PROCESS DESCRIPTION

REGISTRATION OF AAS SUBMODEL TEMPLATES FOR DIGITAL TWINS (IDTA SUBMODELS) V1.0

Imprint

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Process Description

Registration of Asset Administration Shell Submodel templates[1] for Digital Twins (IDTA Submodels)

The following describes the process of how parties can create Submodels for the Submodel Asset Administration Shell that are to be reviewed and published. The aim of the process is primarily to ensure that Submodels are correct in relation to the standardized meta model, describe a well-defined purpose and meet a certain quality standard.

The IDTA Working Group "Submodels" is responsible for the orchestration and content of the IDTA registered Submodels. There are the following roles in this process:

- **Interested person/submitting body**: individual or group of companies, associations, standardization bodies, research institutes who wishes to register a Submodel with IDTA
- **IDTA registration office**: IDTA maintains personnel for handling all administrative tasks for a Submodel registration, running dedicated platforms for the storage and publication of Submodels, supports interested parties and manages the process
- **Working Group "Submodels"**: responsible for the overall architecture (big picture) of all registered IDTA Submodels. Verifies content of new proposals and syncs with other initiatives.
    - The **Architect** is a specialist designated by the Working Group "Submodels" with excellent knowledge in the Asset Administration Shell and existing Submodels. He is responsible to consult working teams in developing consistent Submodels.
- **Working Team**: group of interested people to work on a specific Submodel. Can be an IDTA working group, a joint working group between IDTA and any other organization or an external working group within another associations. This group should have a sufficient legal setup to be able to hand in the required documents for registering a Submodel and well-defined IP regulations to have an open usage of the Submodel.

[1] Submodel template specifications (written documents) as well as Submodels with kind = Template according to section 4.4.7 of *Details of Asset Administration Shell (Version 3.0RC01)*

Formulation of an IDTA Submodel

The registration of Submodels takes place in several steps according to a standardized procedure (see Figure 1).

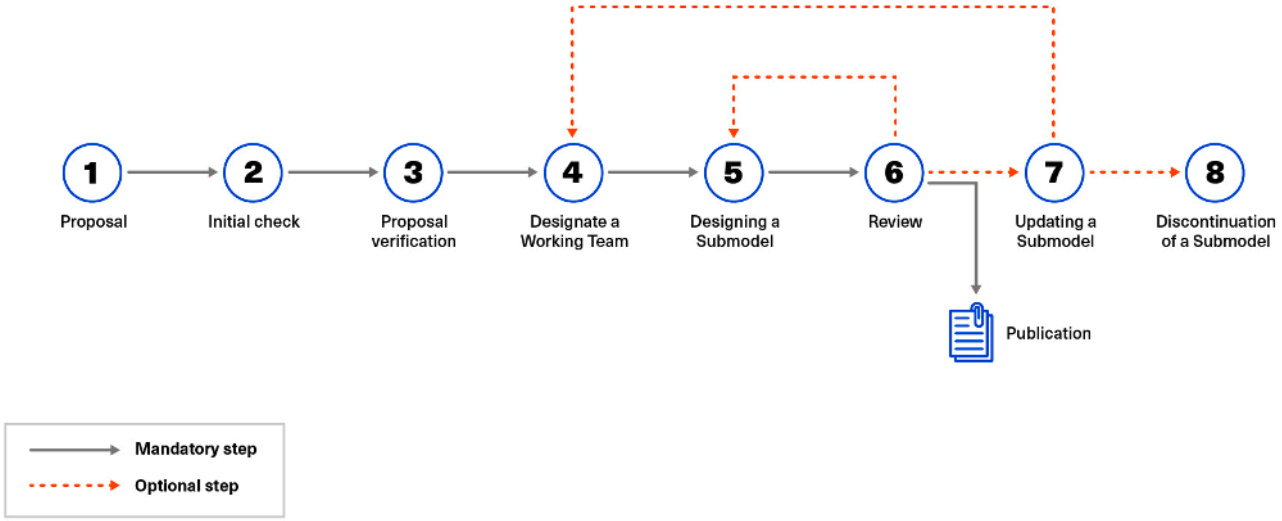

Figure 1: Procedure model for the formulation of a Submodel

(1) Proposal

a) The interested person notifies the IDTA registration office to propose a new Submodel. Proposals can be submitted by companies, associations, standardization bodies, research institutes, but not by private persons.

b) A proposal shall contain the following information in a generally understandable form[2]:

- Title of the Submodel*.
- Contact person for the project*.
- Submitting body (association, society, institute, company, ...) *.
- Short written description of the planned content of the Submodel *.
- As far as known to the interested person, reference to other Submodels, norms or standards.
- As far as known to the interested person, which other circles might be interested in participating.
- Indication of whether a proposal already exists for a working team to develop the proposal.

c) The registration takes place in written form. The form provided can be used for this purpose.

[2] Mandatory information is marked with an *. We assume that a privacy agreement and usage policy exist and that the proposing person agrees to them.

(2) Initial check

a) The IDTA registration office checks the proposal for completeness and formal correctness.

b) If the review is successful, the details of the application are published appropriately. The status of the proposal will be indicated as shown in Figure 2. Otherwise, revision of the proposal is requested. If this does not happen, the proposal will not be pursued further by the IDTA registration office.

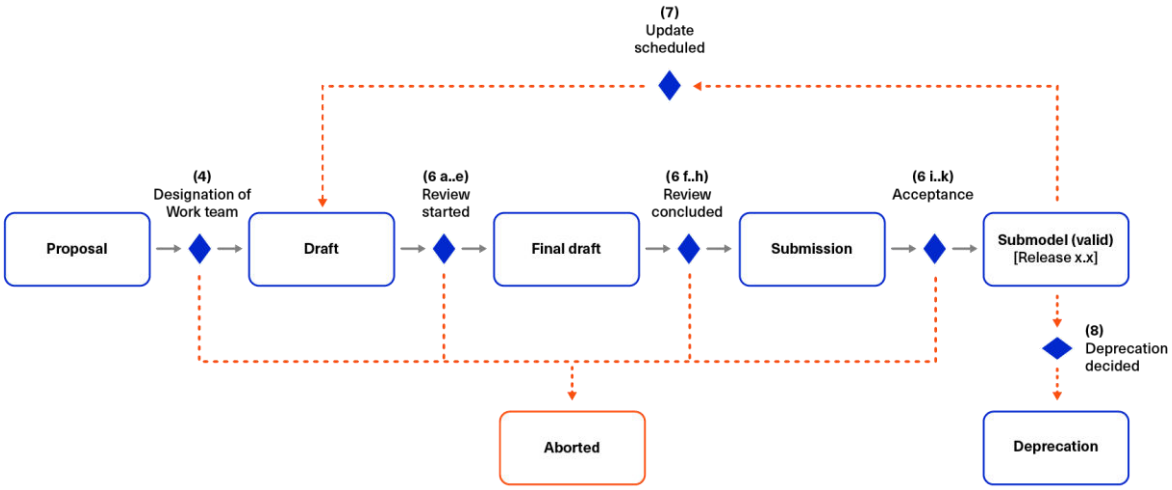

Figure 2: Life cycle of a IDTA Submodel project. Numbers in brackets refer to the numbered clauses in the text and Figure 1

(3) Proposal Verification

a) The IDTA registration office invites the contact person to explain the content and objective of the project to the Working Group “Submodels”.

b) The Working Group “Submodels” reviews the proposal. For the review, the Working Group “Submodels” may involve further experts, e.g. from standardization organizations or associations.

c) Working group “Submodels” checks:

- Whether the proposal describes a clearly defined area relevant to the scope of the Asset Administration Shell,
- Whether a partially competing/ contradictory Submodel is already covered (purpose and domain),
- Whether another Submodel processes the same or closely related scope/standards,
- Whether the standardization bodies to be addressed are correctly and completely named.

d) The Working Group “Submodels” provides substantive guidance on the proposed project, e.g., what other entities, groups, individuals, Submodels, standards, etc., need to be considered.

e) In the case of a competing/conflicting Submodel, the Working Group “Submodels” provides clarification with respect to existing Submodels.

f) As a result of the review, the Working Group “Submodels” decides whether to accept the proposed project or not to pursue it. The decision is justified and recorded. The result is published by the IDTA registration office.

(4) Designate a Working Team

a) In case of a positive decision, the IDTA Registration Office informs the contact person to form or appoint a working team for the elaboration of the Submodel. For the composition of the working team it has to be considered that interested parties are adequately represented. The public must be informed.

b) The Working Group “Submodels” appoints an Architect for the project. IDTA registration office will consult regarding all process matters. IDTA registration office is available for coordination, queries about the organization and the process model. The Architect supports the interested person in the development of the Submodel with his knowledge of the Asset Administration Shell metamodel and existing Submodels.

c) The working team jointly adopts a schedule for the development of a revision of the relevant Submodel that can be agreed upon and communicates this to the IDTA registration office.

(5) Designing a Submodel

a) The draft of the Submodel specification is created by the working team based on the provided Word-Template. Further support is provided by the generator function in the AASX Package Explorer. Notes on modeling and content design can be found in the "Frequently Asked Questions" (https://github.com/admin-shell-io/questions-and-answers) .

b) Basically, the following applies to the creation of a IDTA Submodel specification:

- Specification and modeling are done in English
- The modeling shall follow the specifications of the current version of the document "Details of the Asset Administration Shell, Part 1". "Frequently Asked Questions" shall be taken into account.
- Characteristics should primarily be taken from existing catalogs of characteristics, such as ECLASS or the IEC Common Data Dictionary (CDD)[3]. The preferred standard for Submodel is ECLASS.
- The design includes an AAS with a template of the Submodel. This template is complete but does not contain values for a concrete asset. The template must be in AASX format.
- In the case of optional features, data and functions, it must be clear from the specification to the reader when their specification is expected (e.g. by describing use cases).
- The draft should also already provide guidance and recommendations regarding the protection of features, data and functions in terms of information security ('data security').
- Examples facilitate the understanding and use of the Submodel.

c) New features can be proposed to the Working Group “Submodels” for standardization. The Working Group “Submodels” will review these proposals and forward them to ECLASS or IEC CDDas appropriate.

[3] IEC 61360-4 - Common Data Dictionary (CDD - V2.0014.0017)

d) The subsequent users of the relevant Submodel, e.g., distributors of components and software or manufacturing companies from relevant industries, are to be considered in the creation of the draft.

(6) Review

a) The working team submits the Submodel specification to the Working Group “Submodels” for review. The review process is led by the Architect.
b) The IDTA registration office publishes the draft to the IDTA members in a timely manner and calls for comments as well as objections. Any IDTA member is entitled to comment on a Submodel draft with reasons. This measure serves to involve interested parties in the work of the Working Group “Submodels” as well as to increase the quality of Administration Shell Submodels.
c) The registration office will establish comment deadlines according to the regulations given by the Working Group "Submodels". Comments and objections should be submitted electronically using the form provided. The IDTA registration office shall confirm receipt and, in this context draw attention to the assignment of the copyright and the right of appeal.
d) The Architect is responsible for checking that the recommendations described in "Frequently Asked Questions" are taken into account, that the "Details of the Asset Administration Shell, Part 1" are complied with, and that features from feature catalogs are used correctly. Additional experts may be consulted.
e) The IDTA registration office hands over all comments and objections to the working team. The working team reviews all comments and objections.
f) To discuss the comments and objections, the objectors must be given the opportunity to present their opinion to the working team. A decision on the consideration of comments and objections is brought about in the working team. Each objector will be informed in written form about the result of the examination of his objection.
g) If the objection handling results in fundamental or serious changes in content compared to the published Submodel draft, the working team must check with the Working Group “Submodels” whether another Submodel draft should be published and the review process repeated. The result of the review shall be documented. A renewed Submodel draft replaces the preceding one.
h) The Architect verifies that all comments received have been properly addressed.
i) In case of a positive review, the Working Group “Submodels” votes on the draft. In case of 2/3 majority, the draft is accepted as a registered Submodel. The IDTA registration office assigns a revision number for this Submodel and ensures that the contents are published.
j) IDTA registration office publishes the registered Submodel and provides it on GitHub and the IDTA website.
k) The Working Group “Submodels” thanks the working team and declares its activity for the creation of the Submodel finished.

(7) Updating a Submodel

a) The Working Group “Submodels” regularly reviews all existing Submodels to determine whether they are being used in practice and whether revisions are needed. (Examples of indicators for the use of Submodels are: Publication in the technical press, adoption in other standards, dissemination of alternative standards in the domain of the Submodel). A revision of a Submodel may also be proposed to the Working Group “Submodels” by any interested person mentioned in (1a).

b) The Working Group “Submodels” decides by simple majority whether a revision of a Submodel is necessary. This is done according to the size of the proposed change.

- Editorial corrections, such as layout, spelling, misleading wording or incorrect references can be decided directly by the Working Group “Submodels” by simple majority vote and the Submodel published with an increased minor version number. However, it is recommended that editorial changes be deferred until the next substantive revision.
- In the case of corrections to the content, such as changing or adding features, a working team must be established or reconvened to work out the proposed change. The process described above applies to the formation and operation of the working team. In case of major changes (more than 15 % of the original description affected or more than 10 additional pages or break of backward compatibility) the major version of the Submodel will be increased, in case of minor changes the minor version.

c) If no working team can be found for a revision, it will be deferred until the next regular review or amendment.

d) The change process of Submodels is documented.

(8) Deprecation of a Submodel

a) An assessment according to (7) can lead to a Submodel being marked as deprecated. This means that its use for new realizations is discouraged. Software tools should, however, continue to be able to work with deprecated models (backward compatibility). Unanimity is required for the Working Group “Submodels” to decide to mark a published Submodel as obsolete.

b) Depreciation of Submodels will be flagged in Github. Additionally, the status of Submodels will be reflected on IDTA web site.

c) Deletion of a Submodel is not intended.

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