of the document. Data validation MUST include use of the contextActivity with type category and an activity ID of this profile. That activity ID is found in the corresponding JSON-LD schema. Conformance of data has to do with meeting the intentions of this document. JSON-LD validation is not the same as conformance. For example, a profile might expect that the same Statement not be issued twice, but as Statements are validated as singles, it might be valid but not conformant.

**Validating Profile Data**

When a violation of a general xAPI Statement occurs, the LRS typically rejects that Statement. With xAPI Profiles, it is not the case where an LRS will reject it. Data validation should be done during the design of resources that either act as a LRP (Learning Record Provider) or communicate through an LRP and checked prior to deployment. An LRP may not be aware of xAPI Profiles that designed resources intend to adhere to and is not responsible for non-conformance/invalid xAPI Profile data, it is only responsible for xAPI conformance. Data validation of Statements or sets of Statements MUST (from a standpoint of a data validator, not the LRS) match Statement Templates or be considered invalid. This invalid/non-conformant data is not to be rejected it just may not be useful, particularly in contexts where the profile data is used for analytics or visualizations. There are other processes that an organization can do to effectively perform data management. LRPs SHOULD NOT expect the retrieval of data with an xAPI Profile-based query to return results that are invalid and/or non-conformant to a profile.

**Reusing Concepts vs. Statement Templates**

xAPI Profiles will seek to re-use concepts rather than recreate them. This doesn’t mean that an existing, even if only one exists, Statement Template from another profile will be used that contains that concept, even if the concept is from another profile. Requirements from this profile, when actualized in the JSON-LD technical profile as well as any additional conformance, are to be considered built “from the ground up” rather than inheriting all requirements, unless specifically noted.

**Dates**

Statement timestamps are to be considered/modified to represent the date which something happened. That is, if a competency were revoked at a certain time, the timestamp should be adjusted rather than using another property that would do the equivalent. Thus, properties like “revocation date” will not be part of the Statement and will be inferred from the standard. Expiration dates will be calculated/provided at the time of Competency achievement.

**Roles**

Competency earner – the Agent that earns (or possibly loses) a competency.

Competency granter – the Agent authorized on the competency owner’s behalf to make declarations, likely based on evaluation, of a competency earner’s “competence”.

Competency owner – the Agent that owns the competency, such that changes to the competency definition, including the rubric, would be done by that owner.

Competency verifier – the Agent authorized on by the non-owner of a competency to make declarations, likely based on evaluation, of a competency earner’s “competence” such that this Agent “trusts” a competency granter’s declaration.

**Actions**

Goal setting – The Actor sets a goal as a part of a plan. The Actor remains the center of the setting regardless of any intervention by another Actor (intelligent system, boss, etc.). The Actor may have no knowledge of competencies and may achieve setting a competency as a goal by setting as a goal a learning resource, a job, a job function, etc. Use of goal setting is completely optional. The same competency as a goal MAY be used more than once but care should be done that it is only done if the previous competency goal was removed. While there is no reason to set as a goal, a competency that has already been achieved, the goal achievement is not the “source of truth” and therefore SHOULD NOT be restricted based on achieved goals.

Goal achieving – The Actor achieves the goal and therefore, removes the goal as a part of the process. The Actor does not need to have knowledge of goals or existence of a goal to achieve the goal, but the goal achievement MUST provide as a StatementReference, the goal setting Statement. Use of goal achievement is optional depending on the use of goal setting. Issuing the exact same goal removal Statement (e.g., with the exact same StatementReference) is pointless, but not specifically checked against, so these Statements SHOULD NOT be restricted.

Goal removing - – The Actor removes the goal for any reason other than being successful at achieving the goal. Use of goal removing is completely optional – goals can persist forever if they are not achieved. Removal of the goal MUST provide as a StatementReference, the goal setting Statement. Issuing the exact same goal removal Statement (e.g., with the exact same StatementReference) is pointless, but not specifically checked against, so these Statements SHOULD NOT be restricted.  
  
Competency Granted – An Organization (as an Actor) grants a Competency Definition to an Actor. This granting of competence MUST contain a Context Activity of the competency. The Statement SHOULD contain a Context Statement that serves as evidence for the decision to grant that competence. In the case where many Statements of evidence are needed, a contextExtension of “evidence” SHOULD be used and SHOULD use Statement ids in an array with the “best” evidence still linked in the Context Statement. The rationale is that an LRS will natively not understand to query “evidence” and if so, likely not to use the data as Statement ids. Using a Context Statement is the surest way to have full search capability. The actual evaluation that resulted in the granting is beyond the scope of this profile, including how assertions may have been modeled/evaluated to reach the granting. The granting is considered sufficient to achieve the competency referenced, it is not a “partial” assertion or even a full assertion (although it may reference it). Any use of a partial satisfaction of rubric criteria or a partial granting MUST NOT use this mechanism.

Competency Achieved – An Actor achieves a competency by referencing the competency definition as the object. This is the learner centric Statement that SHOULD also be issued when a Statement granting competence is issued. If only one of Competency Achieved or Competency Granted is used, it SHOULD be this one because of the Actor as the learner. The Statement SHOULD contain a Context Statement that serves as evidence for the decision to grant that competence. In the case where many Statements of evidence are needed, a contextExtension of “evidence” SHOULD be used and SHOULD use Statement ids in an array with the “best” evidence still linked in the Context Statement. The rationale is that an LRS will natively not understand to query “evidence” and if so, likely not to use the data as Statement ids. Using a Context Statement is the surest way to have full search capability. The actual evaluation that resulted in the granting is beyond the scope of this profile, including how assertions may have been modeled/evaluated to reach the granting. The granting is considered sufficient to achieve the competency referenced, it is not a “partial” assertion or even a full assertion (although it may reference it). Any use of a partial satisfaction of rubric criteria or a partial granting MUST NOT use this mechanism.

Competency Verification – An Actor is verified competence to a given Competency Granting Statement. This verification of competence MUST use a Statement Reference to an existing Statement that is a Competency Granting Statement. If an organization is doing anything more than simply trusting another organization’s granting, they should create their own competency definition and grant that competency to that learner. If it is logically the equivalent competency, then it should link their version to the other as acceptable. An alternative is to gain the permission of the competency owner to make granting of competencies. The verification is considered sufficient to achieve the competency referenced, it is not a “partial” assertion, even a full assertion, or verification. Any use of a partial satisfaction of rubric criteria or a partial verification MUST NOT use this mechanism.

Competency Expiration – An Actor is negated their competence due to time of the competency expiring. There is no need of an organization as an Actor as this is a natural occurrence with the passing of time. The expiration of competence SHOULD use a Context Statement of the most effective Competency Granting or Verification Statement in terms of providing the last possible date of the expiration. This Statement MUST NOT be issued in a way that contradicts the intended duration of the competency granting/validation. Issuing the two Competency Expiration Statements is pointless (e.g., an expiration per competency granting is not needed), but not specifically checked against, so these Statements SHOULD NOT be restricted.

Competency Revocation – – An Organization takes away a competency from an Actor due to cause. This granting of competence MUST contain a Context Activity of the competency. The revocation of competence SHOULD use a Context Statement of the reason for revocation. In the case where many Statements of evidence are needed, a contextExtension of “evidence” SHOULD be used and SHOULD use Statement ids in an array with the “best” evidence still linked in the Context Statement. If a rubric has a specific condition for revocation and that is met, then a Statement with that corresponding condition SHOULD be used. Issuing two Competency Revocation Statements is pointless, but not specifically checked against, so these Statements SHOULD NOT be restricted.

Competency Forfeiture – –An Actor has their competency negated/forfeited due to cause. The forfeiture of competence SHOULD use a Context Statement of the reason for forfeiture. In the case where many Statements of evidence are needed, a contextExtension of “evidence” SHOULD be used and SHOULD use Statement ids in an array with the “best” evidence still linked in the Context Statement. If a rubric has a specific condition for forfeiture and that is met, then a Statement with that corresponding condition SHOULD be used. Issuing two Competency Revocation Statements is pointless, but not specifically checked against, so these Statements SHOULD NOT be restricted.  
  
Competency Update – An Actor is reissued a competency granting or verification with the purpose of overwriting a characteristic of that granting or verification. Competency Update Statements MUST have at least one characteristic extension. The Statement SHOULD contain a Context Statement that serves as evidence for the decision to grant that competence. The value of the characteristic is intended to overwrite any Statement with the timestamp before this one, whether it extend, reduce, or instantly expire a competency granting/achievement/verification/update.

**Characteristics**

Expires – A context extension that indicates how long the competency granting/verification is valid. This is considered a date which the competency will expire. It is expected that prior to issuing this Statement, math is done to calculate the date of issuance plus the length of validity. A Competency Validation can, from the perspective of this standard, but in no other legal way, change the valid for time period on a competency that was granted.  
  
Degradation Rate – A context extension that indicates the rate at which a competency will expire. This extension is considered a string and doesn’t necessarily need to be parsed by a consuming service. Because using a degradation rate mathematically will result in an expiration date from issuance, expires MUST accompany degradation rate. A Competency Validation can, from the perspective of this standard, but in no other legal way, change the degradation rate on a competency that was granted. In this case, the value of expires MUST also be updated.