SEMANTIC ASSET CLEARING PROCESS AND QUALITY FRAMEWORK

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JOINING UP GOVERNMENTS

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1. INTRODUCTION

This document has been prepared in the context of Action 1.1 of the Interoperability Solutions for European Public Administrations (ISA) Programme: Methodologies for the development of semantic assets. It describes the redesigned asset clearing process that will become operational as from October 2011, after the migration of the former SEMIC repository to the Joinup platform. This chapter introduces the rationale for the clearing process and indicates the structure of the remainder of this document.

The semantic methodologies Action is operating a clearing process on the Joinup platform to:

- **Support and give visibility to *asset development* in the *scope* of the ISA programme**: The creation of semantic interoperability assets essentially requires the collaboration of many stakeholders in reaching consensus around a specification. By registering their asset on the Joinup platform, Asset Owners can use the collaboration and communication tools to build a community of developers and (potential) users around their semantic interoperability asset. Because this may occur even in an early stage of development, semantic interoperability assets should be registered on the platform with only a minimal set of mandatory quality requirements to be fulfilled. However, not every semantic interoperability asset belongs in the Joinup repository. One should therefore put in place a selection process only to accept these asset development projects that meet the scope of the ISA Programme.
- **Provide *recognisable quality indicators* to public administrations**: By operating a clearing process, Joinup provides “quality assurance on semantic interoperability assets”. Via this service, it supports public administrations to choose semantic interoperability assets that are included in its asset repository. In particular, SEMIC provides an assessment according to a number of relevant **quality indicators** in various categories that allow a public administration to assess the suitability of the semantic interoperability asset for their e-Government projects. The value of these quality indictors is much dependent on the extent to which they are recognised and meet the information needs of public administrations.
- **Remove semantic interoperability assets that have been discontinued or that no longer meet the quality criteria**. The asset repository should only contain assets that either are candidate or that have been finalised but remain highly valuable to public administrations. The clearing process should therefore ensure that assets for which development has been discontinued are periodically removed from the asset repository. Likewise, the clearing process should verify whether external changes (such as a change in scope, business requirements, or market conditions) do not justify an asset to be removed from the asset repository.

The remainder of this document consists of three chapters and a number of Annexes. Chapter 2 contains a description of the procedural aspects of the asset clearing process. Chapter 3 lists the criteria that are applied during the different stages of the asset clearing process. Chapter 4 concludes by listing the main characteristics of the redesigned clearing process and pointing out

the most important changes with regard to the 2008-2011 versions. The Annexes contain supplementary information to the process and criteria.

2. ASSET CLEARING PROCESS

This chapter describes the redesigned asset clearing process. Figure 1 provides an overview of the overall Asset Clearing Process. The clearing process consists of five sub-processes:

1. **Asset Identification Process**: this is a sub-process that is closely linked to the second process, the Asset Proposal Process. In the Asset Identification Process, the Clearing Process Manager identifies candidate semantic operability assets that could be stored in the repository. The Clearing Process Manager will encourage the actual Asset Owner to initiate the Asset Proposal Process.
2. **Asset Proposal Process**: In this sub-process the Asset Owner proposes a semantic interoperability asset to be included in the asset repository. Provided that the semantic interoperability asset meets the formal acceptance criteria and the scope criteria of the ISA Programme, the asset will be registered in the asset repository with the "**candidate**" status. The platform provides a number of communication and collaboration tools that will allow the asset owner to create a community of developers and users around his semantic interoperability asset.
3. **Asset Release Process**: This sub-process involves the Asset Owner creating a release, which is a collection of files representing the latest version of the semantic interoperability asset. Upon publication, the release is subject to verification by the Clearing Process Manager to verify whether the release meets all formal requirements. The release process does not influence the status of the asset in general.
4. **Asset Assessment Process**: With this sub-process, the Asset Owner can request a particular release to be assessed by the Clearing Process Manager. To this end, the asset owner must first perform a self-assessment and file a formal request via the platform. Semantic interoperability assets for which a release has successfully passed the assessment obtain the status "**assessed**". This status indicates that the release has passed the minimal thresholds and that a complete asset assessment report is available for the release.
5. **Asset Removal Process**: The Asset Removal Process is run in two modes: a yearly mode and as a result of an unsuccessful termination of the Asset Release Process or Asset Assessment Process. In both cases, the Clearing Process Manager verifies whether the asset should remain in the asset repository, taking into account the formal criteria and scope criteria, and asset removal criteria. The latter take into account the development activity, outlook, and future plans of the asset development project. Assets that are removed as a result of this process have the status "**removed**". All releases of the asset – if any – become invisible.

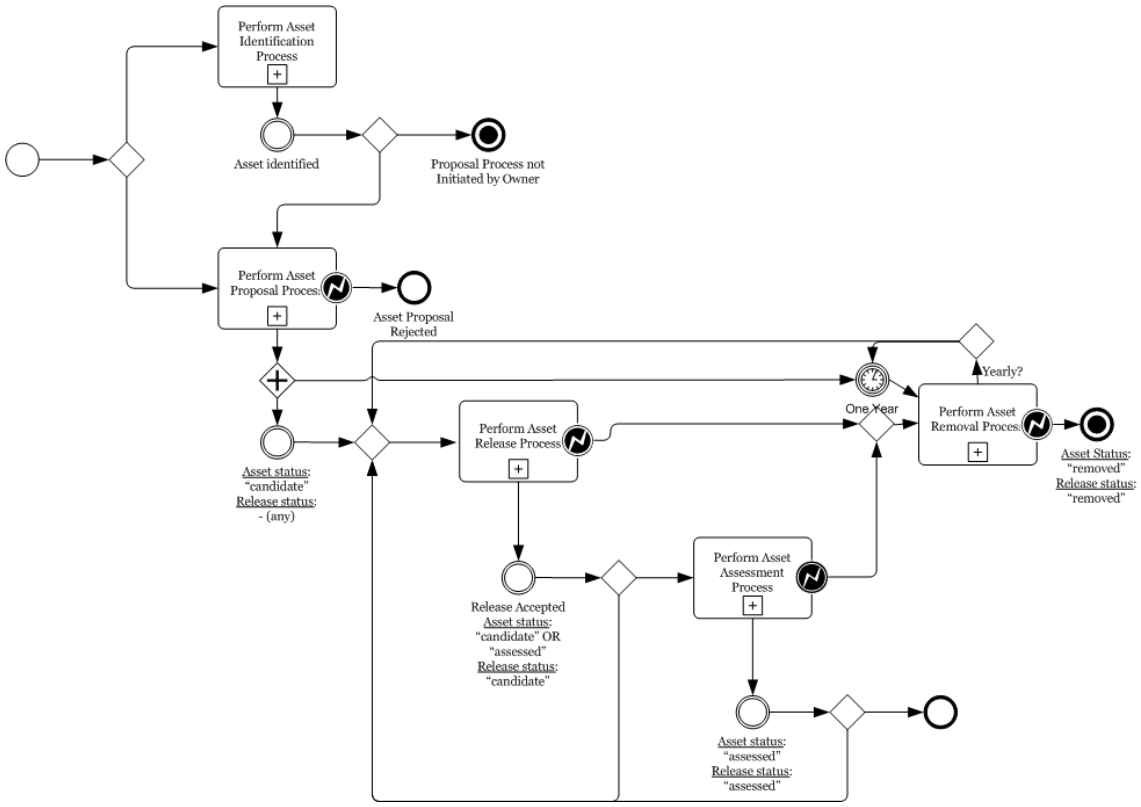

Figure 1 Overall Asset Clearing Process

The remainder of this chapter is structured as follows. First, the most important roles of actors in the clearing process are defined. Then, an overview is given of the evolution of the Asset status and Release status in the course of the aforementioned sub-processes. Finally, each of the aforementioned sub-processes is described in detail. In particular, its objectives, inputs, outputs and detailed steps are discussed. The next chapter describes the assessment criteria that are applied during each of these processes.

2.1 PROCESS ROLES

The clearing process involves numerous people in a variety of process roles. In this document, **process roles** are used to identify a particular role an agent can play in the context of a process.

- Semantic Interoperability Audience
- the Asset Provider
- Assessment Roles

These roles will be discussed in the following sections.

2.1.1 Semantic Interoperability Audience

The semantic interoperability audience is the target group of the Joinup platform, people who directly or indirectly work for public administrations. It consists of all users of the Joinup platform who should be able to use the assets in their implementations.

2.1.2 Asset Provider Roles

The Asset Provider includes the roles Asset Owner, Agent and Developer.

The central role is the **Asset Owner**, who is responsible for the asset over its entire lifetime and holds the intellectual property rights (IPR) of the asset. The asset owner may well be an organisation, in which case the organisation is represented by an **Asset Agent**, who is the legal representative and assigned point-of-contact of that organisation.

The asset owner can be supported by additional **Asset Developers** but he is the coordinator for all critical decisions related to the asset. The asset owner may support the development process itself, however, this is no necessity.

2.1.3 Assessment Roles

The **Clearing Process Manager** is responsible for the correct application and operation of the clearing process. This role supervises and improves the clearing process itself. The Clearing Process Manager supports all stakeholders regarding issues directly related to the process.

The ISA Programme, an initiative by the European Commission, is the owner of the Joinup asset repository. In case that the Clearing Process Manager is unable to find an appropriate solution to a dispute or in case that a complaint against the decisions of the Clearing Process Manager has been filed, the ISA Programme should mediate between the involved parties.

2.2 ASSET STATUS AND RELEASE STATUS

The clearing process in part reflects the life cycle of a semantic interoperability asset and its different releases. Therefore, a definition of the clearing process is necessarily based on a consensus about the meaning and representation of semantic interoperability assets and releases. This document adopts the definitions and data structures as they are defined in the draft Asset Description Metadata Schema (ADMS) specification (Arndt, et al., 2011). Figure 2 gives a UML representation of the two most important concepts in the draft ADMS specification: an asset (adms:Asset) and an asset release (adms:Release). The relationship between both concepts is essential for a good comprehension of the clearing process. In particular, a semantic interoperability asset can have zero or more releases, as expressed by the relationship adms:hasRelease.

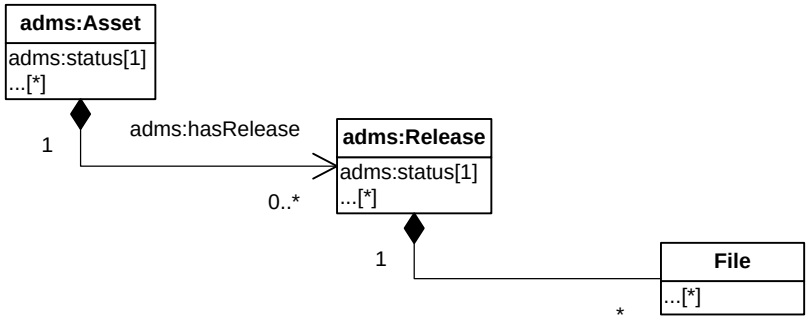

Figure 2 UML Class Diagram: adms:status for an Asset and a Release (Arndt, et al., 2011)

The **status** of both an asset and a release is indicated by the property adms:Status. The clearing process specifies in detail which are valid asset status and release status transitions. The **asset status** (adms:status) gives an indication whether a semantic interoperability asset is still "candidate" or whether a release of the asset (at least one) has been assessed to be of sufficient quality and therefore that it has been registered in the Joinup repository with the status "assessed". The following asset status codes are used:

- **"draft"**: The asset has been created as a draft on the Joinup platform. It is only visible to the Asset Owner and the Clearing Process Manager. The asset is not displayed to any other users in any search result on the Web site.
- **"candidate"**: This status indicates that the asset meets the formal publication criteria and scope criteria to be included in the Joinup repository. The asset has been published on the Joinup platform and is currently in development. The asset may – but not necessarily has to – have one or several releases. However, the asset does not have a release for which an assessment was requested by the Clearing Process Manager.
- **"assessed"**: This status indicates that an asset has at least one release that has successfully passed the assessment process and for which the overall assessment score is higher that the assessment thresholds set by the Clearing Process Manager. Consequently, the asset has been incorporated in the Joinup asset repository.
- **"removed"**: This status indicates that an asset has been removed from the asset repository. It is no longer publicly visible.

An asset is *not* visible to the public when it is in "draft" or "removed" state.

The status of an asset is linked with the status of its releases. The **release status** (adms:status) indicates whether or not an asset has been published and whether or not is has passed the asset assessment process. The following release statuses can occur:

- **"draft"**: This status indicates either that the asset owner has created a draft release but has not yet published it, or the publication of the asset release was rejected by the Clearing Process Manager, because it does not meet the formal criteria or scope criteria.
- **"candidate"**: This status indicates that an asset release has been published and is thus visible to all users of the platform.

- **“in assessment”**: This status indicates that the asset owner has requested the asset release to be assessed by the Clearing Process Manager. This request must be accompanied by a completed self-assessment report that has to be supplied by the Asset Owner. The Clearing Process Manager can reject the request, the asset release then returns back to the “candidate” status.
- **“assessed”**: This status indicates that the Clearing Process Manager has finalised the asset release assessment process and that the asset meets the assessment thresholds necessary to be included in the Joinup repository. An asset assessment report is attached to the asset release.
- **“negative assessment”**: This status indicates that the Clearing Process Manager has finalised the asset release assessment process, but that the asset does not meet the assessment thresholds to be included in the Joinup repository. An asset assessment report is attached to the asset release.
- **“removed”**: This status indicates that the asset release has been removed from the asset repository. The release is no longer publicly visible.

Similar to an asset itself, an asset release is *not* visible to the public when it is in “draft” or “removed” state.

2.3 ASSET IDENTIFICATION PROCESS

The Asset Identification Process can be considered to be an internally initiated Asset Proposal Process. It is started at the initiative of the Clearing Process Manager and is used to identify and propose an asset than can potentially be stored in the Joinup repository.

2.3.1 Objectives

The main objectives of the Asset Identification Process are:

- **Give visibility to semantic interoperability initiatives**: Not all asset owners are aware of the Joinup platform and the benefits of publishing semantic interoperability assets in the Joinup repository. Therefore, the Clearing Process Manager should actively identify semantic interoperability initiatives that are within scope of the Joinup repository.
- **Promote Joinup as a semantic interoperability platform**: By actively looking for new assets and by contacting the Asset Owner and encouraging him to register his asset on the Joinup platform, the Asset Identification Process makes a name for Joinup as a semantic interoperability platform.

2.3.2 Input

There is no specific trigger for this process, other than the getting in contact with Institutions of the European Union, Standardization Organisations, and Member States and keeping up to date with current projects and initiatives.

2.3.3 Output

The output of the Asset Identification Process is a semantic interoperability asset that has been identified as a potential Asset to be stored in the Joinup repository by the Clearing Process Manager. This asset can be used as input to the Asset Proposal Process at the initiative of the Asset Owner.

2.3.4 Detailed Process Description

Figure 3 gives an overview of the Asset Identification Process. The Clearing Process Manager should actively look out for assets that are potentially good candidates to store in the Joinup repository. If such an asset can be identified, he should contact the Asset Owner and explain the vision of Open Metadata Management(European Commission, ISA Programme, 2011) and the advantages of storing the asset in the Joinup repository.

As such, the Asset Identification Process is an informal process in which the Clearing Process Manager actively seeks out potential candidates to store in the repository and promotes Joinup. It is not possible to provide an exhaustive list of all possible asset sources, but the following main categories can be identified:

- **EU-projects**: these can be considered to be the prime source of assets. The outputs of such a project have a strong possibility to fit the scope criteria defined in paragraph 3.1. The Clearing Process Manager should attempt to follow-up on projects initiated by the European Commission or European institutions (e.g. CEN) and assess if the outputs qualify for the Joinup repository.
- **Conferences and meetings**: these are a great opportunity for the Clearing Process Manager to become aware of projects and initiatives that have a link to the semantic research domain. They also offer a natural forum to promote awareness about Joinup and its activities.
- **Online communities**: the Clearing Process Manager should be an active member in online semantic communities. The Joinup platform can be promoted as a collaborative working environment, facilitating the further development of an asset. These are however, less likely to meet the scope criteria on EU-policies and -activities.

If an asset can be identified, it's ultimately still up to the Asset Owner to decide whether or not to participate. If the Asset Owner is interested, he can upload the Asset with the assistance of the Clearing Process Manager. It is not the responsibility of the Clearing Process Manager to create an Asset on the repository without the Asset Owner's consent.

- **Identify Asset**: the process starts with the activity of identifying a candidate asset that meets the Scope Criteria, discussed in paragraph 3.1.
- **Contact Asset Owner**: when the Clearing Process Manager believes a certain asset should be stored in the Joinup repository, he should contact the Asset Owner and introduce him to the Joinup platform and encourage him to initiate the Asset Proposal Process and share his semantic asset on the Joinup platform.

- **Express interest to co-operate**: the Clearing Process Manager should not add the asset to the Joinup repository himself. He should wait until the Asset Owner agrees to further develop the asset on the Joinup platform.
- **Assist In proposal**: In order to let the Asset Proposal Process progress as smoothly as possible, the Clearing Process Manager assists the Asset Owner when the **Asset Proposal Process** is started.

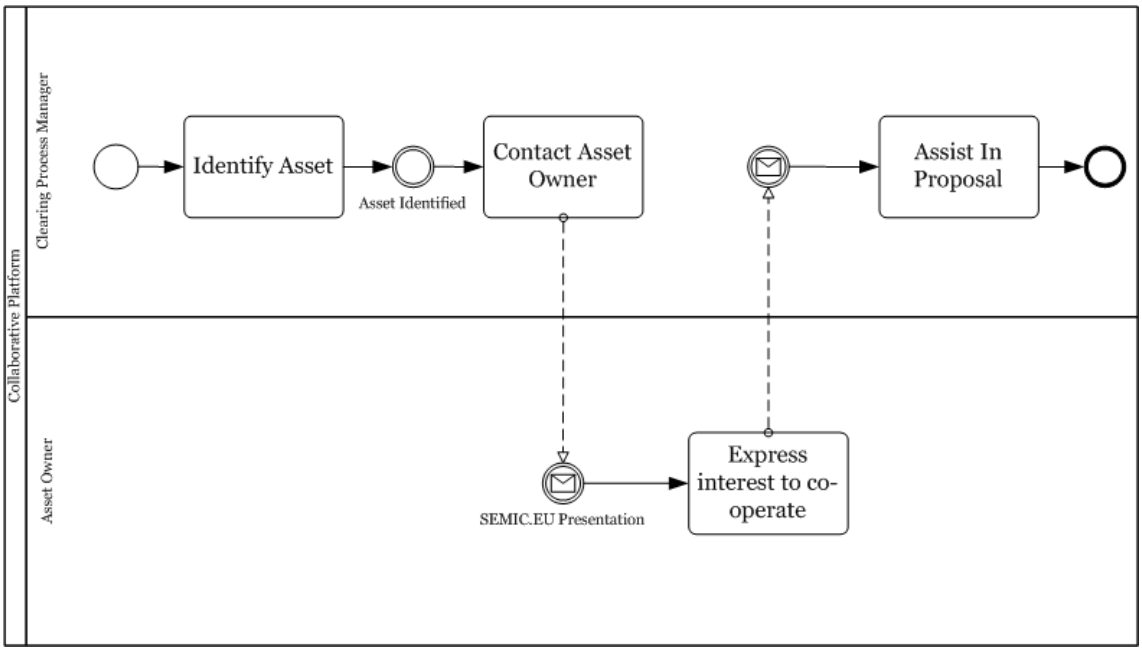

Figure 3 BPMN Diagram: Asset Identification Process

2.4 ASSET PROPOSAL PROCESS

The Asset Proposal Process is the first step to actually include the asset in the Joinup repository. The asset has to be created first on the Joinup platform so that its existence becomes known to the community. However, not every asset meets the formal requirements or is relevant to the scope of the ISA Programme. To this end the Clearing Process Manager will verify whether the proposal sufficiently meets the formal acceptance and scope criteria. After successful verification the asset receives the “candidate” status. At this point, the asset does not yet have a release on the Joinup platform.

2.4.1 Objectives

The objectives of the Asset Proposal Process are the following:

- **To give visibility to projects dealing with semantic interoperability:** The creation of semantic interoperability assets essentially requires the feedback and collaboration of many stakeholders in reaching consensus around a specification. By registering their

asset on Joinup, Asset Owners can use the collaboration and communication tools to build a community of developers and (potential) users around their semantic interoperability asset. Because this may occur even in an early stage of development, semantic interoperability assets can be registered on the platform with only a minimal set of mandatory quality requirements to be fulfilled.

- **To verify whether formal criteria and scope criteria are met**: Not every semantic interoperability asset belongs in the Joinup repository. The Clearing Process Manager should only honour those asset proposals that meet the formal criteria and scope criteria discussed in detail in chapter 3.

2.4.2 Input

The input of the Asset Proposal Process is the draft semantic interoperability asset that is created by the Asset Owner or the Asset Agent. Every registered user on Joinup can propose an asset.

2.4.3 Output

The output of the Asset Proposal Process depends on the decision of the Clearing Process Manager to accept the semantic interoperability asset on Joinup or not. In case of acceptance, the semantic interoperability asset is visible to all users on Joinup in the “candidate” status. The communication and collaboration tools related to the asset allow building a community of developers and users around the semantic interoperability asset.

2.4.4 Detailed Process Description

Figure 4 gives an overview of the Asset Proposal Process. It shows the two main roles involved in the process and its control flow. It consists of the following steps:

- **Create/Modify Asset**: The process starts when the Asset Owner (Project Owner) creates an asset and enters the asset metadata description on the platform. The asset has the status “draft”.
- **Propose Asset**: Then, the Asset Owner requests his asset to be included on the collaborative platform by filing a simple request.
- **Verify Asset:** The Clearing Process Manager verifies whether the asset meets the formal acceptance criteria and the scope criteria listed in paragraphs 3.2 and 3.1 respectively.
- **Accept Asset:** In case the asset meets the aforementioned criteria, the Clearing Process Manager accepts the asset proposal. The asset becomes visible on the platform under the “candidate” status. A number of collaboration and communication tools around the asset are created to manage a community of developers and users of the asset.
- **Reject Asset:** In case the asset does not meet the aforementioned criteria, the Clearing Process Manager must reject the asset proposal. The asset status remains in “draft” status and the Asset Owner will be informed of the decision taken by the Clearing Process Manager. The fact that the status remains “candidate” allows the Owner to update the Asset Proposal, based on the feedback of the Clearing Process Manager, and to file a new request.

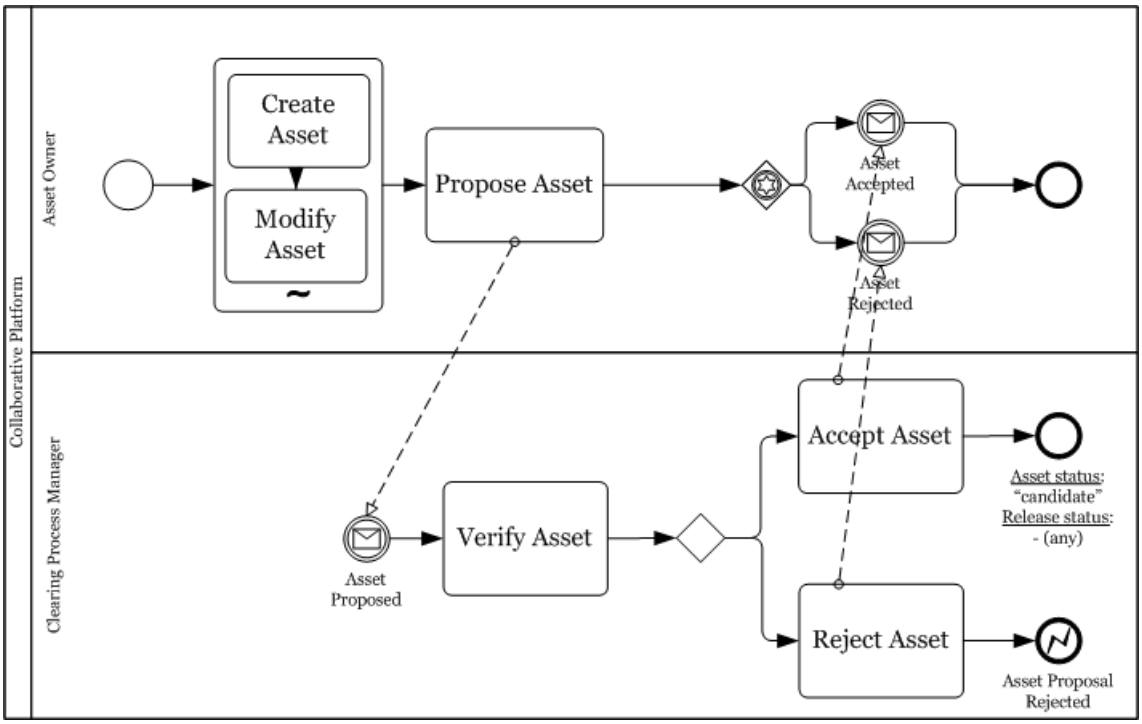

Figure 4 BPMN Diagram: Asset Proposal Process

2.5 ASSET RELEASE PROCESS

In the Asset Release Process, the Asset Owner creates and publishes a new release (with a new version number) of the semantic interoperability asset. After publication, the release is checked against formal criteria and scope criteria by the Clearing Process Manager.

2.5.1 Objectives

The objectives of the Asset Release Process are the following:

- **Step-wise improvement**: A release is a delivery of a particular version of a semantic interoperability asset or part thereof at a specific point in time and is identified by a version number. The notion of a release allows structuring the development process related to a semantic interoperability asset in several releases. Each time a release is produced, the semantic interoperability asset is handed over from the development community to the user community. The user community can inspect the release, potentially use it, and give feedback with respect to a specific release number.
- **To verify whether formal criteria and scope criteria are met**: The process allows safeguarding that all formal criteria and scope criteria are fulfilled. This verification is performed *after* the release has been published.

2.5.2 Input

The input of the Asset Release Process is a new release that is created by the Asset Owner (or the Asset Agent). Each release contains among other the following data:

- **Release version**: a meaningful identification of the asset release.
- **Release notes**: an accompanying text to the release. This text can for example include a description of the content of the asset release, an overview of changes with regard to the previous release, a list of known limitations, and future work.

2.5.3 Output

The output of the Asset Release Process is the publication of the new release by the Asset Owner. After publication, the Clearing Process Manager subjects the release to a verification of formal and scope criteria. If these criteria are not met, the release might still remain in “draft” status.

2.5.4 Detailed Process Description

Figure 5 gives an overview of the Asset Release Process. It shows the two main roles involved in the process and its control flow. It consists of the following steps:

- **Create/Modify/Delete Release, Add/Remove File, Add/Remove Link**: The process starts when the Asset Owner creates an asset release and enters the asset release metadata. The asset owner also must add files to the release or include an external link the download location of the external release. During this process, the release has the status “draft”.
- **Publish Asset Release**: When the Asset Owner publishes a release, the release obtains the status “candidate” and becomes visible to all users of the platform. All registered users can download the release and inspect its content.
- **Verify Release**: The Clearing Process Manager is notified of the publication of a new release. He subjects the release to a limited verification with regard to the formal and scope criteria.
- **Accept Publication of Release**: In most cases, the Clearing Process Manager will accept the publication of the release. The Asset Owner is notified of the acceptance, and the release remains published.
- **Reject Publication of Release**: In some cases, the release does not meet the required formal or scope criteria. This is for example the case when the metadata related to a release is incomplete or missing, or if a release does not properly indicate license information. In this case, the Clearing Process Manager rejects the publication of the release. The release status is updated to “draft”. The release is no longer visible to the users of the platform. The Asset Owner can modify the release and again request publication. Reverting the status to “draft” instead of to a specific “rejected” status allows for the Owner to modify the existing release. He is not forced to create a new release simply to make the necessary modifications.

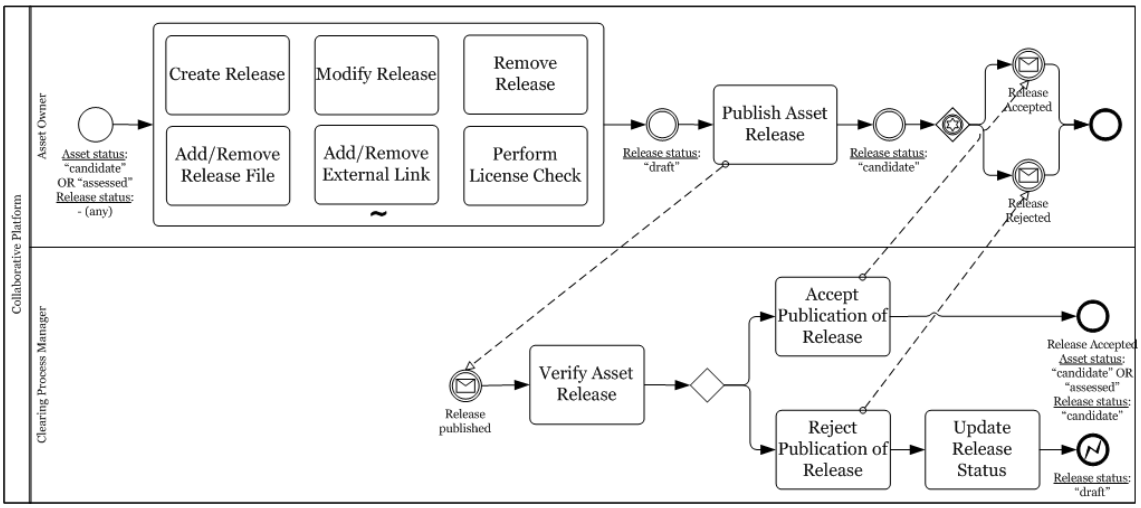

Figure 5 BPMN Diagram: Asset Release Process

2.6 ASSET ASSESSMENT PROCESS

In the Asset Assessment Process, a particular release of an asset is subject to an assessment by the Clearing Process Manager. This assessment involves the evaluation of the asset release according to a number of pre-defined evaluation criteria that are relevant to public administrations that wish to use the asset as part of their electronic public services. Releases that meet the evaluation thresholds are given the “assessed” status.

2.6.1 Objectives

The objectives of the Asset Assessment Process are the following:

- **To support public administrations to design semantic interoperability assets**: The evaluation criteria of the Asset Assessment Report provide indicators to the developers of semantic interoperability assets to meet specific quality thresholds.
- **To support public administrations to choose semantic interoperability assets**: The Joinup team should help public administrations to choose semantic interoperability assets. It can do this by providing and validating asset assessment indicators according to a predefined number of asset assessment criteria. Note that it is not the objective of Joinup to guarantee the quality of the semantic interoperability asset. The Asset Assessment Report of a semantic interoperability asset is does not constitute its endorsement, recommendation, or favouring neither by the Joinup team nor by the European Commission. It merely provides a motivated assessment of the semantic interoperability asset, according to a predefined number of indicators.

2.6.2 Input

The Asset Assessment Process starts with the Request for Assessment of a particular asset release. Each request must be accompanied by a Self-Assessment Report that is added to the release as a separate file.

2.6.3 Output

The Asset Assessment Process ends with a final Asset Assessment Report by the Clearing Process Manager. This final report provides an evaluation and quality indicators for a set of predefined assessment criteria. The final report is based on the self-assessment of the Asset Owner and the opinion of the Clearing Process Manager. When a release meets the evaluation thresholds, the status of the asset release and the asset itself are both set to “assessed”.

2.6.4 Detailed Process Description

Figure 6 gives an overview of the Asset Release Process. It shows the three main roles involved in the process and its control flow.

- **Perform Self-Assessment**: The Asset Assessment Process starts when the Asset Owner performs a self-assessment of a particular release. First, the Asset Owner must specify the business requirements that the semantic interoperability asset intends to meet. Then, the Asset Owner analyses the release with regard to the predefined assessment criteria, gives a score, and justifies his assessment for each criterion, using the template for the Self-Assessment Report. The Asset Owner attaches the Self-Assessment Report to the asset release.
- **Request Assessment of Asset Release**: After completing the self-assessment, the Asset Owner requests the assessment of the release by the Clearing Process Manager.
- **Analyse Assessment Request**: The Clearing Process Manager first examines whether the assessment requests meets all formal requirements, such as for example whether the Self-Assessment report has been correctly provided. The Asset Owner is notified whether the request is accepted or rejected.
- **Perform Assessment**: When the Clearing Process Manager accepts the assessment request, the Assessment process is started. The Clearing Process Manager will review the asset according to the asset criteria, and create a final Asset Assessment Report that consolidates the Self-Assessment Report and his observations. The final assessment score for each criterion is set by the Clearing Process Manager only.
- **Communicate Assessment Result**: In this sub-process, the Clearing Process Manager will attach the Asset Assessment Report to the asset release. In case the assessment scores are above a certain thresholds the Clearing Process Manager must accept the asset to be included in the Joinup repository, the status of the asset and asset release will have the status “assessed”. In case the assessment scores do not meet the evaluation thresholds, the asset release will have the status “negative assessment”; the asset status remains the same as before (either “candidate” or “assessed”). In both cases, the Asset Owner is notified of the decision of the Clearing Process Manager.

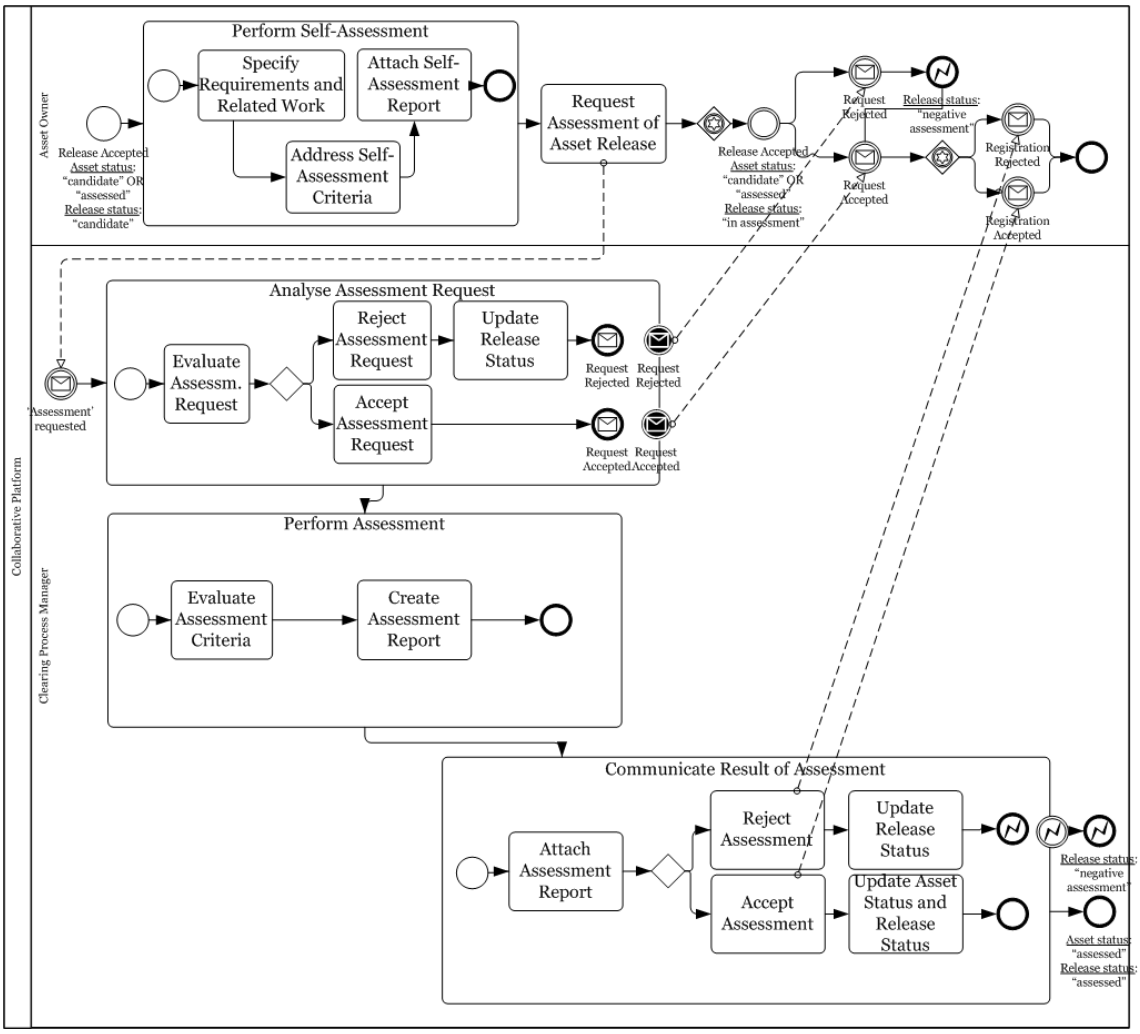

Figure 6 BPMN Diagram: Asset Assessment Process

2.7 ASSET REMOVAL PROCESS

The Asset Removal Process is periodically (e.g. each year) run by the Clearing Process Manager for *all* assets in the asset repository. It is also triggered each time the Asset Release Process or the Asset Removal Process has terminated unsuccessfully. In both cases, the Clearing Process Manager verifies whether the asset should remain in the asset repository, taking into account the formal criteria and scope criteria, and asset removal criteria. The latter take into account the development activity, outlook, and future plans of the asset development project.

2.7.1 Objectives

The objective of the Asset Removal Process is to ensure that *all* assets in the asset repository are of value to the users. In particular, the process tries to remove assets in the following situations:

- **Abandoned asset development projects**: the process tries to ascertain that assets do not remain in the “candidate” status eternally, whereas the actual development of the semantic interoperability asset has been abandoned.
- **Assets that no longer meet the formal criteria or scope criteria**: asset development projects might shift scope and therefore no longer meet the formal criteria or scope criteria.
- **Assets no longer meet the maturity, business need, standardization, or market criteria**: An external event may cause that an asset no longer meets the assessment thresholds on the business need, standardization, or market criteria. In this case, it might sometimes be required remove the asset from the asset repository.

2.7.2 Input

The Asset Removal Process is either triggered because of an unsuccessful Asset Release or Asset Assessment or as part of a periodic review of *all* assets in the asset repository. The Clearing Process Manager examines the asset and decides whether its removal should be requested or not.

2.7.3 Output

Assets that are removed as a result of this process have the status “removed”. All releases of the asset – if any – bear the status “draft” and are visible only to the Asset Owner and the Clearing Process Manager.

2.7.4 Detailed Process Description

Figure 7 gives an overview of the Asset Removal Process. In consists of the following tasks:

- **Examine Asset**: The Clearing Process Manager examines the asset and verifies whether it *still* satisfies all required assessment criteria as indicated by the asset status. If this is the case, the process stops at this point. If this is not the case, he requests the Asset Owner to remove the asset via e-mail. The e-mail should motivate the request.
- **Refuse Asset Removal**: The Asset Owner can refuse to remove the asset by sending a motivated e-mail to the Clearing Process Manager. He should do this within two weeks after receiving the request for removal.
- **Accept Refusal**: Based on the new information contained in the refusal message of the Asset Owner, the Clearing Process Manager can decide not to remove the asset. In this case the Asset Removal Process terminates here.
- **Remove Asset**: In several situations, both the Asset Owner and the Clearing Process Manager can decide to remove the asset from the asset repository:
    - When the Asset Owner accepts the request for removal;
    - When the Asset Owner does not respond within two weeks after the request for removal; or
    - When the Clearing Process Manager decides to remove the Asset, even when the Asset Owner has refused it to be removed.

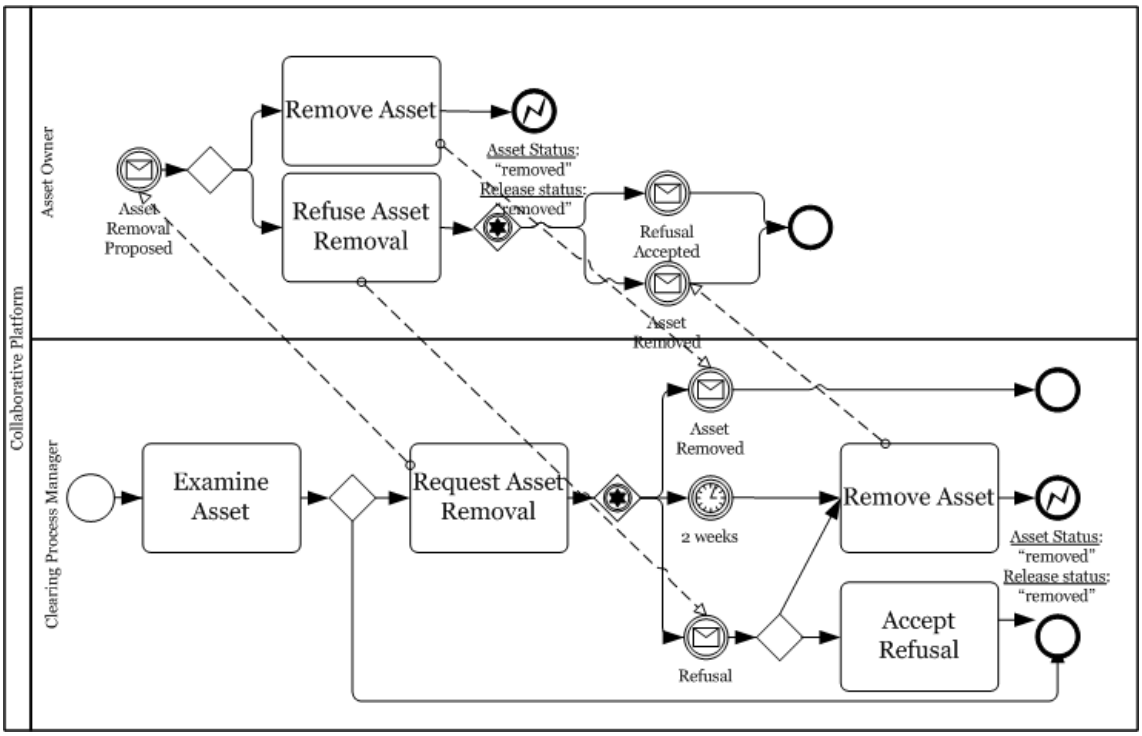

Figure 7 BPMN Diagram: Asset Removal Process

3. EVALUATION CRITERIA

This chapter contains a description of the evaluation criteria that are to be applied during the different stages of the clearing process. These criteria are grouped into three **sets:** scope criteria, formal criteria, and assessment criteria**.** Table 1 indicates in which sub-process of the clearing process these are applied.

Table 1 Evaluation Criteria: Application Matrix

Class	Asset Identification Process	Asset Proposal Process	Asset Release Process	Asset Assessment Process	Asset Removal Process
Scope Criteria	x	x	x	x	x
Formal Criteria	-	x	x	x	x
Assessment Criteria	-	-	-	x	x

3.1 SCOPE CRITERIA

The Clearing Process Manager will only honour those assets and releases that meet the scope of ISA Programme[1] in general, and its Action 1.1 on semantic methodologies[2] in particular. Table 2 lists the scope criteria that are applied.

Table 2 Scope Criteria

II. Scope Criteria	
II.1	**Does the semantic interoperability asset support the implementation of an EU Policy or activity?** **Indicator:** The semantic asset explicitly documents the EU Policy or activity which implementation it supports. **Motivation**: The Joinup repository must only include assets in its asset repository that contribute to the implementation of EU policies and activities. If an asset only supports the implementation of national policies or activities, it better belongs in a

[1] http://ec.europa.eu/isa/
[2] http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action_en.htm

	national repository and SEMIC should not intervene (EU subsidiarity principle). This is motivated by the scope of the ISA programme, as indicated in Article 1 of the ISA Decision No 922/2009/EC.
II.2	**Does the asset describe metadata or reference data that can be used for e-Government system development?** **Indicator:** The asset must meet the definition of a semantic interoperability asset[3]. This definition requires that the asset describes metadata and reference data that can be used for e-Government system development. The latter requires that the documentation of the asset refers to a (potential) usage to describe the semantic aspects of an electronic public service. **Motivation**: The requirement for an (intended) usage of a semantic interoperability asset by an electronic public service filters out these contributions that not semantic interoperability assets, that are only an intellectual exercise and are not to be used in practice.

These criteria are fundamental to the inclusion of an asset in Joinup. If an asset doesn't fulfil both criteria, it will not be accepted. These rules are needed to ensure that every asset is relevant to Joinup.

3.2 FORMAL CRITERIA

The Clearing Process Manager will check whether an asset or an asset release meets a number of formal criteria, such as the presence of an adequate license and the validity of the provided asset description metadata and attached release files. Table 3 provides an overview of these criteria, which are based on a simplified version of the 2008-2011 clearing process (Nentwig, et al., 2008). .

Table 3 Formal Criteria

I. Formal Criteria	
I.1	**Do the asset and/or release have a license?** **Indicator**: For each asset and asset release, at least one authoritative licence must be provided. For non-English licences, an English translation must be provided. **Motivation**: Users of the Joinup repository must be able to easily understand the

[3] A semantic interoperability asset is defined as a "highly reusable metadata (e.g. xml schemata, generic data models) and reference data (e.g. codelists, taxonomies,dictionaries, vocabularies) which are used for e-Government system development" (European Commission, ISA Programme, 2011)

	conditions under which a particular semantic asset can be used, changed, redistributed, etc.
I.2	**Do the asset and/or release have complete and valid asset description metadata?** **Indicator**: The asset and/or asset release must have *valid* values for all required asset description metadata fields, as specified by the Asset Description Metadata Specification (ADMS). This means that the metadata correctly and sufficiently describes the asset for an external user to be able to retrieve it and to understand its context and purpose. **Motivation**: Well-documented metadata improves retrievability of the semantic asset.
I.3	**Is the asset release content valid?** **Indicator:** • The release content (files) must contain at least a human-readable specification of the semantic asset; • The release content (files) must not contain unrelated information or other semantic assets. • The release should not contain any discriminating content. **Motivation**: Invalid release content limits the usability of the semantic asset.

These criteria are fundamental to the inclusion of an asset in the Joinup repository. If an asset does not fulfil the formal criteria, it will not be accepted. They ensure that only well-documented assets enter the repository.

3.3 ASSESSMENT CRITERIA

The formal and scope criteria are necessary conditions to be accepted in the Joinup repository. In addition, the redesigned Clearing Process also provides an assessment of the overall potential of an asset using objective indicators. This assessment can help (people who work for) public administrations to better choose whether or not to reuse a particular semantic asset.

The assessment criteria are based on the original assessment criteria of the Common Assessment Method of Standards and Specifications (CAMSS), discussed at length in Annex IV. The original CAMSS criteria (CAMSS, 2010) are divided in three classes, each consisting of multiple categories and in some cases subcategories as well. Each category consists of several criteria which can be used to assess a certain characteristic of a standard of specification. In total CAMSS contains 90 assessment criteria for standards and specifications. The reuse of the structure and criteria CAMSS aims at the following benefits:

- By reusing the CAMSS assessment structure, public administrations can share or reuse asset assessments more easily.
- The structure of CAMSS enhances the completeness of the assessment, but leaves room to attribute a higher weight to characteristics that are deemed more important.

A subset of the original CAMSS assessment criteria has been retained. Furthermore, an indicator was added to each assessment criterion to ensure that the Clearing Process Manager will be able to objectively assess whether a criterion is met, on the basis of the *evidence* supplied by the Asset Owner, during a self-assessment.
Table 4 contains an overview of the 16 assessment criteria that will be applied during the clearing process. Out of these 16, 4 criteria can be considered to be **core criteria**: 1.5, 2.8, 2.12, and 3.23, as they are aligned with the objectives of the semantic methodologies Action of the ISA Programme. The semantic asset should contribute to **interoperability (1.5)**. Public administrations will be more inclined to use the asset if the asset is available under an **open license (2.8)**. When available in a **machine-readable (2.12)** format, the asset will have a higher chance of being adopted in projects as the asset is better accessible. And most importantly, **usage in real-world scenarios (3.23)** is an important indicator of success.

The numbers used in the table refer to the criteria of the original CAMSS identification.

Table 4 Assessment Criteria

III.1 Business Criteria	
	Suitability: applicability
1.1	**What is specified in the formal specification? Is it clear who should use the semantic asset and for what applications?** **Indicator:** Does the specification of the semantic asset contain documented use cases that have been validated by a domain expert to reflect the actual business need? **Motivation**: In order to improve interoperability and to allow a measurement of success, the asset should address an actual problem.
	Suitability: relevance
1.5 **CORE CRITERION**	**Has the formal specification been designed to take into account interoperability? What are the existing or planned mechanisms to assess the interoperability of different implementations of the formal specification?** **Indicator:** The following evidence must be provided: • The asset must have at least one mapping to another asset or reuse at least one other asset. • The documentation of the semantic asset must also indicate how it addresses semantic interoperability conflicts and how it contributes to an improved semantic interoperability. • The documentation must mention existing or planned mechanisms for assessing interoperability of implementations (cfr. 2.12). **Motivation**: Compatibility with other assets or standards greatly improves the interoperability potential of the asset. The objective of Action 1.1 of the ISA Programme is to promote interoperability between organizations. The asset should share this goal, preferably as a key feature and not just as a side-effect.

	Impact
1.7	**What is the impact of choosing this formal specification? I.e., what are the risks and opportunities identified?** **Indicator:** Is there a documented business case for the asset that makes the case for using the asset in comparison to other alternatives? **Motivation:** In order to keep the Clearing Process practical and maintainable, an examination of the business requirements and an analysis of how well the asset implements these are not feasible. The asset owner should however list alternatives (e.g. other semantic assets, if they exist), and identify the benefits his own asset has. If there is no clear benefit, no one will be tempted to use the asset.
	Scalability
	No CAMSS criterion has been retained.
	Extensibility
1.19	**Can the asset be easily extended?** **Indicator:** This criterion can be met by either: • The availability of documentation explaining how to extend or customize the asset; or • The usage of a representation language (e.g. RDF) that renders the semantic asset by nature extensible. **Motivation**: The asset should be able to adapt to a changing environment and business requirements. No organization will easily commit to an asset that cannot be tailored to its own requirements.
1.20	**Are there possibilities of localisation, i.e.: adaptation to different user environments and cultures?** **Indicator**: Evidence that this criterion is met can be established in different ways: • In the case the asset contains a value vocabulary (e.g. a thesaurus, taxonomy or code list) does it provide translations of these values and their meaning into other languages? • In the case the asset contains a schema vocabulary (e.g. an XML schema), does it provide label translations for the concepts, properties, and relationships defined in the schema? • Does the specification advise the usage of appropriate techniques, such as UTF-encoding, to ensure a correct character encoding? **Motivation**: The asset should be able to be used independent of language and culture. This improves the interoperability potential.
	Stability
1.122	**How long can a formal specification and its later modifications be used and still maintain its quality?** **Indicator:** There is a mechanism documented as part of the specification to make sure subsequent releases are compatible. **Motivation**: Compatibility between versions will allow easier transitions to a new version, without having to coordinate between all implementing organizations.

1.25	**Are there any "backward compatibility" problems reported/documented for the previous version of the semantic asset?** **Indicator:** There are no severe "backward compatibility" problems reported/documented for the previous version of the semantic asset. **Motivation**: To prevent transitioning problems, the Asset Owner should be transparent about any changes made to the asset.
	Maintainability
1.29	**Is there any entity in charge of regularly assessing the semantic asset against the evolution of needs and available technologies?** **Indicator:** The Asset Owner demonstrates a clear commitment to maintain the asset in the future. **Motivation**: Continuity of the semantic asset is needed to ensure that it is safe to use the asset. An implementing organization does not want to be exposed to too many risks when using the asset.
III.2 Standardization Criteria	
	Availability of documentation
2.2	**Access to all final result documentation?** **Indicator:** As a minimum the complete specification of the asset should be documented and made available. **Motivation**: Incomplete documentation of the semantic asset is not reusable.
	IPR
2.8 (adaptation) **CORE CRITERION**	**Is the semantic asset available under an open licence [4] that avoids the exclusive exploitation of the semantic asset by any party?** **Indicator:** Does the licence grant the right to use, study, change, improve and redistribute the semantic asset? **Motivation**: An open license is preferred: it stimulates collaborative development and ensures maintainability.
	Accessibility
2.12 **CORE CRITERION**	**Is a conformance test offered to implementers? Is the semantic asset available in a machine-readable format?** **Indicator:** An asset is machine-readable if it is documented in a format that can be meaningfully processed by a computer application, such that the concepts it represents (e.g. classes, properties, relationships, codes, values, etc) can be identified by the computer application. This also implies that the asset has a valid syntax. **Motivation**: A machine-readable version of the semantic asset facilitates reuse and allows automated conformance testing.
	Interoperability governance
	No CAMSS criterion has been retained.

[4] http://www.semic.eu/semic/view/documents/licensing-framework.pdf

	Meeting and consultation
2.19	**Is the development of the asset open to the all types of organisations and to individuals?** **Indicator**: The contribution and involvement of organisations and individuals in the development is not excluded. **Motivation**: contributions from the wider public can help in making and keeping the asset achieves its interoperability goals.
	Process and consensus
2.23	**Does the organisation have a stated objective of reaching consensus when making decisions on standards?** **Indicator:** The specification must indicate or refer to a process of consensus building. The process does not necessarily need to be formally documented, but evidence of such efforts should be available. **Motivation**: An asset that is the result of a collaborative design and that reflects the viewpoints and interests of different stakeholders is more likely to contribute to semantic interoperability.
	Support
2.29	**Does the asset owner provide support until removal of the formal specification from public domain?** **Indicator:** Evidence of any form of support is accepted, including the following: • **Implementation guide**: Is there an implementation guide that explains how the asset should be implemented in a conformant way? Is the documentation available on-line? Is an English translation provided? Is it kept up-to-date between releases? • **Online support**: evidence of support via a discussion forum or mailing list. **Motivation**: Support is an important enabler for usage. It provides a level of confidence to the implementing organization. Easy access to documentation and related materials is an important enabler.
III.3 Market Criteria	
	Market support
3.3	**How many implementations of the formal specification are there?** **Indicator**: The asset is already implemented as a real-world solution available in the market? **Motivation**: If an asset is already supported by a real-world solution, it has proven its worth.
	Maturity
	No CAMSS criterion has been retained.
	Reusability
3.23 **CORE CRITERION**	**Can other cases where similar systems implement the formal specification be considered as successful implementations and good practices?** **Indicator:** Has the semantic asset been reused by other public administrations for

	the provision of electronic public services? **Motivation**: Reusability the most important criterion and the best indicator for it is the fact that other public administrations reuse the semantic asset.

A demonstration of these criteria is given in Annex II, illustrating the assessment of Europass[5] and Eurovoc[6]. It shows how the criteria can be applied to a particular asset and how evidence can be found to show that an asset fulfils a particular criterion.

Other than the formal and scope criteria, these criteria are not deemed to be essential for inclusion in the Joinup repository. If an asset does not fulfil a particular criterion, it should not be automatically rejected. However, if the number of failed criteria reaches a certain threshold, then the asset should be rejected as it indicates that the asset is not relevant enough to be included in the Joinup repository. The importance or the weight of a particular criterion is to be judged by the Clearing Process Manager. It is for instance quite possible that the availability and quality of documentation is more important for a complex asset than for a simpler one. Documentation and support by the owner might be viewed as less important if the asset already shows wide market adoption.

This weighing procedure can be further formalized by assigning a specific weight to each criterion, allowing a total average weighted score to be calculated. The importance of this total score should not be overestimated. A positive assessment is an indication but not a guarantee that a semantic interoperability asset will gain traction in reality. It is very much possible that an asset with a high average weighted score is not successful in practice. Conversely, it might even be the case that assets with a low average weighted score become adapted and are widely used. In conclusion, weighted average scores say little about the quality or usefulness of semantic interoperability assets. Users will therefore find the detailed asset assessment report more useful than the overall weighted average score.

[5] http://europass.cedefop.europa.eu

[6] http://eurovoc.europa.eu

4. CONCLUSION

This document has described a redesigned Clearing Process for the Joinup asset repository. By means of conclusion, this section sketches the main characteristics of the redesigned clearing process and indicates the most important changes with regard to the 2008-2011 version. Annex I contains a more detailed comparison.

- **No artificial ranking but the mere provision of quality indicators**. The 2008-2011 version has a clearing process that divided semantic interoperability assets in different levels of maturity: “candidate”, “registered”, “mature”, and “conform”. The artificial ranking introduced by these asset statuses was however not perceived to be an adequate quality indicator. This situation was worsened by the fact that more than 95% of the assets never reached beyond the “registered” state. The new clearing process therefore only has two states: “candidate” and “assessed”. The former state indicates that the asset has not yet delivered a release yet. The assessed state indicates that there is a detailed asset assessment report available for the asset that can be consulted by potential users to evaluate whether the asset is suitable for reuse.
- **Scope criteria**. The 2008-2011 version of the clearing process did not have a process only to accept the registration of these assets into the repository that were relevant to the scope of the ISA Programme. The Asset Proposal Process and the Scope Criteria serve exactly this purpose.
- **Asset removal process**. Unlike the 2008-2011 clearing process, the redesigned clearing process does foresee in the removal of assets in the asset repository. This is needed because the development of some assets is discontinued or because “external changes” make that an asset no longer meets the requirements to be registered in the Joinup repository.
- **Reduced control**. Unlike the 2008-2011 clearing process, the proposed clearing process does not require an Asset Owner to request the Clearing Process Manager’s approval to publish a release, giving Asset Owners more freedom and facilitating their work.
- **Inclusion of the main ideas expressed by CAMSS**. Public administrations and national interoperability initiatives are encouraged to reuse the CAMSS criteria to assess formal standards and specifications for e-Government procurement and development. When the Joinup team bases its assessment process on the same foundations as CAMSS, public administrations can evaluate the suitability of the semantic interoperability assets in its repository reusing *recognisable* evaluation criteria. Even if the CAMSS criteria are better suited at assessing formal specifications, the reuse of common basic assessment criteria can potentially lead to benefits of scale and scope for public administrations in Europe.

5. REFERENCES

Arndt, Adam, et al. 2011. ADMS - Asset Description Metadata Schema - Draft Specification v0.6a for Community Consultation. *semic.eu.* [Online] 17 03 2011. http://www.semic.eu/semic/view/documents/adms-specification-v0.6.html.

Breyne, Pieter, Rodrigues Frade, João and Goedertier, Stijn. 2011. *Analysis Report on the SEMIC activities.* 2011.

—. 2011. *Updated SEMIC.EU business model and processes.* 2011.

CAMSS. 2010. CAMSS, Common Assessment Method for Standards and Specifications. *webgate.ec.europa.eu/fpfis/mwikis/.* [Online] 12 2010. [Cited: 19 06 2011.] https://webgate.ec.europa.eu/fpfis/mwikis/idabc-camss/.

European Commission, ISA Programme. 2011. Towards Open Government Metadata. [Online] 2011. http://www.semic.eu/semic/view/documents/towards_open_government_metadata.pdf.

Gottschick, Jan, et al. 2008. Vision of the Clearing Process. *Semic.eu.* [Online] 2008. http://www.semic.eu/semic/view/documents/vision-of-the-clearing-process.pdf.

Nentwig, Lutz, et al. 2008. Quality Framework for Interoperability Assets. *Semic.eu.* [Online] 2008. http://www.semic.eu/semic/view/documents/quality-framework.pdf.

SEMIC.EU. 2009. *Asset Assessment Report.* s.l. : SEMIC.EU, 2009.

Annex I. MOTIVATION AND CHANGES WITH REGARD TO THE 2008-2011 CLEARING PROCESS

In 2008, the European Commission has launched the SEMIC platform as part of the former IDABC Programme, which was the predecessor of the ISA Programme. Since its start in 2008, SEMIC operated a clearing process which safeguarded certain quality criteria to ensure the usefulness of the assets in its repository. The initial clearing process is described in the "Vision of the clearing process" document (Gottschick, et al., 2008). After three years of operations, it is appropriate to evaluate the 2008-2011 clearing process and determine whether and at which point it requires to be redesigned. As the semantic interoperability ecosystem has changed and matured, not all initial design assumptions remain valid. In particular, the following changes motivate the redesign of the 2008-2011 Clearing Process.

- **Analysis of the SEMIC activities**. In the first half of 2011, SEMIC has conducted a strategic analysis of its activities (Breyne, et al., 2011). This analysis was based on several information sources, among others, on the analysis of Key Performance Indicators (KPIs) and interviews with SEMIC users, asset owners, and representatives of standardization bodies. The analysis has revealed a number of findings that pointed to strengths and weaknesses related to the current SEMIC clearing process. Table 5 is an excerpt of this report, presenting the findings with regard to relevance, effectiveness and efficiency of the clearing process. According to the table, it is relevant for SEMIC to be a curator and ensure the quality of the assets of SEMIC (Finding 19). Nonetheless, several other findings point out that both the effectiveness and efficiency of the clearing process need to be improved and simplified (Finding 10, 11, 13, 14 and 16). It has therefore been recommended (see the Updated Business Model Report) to redesign the clearing process according to a no-ranking philosophy, whereby the asset (release) states "candidate", "registered", "mature" and "conform" should be reduced to two states. Consequently, the activities "Perform maturity process", and "Perform conformance process" should be removed and the threshold for an asset to be in a non-development status should be raised. Instead of ranking assets, SEMIC should provide clear quality indicators, hereby possibly re-using the CAMSS (Common Assessment Method of Standards and Specifications) criteria.
- **The Common Assessment Method of the CAMSS initiative**. The CAMSS – Common Assessment Method for Standards and Specifications - project is an initiative of the European Commission that started under the IDABC programme and that continues under the ISA Programme. The CAMSS initiative aims at delivering three things: a common method (process) for assessing standards and specifications, a common list of assessment criteria, a list of assessments by the Member States. In 2010, the CAMSS initiative has produced an assessment method to be used to assess standards and formal specifications. As (good) semantic interoperability assets are a subset of standards and specifications, this assessment method is in spirit very similar to the SEMIC clearing process. The benefit of standardized assessment criteria is that public administrations can *reuse* the assessment of others in make their own assessment,

resulting in overall efficiency gains for public administrations in Europe. The redesigned clearing process therefore should be based on the CAMSS assessment criteria.

- **New collaborative platform.** The ISA Integrated Collaborative Platform, called Joinup, is a new web-based collaborative platform to which the existing SEMIC and OSOR platforms will be migrated in the second half of 2011. I t is expected that the integration of these platforms will take considerable effort, but will result in better collaboration and communication tools, while requiring less public funding in the long run. The migration to the new platform presents an opportunity for SEMIC to change its clearing process and have it supported by the new collaborative platform.

Table 5 Assessment of the Relevance, Effectiveness, and Efficiency of the 2008-2011 Clearing Process (Breyne, et al., 2011)

Service Name	Activity Name	Relevance	Effectiveness	Efficiency
Clearing process (Quality assurance)	**Upload semantic interoperability asset/idea**	**Finding 19:** It is relevant for the SEMIC to be a curator and ensure the quality of the assets of SEMIC.	**Finding 10:** the lack of interest in the repository can potentially be caused by the lack of effectiveness of the current clearing process.	**Finding 16:** the clearing process could become more efficient by offering several routes for asset clearing.
	Perform asset registration process		**Finding 11:** as the asset clearing process only pays attention to the splitting of assets during the Conformance step, one third of the total number of assets can potentially be split. **Finding 13:** licensing hinders effectiveness.	
	Perform maturity process		**Finding 14:** the single view on quality, based on the states of the clearing process, does not seem to be the most effective approach to communicate their quality to the target groups. This is aggravated by the fact that most assets are in a single state (i.e. registered) and lack other quality information (e.g. actual use).	
	Perform conformance process			

These motivations have been translated into the concrete changes for each sub-process. Note that the Asset Identification Process isn't listed here, as it is a new sub-process.

I.1 ASSET PROPOSAL PROCESS

In the 2008-2011 Clearing Process, the Asset Proposal Process is in part reflected in the **Asset Publication Process**. This process is (albeit largely implicitly) documented in the "Vision of the Clearing Process" (Gottschick, et al., 2008). The following similarities can be detected:

- **Give visibility to semantic interoperability initiatives**: Similar to the former Asset Publication Process, the Asset Proposal Process also foresees in the early publication of a semantic interoperability initiative.
- **Formal evaluation criteria**: Another similarity is that the proposed semantic interoperability assets are scrutinised on the basis of the same formal evaluation criteria as former Asset Publication Process. These criteria are listed in Section 3.2.

The following differences exist:

- **Scope criteria**: Unlike the former Asset Publication Process, the new Asset Proposal Process also requires the Clearing Process Manager to evaluate the proposed semantic interoperability asset with regard to the scope criteria documented in Section 3.1.
- **Collaboration and communication tools**: The new platform allows creating a community of developers and users around a semantic interoperability asset and offers a large set of communication and collaboration tools, including a forum, an issue tracker, a documentation tool, support for mailing lists, news items, and events, a version management system, and a member administration tool.

I.2 ASSET RELEASE PROCESS

In the 2008-2011 Clearing Process, the Asset Assessment Process is in part reflected in the Asset Registration Process (Gottschick, et al., 2008). The following similarities exist:

- **Formal criteria**: The redesigned Asset Release Process adopts *all* of the Formal criteria of the 2008-2011 clearing process. These criteria are described in Section 3.2.

The following differences can be detected:

- **Scope criteria**: Unlike the former Asset Publication Process, the new Asset Proposal Process also requires the Clearing Process Manager to evaluate the proposed semantic interoperability asset with regard to the scope criteria documented in Section 3.1.
- **Review after publication (post-moderation instead of pre-moderation)**: The former “Asset Registration Process” requires the Asset Owner to request publication of a release to the Clearing Process Manager. This is called pre-moderation. In contrast, in the new “Asset Release Process” a release becomes visible upon publication by the Asset Owner. The Clearing Process Manager performs his review of the release after its publication. This is called post-moderation. Although the end result of both pre-moderation and post-moderation are the same, there is a timing difference and a psychological difference in perception, as the Asset Owner can publish a release without the consent of the Clearing Process Manager.

I.3 ASSET ASSESSMENT PROCESS

In the 2008-2011 Clearing Process, the Asset Assessment Process was in part reflected in the **Maturity Process** and **Conformance Process**. According the "Vision of the Clearing Process" document (Gottschick, et al., 2008), the objective of these processes was to *brand an asset, thereby indicating the fulfilment of dedicated quality criteria defined by the quality goals of SEMIC. […] A branding of the asset using predefined quality labels indicates the fulfilment of dedicated quality criteria.* (Gottschick, et al., 2008). The idea of branding an asset was reflected in the attributed asset status. In particular, the 2008-2011 clearing process foresaw the statuses "mature" and "conform" to explicitly brand high-quality assets. This quality ranking served as an incentive to the Asset Owner to increase the quality of his semantic interoperability asset, until the conformance level was reached.

With regard to the **Maturity Process** and **Conformance Process** the following differences can be detected.

- **No ranking / quality branding**: Unlike statuses "registered", "mature", and "conform" of the 2008-2011 clearing process, the status "assessed" of the new clearing process does not imply any ranking of assets based on their quality. The "assessed" status merely indicates that the asset meets the *minimal* thresholds for it no longer to be in a "candidate" status and that a detailed asset assessment report is available for the semantic interoperability asset.
- **Self-Assessment**: The assessment can only start after the Asset Owner has carried out a self-assessment. This step is necessary, as the Asset Owner is in a much better position than the Clearing Process Manager to provide evidence of whether or not an asset meets a particular assessment criterion. The Clearing Process Manager validates the assessment of the Asset Owner and attributes a fair evaluation score.
- **CAMSS evaluation criteria**: New is also that the re-designed clearing process will use the CAMSS assessment criteria that are conceived to be used by public administration to assess standards and formal specifications as part of their public procurement process (CAMSS, 2010). These assessment criteria were not available in 2008. The benefit of a standardized assessment method is that public administrations can *reuse* the assessment of the Clearing Process Manager in their assessment, resulting in overall efficiency gains for public administrations in Europe. Please note that an assessment of a semantic interoperability asset by the Clearing Process Manager should not be regarded as an endorsement, but rather of a detailed evaluation of a number of relevant assessment criteria. Public administrations should still verify whether the semantic interoperability asset meet the assessment thresholds that they have set for themselves.
- **Business Requirements**: To be able to adequately evaluate whether an asset responds to the business requirements, the Asset Owner should document the requirements the semantic interoperability asset must meet.

I.4 ASSET REMOVAL PROCESS

The 2008-2011 Clearing Process, did not foresee in the removal of assets in the asset repository. This can be explained by two implicit assumptions of which we now know that they are invalid:

- **All assets will eventually become mature**: It was assumed that *all* assets in the repository would eventually reach the maturity or even conformance status. This assumption in reality did not materialize. Most of the assets on the SEMIC platform remained in the "candidate" or "registered" status. Less than 5% has reached the "mature" status. Some asset development projects were abandoned or their status on SEMIC was not in sync with the *actual* development status of the asset, of which the development took place outside the platform.
- **Mature (or conform) assets have eternal value**: It was assumed that mature (or conform) semantic interoperability assets would keep their value in time. Although semantic interoperability assets have a timeless character by themselves, this assumption was not valid. In reality, it is very well possible that semantic interoperability assets become outdated because of *external* changes. Such a change might be a change in business requirements, market conditions, or standardization process.

Annex II. ASSESSMENT OF EUROPASS AND EUROVOC

The criteria that are described in chapter 3 have been applied to the Europass and Eurovoc projects. These assessments show how the criteria can be applied in a concrete use case.

II.1 EUROVOC

Asset identification	
ID	
Name	Eurovoc
Version	4.3
Website	http://eurovoc.europa.eu/

All criteria	**21**	**%**
Pass	18	85
Fail	0	0
Unknown	3	15
Asssessment Criteria	**16**	**%**
Pass	14	87
Fail	0	0
Unknown	2	13

The Eurovoc project is a good candidate for the Joinup-repository. The first 'unknown' criterion arises from the fact that there is no asset description metadata system in use yet. There is no description of any process that ensures compatibility and interoperability, so the relevant criteria have been given an unknown-mark as well, but asking these questions to the Asset Owner might provide different answers however.

An overview of the criteria and the evidence found for each is outlined in Table 6.

Table 6 Assessment of Eurovoc

Id	Category	Criterion	Pass?	Evidence
I.1	Formal	Do the asset and/or release have a license?	Yes	There is a legal notice on the website: “Except where otherwise stated, downloading and reproduction of EuroVoc Thesaurus

				in PDF format, for personal use or for further non-commercial or commercial dissemination, publicly available on the EuroVoc website are authorized." More information is available on the website[7].
I.2	Formal	Do the asset and/or release have complete and valid asset description metadata?	Unknown	
I.3	Formal	Is the asset release content valid?	Yes	A quick check on the downloadable files asserts this.
II.1	Scope	Does the semantic interoperability asset support the implementation of an EU Policy or activity?	Yes	This is described on the 'about' page.
II.2	Scope	Can the asset be used in practice?	Yes	The thesaurus can be used electronically, because it is offered as XML / RDF / flat file. It is also used on the website itself.
1.1	Suitability: applicability	What is specified in the semantic asset? Is it clear who should use the semantic asset and for what applications?	Yes	This is also described on the 'about' page. It helps to standardize and make translations consistent.
1.5	Suitability: relevance	Has the semantic asset been designed to take into account interoperability?	Yes	Although it is not listed explicitly, a common thesaurus is by definition meant to enhance interoperability, to make sure everyone is aligned on the

[7] http://eurovoc.europa.eu/drupal/?q=legalnotice&cl=en

				same terms.
1.7	Impact	What is the impact of choosing this semantic asset? I.e., what are the risks and opportunities identified?	Yes	Using the assets will improve consistency across translations. There is no alternative solution that offers this EU-specific functionality[8].
1.19	Extensibility	Can the asset be easily extended?	Yes	The frequent updates of the thesaurus illustrate this.
1.20	Extensibility	Are there possibilities of localisation, i.e.: adaptation to different user environments and cultures?	Yes	Its main objective is to offer consistent translations.
1.22	Stability	How long can a semantic asset and its later modifications be used and still maintain its quality?	Unknown	This is not addressed on the website in any case.
1.25	Stability	Are there any "backward compatibility" problems reported/documented for the previous version of the semantic asset?	Yes	There is a clear revision history on the website.
1.29	Maintainability	Is there any entity in charge of regularly assessing the semantic asset against the evolution of needs and available technologies?	Unknown	This is not described.
2.2	Availability of documentation	Is the semantic asset sufficiently documented?	Yes	This is described on the website.
2.8	IPR	Does the licence grant the right to use, study, change, improve and redistribute the semantic asset?	Yes	This is described in the legal notice.[9]

[8] http://eurovoc.europa.eu/drupal/?q=node/304&cl=en
[9] http://eurovoc.europa.eu/drupal/?q=legalnotice&cl=en

2.12	Accessibility	Is the semantic asset available in a machine-readable format? Is a conformance test offered to implementers?	Yes	The thesaurus can be downloaded as a flat file.
2.19	Meeting and consultation	Is the development of the asset open to the all types of organisations and to individuals?	Yes	A clear contribution form is available.
2.23	Process and consensus	Does the organisation have a stated objective of reaching consensus when making decisions on standards?	Yes	Administration and maintenance structure is described[10].
2.29	Support	Does the asset owner provide support until removal of the semantic asset from public domain?	Yes	There are help pages and technical documents[11].
3.3	Market support	How many implementations of the formal specification are there?	Yes	It is used in the Inter-Active Terminology for Europe database.
3.23	Reusability	Can other cases where similar systems implement the semantic asset be considered as successful implementations and good practices?	Yes	The EU Publications Office, eCADIS and Cadial are sample users.

II.2 EUROPASS

Asset identification	
ID	
Name	Europass
Version	2.1
Website	http://europass.cedefop.europa.eu/

All criteria	**21**	**%**
Pass	15	71
Fail	2	10

[10] http://eurovoc.europa.eu/drupal/?q=node/327&cl=en
[11] http://eurovoc.europa.eu/drupal/?q=ontology&cl=en

Unknown	4	19
Assessement Criteria	**16**	**%**
Pass	11	68
Fail	2	13
Unknown	3	19

The Europass asset fulfils 2/3 of the CAMSS criteria. The failed criteria arise from the fact that there is little documentation about the process available on the website (the website is really targeted at users) and because there is similar standard, HR-XML. There is however, collaboration with the HR-XML organization and the Europass format is easily mapped to HR-XML (tools are available). The asset is therefore still a good candidate to store in the Joinup repository.

The 'unknown' criterion only relates to asset description metadata. Given the fact that ADMS is still a draft, this criterion should be ignored at the moment.

An overview of the criteria and the evidence found for each is outlined in Table 7.

Table 7 Assessment of Europass

Id	Category	Criterion	Pass?	Evidence
I.1	Formal	Do the asset and/or release have a license?	Yes	A legal notice is put on the website[12].
I.2	Formal	Do the asset and/or release have complete and valid asset description metadata?	Unknown	
I.3	Formal	Is the asset release content valid?	Yes	The downloaded files are correct and ready to be used.
II.1	Scope	Does the semantic interoperability asset support the implementation of an EU Policy or activity?	Yes	Clearly put on the website: Nr. 2241/2004/EG
II.2	Scope	Can the asset be used in practice?	Yes	There are already electronic services that can be accessed and there also technical documents (XML, JSON) than are available for download.

[12] http://europass.cedefop.europa.eu/europass/home/botnav/LegalNotice.csp

1.1	Suitability: applicability	What is specified in the semantic asset? Is it clear who should use the semantic asset and for what applications?	Yes	The introductory page describes the need for a pan-European resume.
1.5	Suitability: relevance	Has the semantic asset been designed to take into account interoperability?	Yes	The project aims for a resume that is understood the same in all member states. Interoperability is one of the key goals, as described in the technical resources[13].
1.7	Impact	What is the impact of choosing this semantic asset? I.e., what are the risks and opportunities identified?	Yes	Not only is a Europass CV used throughout the EU, there is also a link with the global HR-XML standard. This is a clear benefit.
1.19	Extensibility	Can the asset be easily extended?	Yes	No specific technology is used – it is XML-based, which is a widely used standard. The different versions show that new functionalities can be added.
1.20	Extensibility	Are there possibilities of localisation, i.e.: adaptation to different user environments and cultures?	Yes	The Europass CV is available in all EU-languages.
1.22	Stability	How long can a semantic asset and its later modifications be used and still maintain its quality?	No	This is not documented.
1.25	Stability	Are there any “backward compatibility” problems reported/documented for the previous version of the semantic asset?	Yes	Although no example is available, the release notes are detailed enough to warrant this.

[13] http://europass.cedefop.europa.eu/europass/home/hornav/News/AvailableTechnicalResources.csp

1.29	Maintainability	Is there any entity in charge of regularly assessing the semantic asset against the evolution of needs and available technologies?	Unknown	This is not described.
2.2	Availability of documentation	Is the semantic asset sufficiently documented?	Yes	The rationale behind Europass is described on the website.
2.8	IPR	Does the licence grant the right to use, study, change, improve and redistribute the semantic asset?	Unknown	No information found.
2.12	Accessibility	Is the semantic asset available in a machine-readable format? Is a conformance test offered to implementers?	Yes	There are several electronic formats that can be used (JSON, XML).
2.19	Meeting and consultation	Is the development of the asset open to the all types of organisations and to individuals?	No	There is a form on the website, but there is no clear sign that using this allows one to contribute to Europass.
2.23	Process and consensus	Does the organisation have a stated objective of reaching consensus when making decisions on standards?	Unknown	The development process is not described on the website.
2.29	Support	Does the asset owner provide support until removal of the semantic asset from public domain?	Yes	Technical documentation is available, as is e-mail support.
3.3	Market support	How many implementations of the formal specification are there?	Yes	The project statistics give an idea on how many CVs have already been created. A Google Search shows quite some results of people using the Europass format.
3.23	Reusability	Can other cases where similar systems implement	Yes	

		the semantic asset be considered as successful implementations and good practices?

Annex III. FORMER SEMIC MATURITY ASSESSMENT CRITERIA

III. SEMIC Maturity Assessment Criteria	
Id	**Criterion**
III.1	**Availability**
III.1.1	Is the data model well partitioned and modularised?
III.1.2	Neutrality of the data model: whether the data model sufficiently separates data structure and data values, e.g. schemas and code lists.
III.1.3	Is the data model designed to fit the requirements?
III.1.4	Is the data model easy to understand?
III.1.5	Are all data exchange formats and mappings made available?
III.2	**Syntax**
III.2.1	Are all data fields named appropriately?
III.2.2	Are all data types defined and described?
III.2.3	Are all integrity constraints described?
III.3	**Semantics**
III.3.1	Is the data model unambiguous?
III.3.2	Are the scales of all values well defined?
III.3.3	Are the representation schemes of all data fields described?
III.3.4	Does the data mode avoid redundancies?
III.4	**Documentation**
III.4.1	Are all context dependent requirements clearly expressed?
III.4.2	Are focus, goals, and scope of the data exchange described and defined?
III.4.3	Is the documentation complete?
III.4.4	Is the documentation well structured, transparent, and easy to understand?
III.5	**Reuse**
III.5.1	Is the possibility for reuse given?
III.5.2	Are enough measures in place to prevent errors in implementation?
III.5.3	Platform independence?
III.6	**Sustainability and modifiability**
III.6.1	Extensibility of the asset
III.6.2	Transparent strategy for extensions to the asset
III.6.3	Does the asset have a transparent change process

Annex IV. **CAMSS CRITERIA**

This section lists all CAMSS criteria (CAMSS, 2010)[14].

The CAMSS Business Need assessment criteria check how mature a specification or standard is. They attempt to achieve this by assessing the standard's suitability and its potential (CAMSS, 2010). This would lead to the following definitions when applied to the domain of semantic interoperability assets:

- The **suitability** of a semantic interoperability asset can be defined as the extent to which the asset responds to the identified business need in the specific context, and promotes interoperability. Suitability characteristics are analysed in terms of applicability and relevance with regard to how the requirements are met when using the formal specification.
- The **potential** of a semantic interoperability asset identifies the indirect consequences linked to the use of the formal specification, whether it is in terms of analysing and assessing the impact of its use, or evaluating its possible evolution.

The entire set of CAMSS Business Need criteria is listed in Table 8. They are grouped into 2 main categories, Suitability and Potential. Each category is further divided into subcategories.

Table 8 CAMSS Business Need Criteria - Complete

CAMSS Business Need Criteria	
Suitability	
	Applicability
1.1	What is specified in the formal specification? Is it clear who should use the formal specification and for what applications?
	Relevance
1.2	To which degree does the use of the formal specification help meet the identified requirements?
1.3	Does the formal specification cover the key features necessary to support the identified e-Government functional need?
1.4	What is its completeness functionality-wise?
1.5	Has the formal specification been designed so as to take into account interoperability? What are the existing or planned mechanisms to assess the interoperability of different implementations to the formal specification? (in Market Criteria)
1.6	How does the formal specification take into account accessibility needs, if possible in the scope of the business need?
Potential	
	Impact
1.7	What is the impact of choosing this formal specification? I.e., what are the risks and opportunities identified?
1.8	What is the financial impact? Which are the costs incurred? Which are the benefits?

[14] https://webgate.ec.europa.eu/fpfis/mwikis/idabc-camss/

1.9	What is the Organisational impact? Is there a continuity of process? Are there business processes to be changed? What is the scope of Change Management to be foreseen (i.e.: training...)?
1.10	What is the Environmental impact of the choice? At the national / regional / global levels?
1.11	What is the impact on the Migration? I.e.: are there migration tools?
1.12	What are the Security aspects? I.e. consequences of the choice and further actions to assure security
1.13	What are the Privacy aspects? I.e. consequences of the choice and further actions to assure privacy
1.14	What is the impact on interoperability with other processes, other organisations?
1.15	What is the compatibility of the formal specifications in the direct environment?
1.16	What dependencies should be considered? (A dependency analysis does not only comprise dependencies of the standard or specification to other standards or specifications but also various “lock-in”, bundling or forced upgrades risks).
1.17	What is the impact on administrative burden?
	Scalability
1.18	To which extent can the formal specification adapt to the size of the needs, i.e.: its ability to support an increasing number of implementations and/or interactions among those implementations?
	Extensibility
1.19	To which degree or with which ease is the formal specification extensible to another area?
1.20	Are there possibilities of localisation, i.e.: adaptation to different user environments and cultures?
	Stability
1.21	For how long has this formal specification existed?
1.22	How long can it and its later modifications be used and still maintain its quality?
1.23	How often are new versions released and with what type of change?
1.24	Were these changes predictable? Were these changes controlled?
1.25	Are there any "backward compatibility" problems reported/documented for previous version of the formal specification?
1.26	Which effort is needed for an organisation using the formal specification to upgrade to a new version?
	Maintainability
1.27	Is the maintenance process of the formal specification stable?
1.28	Does the formal specification benefit from a strong community support?
1.29	Is there any entity in charge of regularly assessing the formal specification against the evolution of needs and available technologies?
1.30	How are new versions communicated to organisations using the formal specification?
1.31	Are there promises to enhance openness of a formal specification?

The way the “standardization” of a semantic interoperability asset is *governed* is an important evaluation criterion for the suitability of an asset to be used in the context of an e-Government project. According to the CAMSS assessment method (CAMSS, 2010), significant governance characteristics are for example the way it gives the possibility to stakeholders to influence the evolution of the formal specification, or which conditions it attaches to the use of the formal specification or its implementation. Moreover, it is important to know how the formal specification is defined, supported, and made available, as well as how interaction with stakeholders is managed by the organisation during these steps. Governance of interoperability

testing with other formal specifications is also indicative. The CAMSS Standardization criteria are listed in Table 9.

Similar to the Business Need Criteria, the Standardization Criteria are divided into several categories. Each category contains multiple criteria, but the assessment should be based on the result per category.

Table 9 CAMSS Standardization Criteria - Complete

CAMSS Standardization Criteria	
	Availability of documentation
2.1	Access to all preliminary results documentation.
2.2	Access to all final results documentation.
2.3	Access to committee meeting notes.
2.4	Access to documentation of procedures, governance policies, annual reports, etc...
2.5	Access to documentation of copyright on published documents
	Intellectual Property Right
2.6	the availability of the IPR or copyright policies of the organisation (available on-line or off-line, or not available);
2.7	the organisation's governance to disclose any IPR from any contributor (ex-ante, online, offline, for free for all, for a fee for all, for members only, not available);
2.8	the level of IPR set "mandatory" by the organisation (no patent, royalty free patent, patent and RAND with limited liability , patent and classic RAND, patent with explicit licensing, patent with defensive licensing, or none);
2.9	the level of IPR "recommended" by the organisation (no patent, royalty free patent, patent and RAND with limited liability, patent and classic RAND, patent with explicit licensing, patent with defensive licensing, or none).
	Accessibility
2.10	Does a mechanism that ensures disability support by a formal specification exist?
2.11	Is conformance governance always part of a standard?
2.12	Is a conformance test offered to implementers?
2.13	Is conformance validation available to implementers?
2.14	Is conformance certification available?
2.15	Is localisation of a formal specification possible?
	Interoperability governance
2.16	open identification in formal specifications,
2.17	open negotiation in formal specifications,
2.18	open selection in formal specifications.
	Meeting and consultation
2.19	if the organisation is open to all types of companies and organisations and to individuals;
2.20	if the standardisation process may specifically allow participation of members with limited abilities - when relevant;
2.21	if meetings are open to all members/can all participate in the formal specification creation process;
2.22	if non-members can participate in the formal specification creation process.
	Consensus
2.23	Does the organisation have a stated objective of reaching consensus when making decisions on standards?
2.24	If consensus is not reached, can the standard be approved? (answers are: cannot be approved but referred back to working group/committee, approved with 75% majority, approved with 66% majority, approved with 51% majority, can be decided by a "director" or similar in the organisation).
2.25	Is there a formal process for external review of standard proposals by interest groups (non-members)?

	Due process
2.26	Can a member formally appeal or raise objections to a procedure to an independent, higher instance?
2.27	Can a member formally appeal or raise objections to a technical specification to an independent, higher instance?
	Changes to formal specification
2.28	All changes to a standard is subject to the criteria 2.1-2.27 above
	Support
2.29	does the organisation provide support until removal of the published formal specification from public domain (Including this process?
2.30	does the organisation make the formal specification still available even when in non-maintenance mode?
2.31	does the organisation add new features and keep the formal specification up-to-date?
2.32	does the organisation rectify problems identified in initial implementations?
2.33	does the organisation only create the formal specification?

During the Asset Assessment Process, the Clearing Process Manager should also make an assessment about the extent to which a semantic interoperability asset is supported in the "market". According to the CAMSS assessment method (CAMSS, 2010), this implies identifying to which extent the formal specification benefits from **market support** and wide adoption, what are its level of **maturity** and its **capacity of reusability**.

Similar to the Business Need and the Standardization Criteria, the Market Criteria are divided into several categories. Each category contains multiple criteria, but the assessment should be based on the result per category. Table 10 lists all CAMSS Market Criteria.

Table 10 CAMSS Market Criteria - Complete

CAMSS Market Criteria	
	Market support
3.1	Does the standard have strong support in the marketplace?
3.2	What products exist for this formal specification?
3.3	How many implementations of the formal specification are there?
3.4	Are there products from different suppliers in the market that implement this formal specification?
3.5	Are there many products readily available from a variety of suppliers?
3.6	What is the market share of the products implementing the formal specification, versus other implementations of competing formal specifications?
3.7	Who are the end-users of these products implementing the formal specification?
	Maturity
3.8	Are there any existing or planned mechanisms to assess conformity of the implementations of the formal specification?
3.9	Is there a reference implementation (i.e.: mentioning a recognized certification process)?
3.10	Is there an open source implementation?
3.11	Does the formal specification show wide adoption?
3.12	Across different domains? (I.e.: public and private)
3.13	In an open environment?
3.14	In a similar field? (i.e.: can best practices be identified?)
3.15	Has the formal specification been in use and development long enough that most of its initial problems have been overcome?

3.16	Is the underlying technology of the standard well-understood? (e.g., a reference model is well-defined, appropriate concepts of the technology are in widespread use, the technology may have been in use for many years, a formal mathematical model is defined, etc.)
3.17	Is the formal specification based upon technology that has not been well-defined and may be relatively new?
3.18	Has the formal specification been revised?
3.19	Is the formal specification under the auspices of an architectural board?
3.20	Is the formal specification partitioned in its functionality?
3.21	To what extent does each partition participate to its overall functionality?
3.22	To what extent is each partition implemented?
	Reusability
3.23	Does the formal specification provide guidelines for its implementation in a given organisation?
3.24	Can other cases where similar systems implement the formal specification be considered as successful implementations and good practices?
3.25	Is its compatibility with related formal specifications documented?

Annex V. COMPARISON OF THE SEMIC AND CAMSS ASSESSMENT CRITERIA

Two sets of criteria, that can be used to assess the quality of an asset stored in the SEMIC.EU repository, have been described.

The first set is designed by the **SEMIC.EU** team. It consists of 3 subsets, focusing on different domains:

- *Formal criteria*: are all formal requirements fulfilled in order to be stored in the repository?
- *Scope criteria*: does the asset belong in the SEMIC.EU repository?
- *Maturity criteria*: how well established is the asset?

The second set is known as the **Common Assessment Method for Standard and Specifications** (CAMSS). CAMSS is an initiative of the European Commission aiming to improve interoperability through the sharing of expertise and best practices in the use of standards and specifications for software in e-Government. The assessment criteria are also divided among 3 subsets:

- *Business Need criteria*: how does the specification fulfil the business requirements?
- *Standardization criteria*: how is the specification made into a standard?
- *Market criteria*: is the specification already in use and what is its position in the market?

Each criterion will be discussed and a conclusion will be made as to whether the criterion has any added value when compared to CAMMS, with the exception of the scope criteria. The latter are considered being unique to the SEMIC.EU project and having no counter-part in the CAMSS framework – they are inherent to the 2008-2011 SEMIC.EU assessment process.

V.1 FORMER SEMIC FORMAL CRITERIA

- *Do the asset and/or release have complete and valid asset description metadata?*
  This is a valid criterion, but could be better implemented on a technical level (e.g., during upload of a new release) than as part of an assessment process.

- *Do the asset and/or release have a license declared?*
  This is also assessed in CAMSS 2.6 and 2.7, but can be further detailed to require at least an English translation.

- *Does the release content have valid content?*
  There is no CAMSS counterpart. This criterion might be better placed in a community review, then in a Formal however, as the validity of the content might only be assessable during implementation.

- *Does the release consist of file formats that are supported by SEMIC.EU?*
  Similarly to the asset description metadata, this is a criterion that lends itself better to a technical implementation.

- *Are the asset and/or release free from discriminating content?*
  Is the asset up-to-date and is its continuity sufficiently assured?
  This is not an actual formal criterion. It is more related to maturity and can be translated into several CAMSS criteria: 1.29, 2.30, 2.31, and 3.15.

V.2 FORMER SEMIC MATURITY CRITERIA

- *Is the data model well partitioned and modularised? Is the asset free from contextually unrelated artefacts?*
  This criterion is also in CAMSS: 3.20

- *Neutrality of the data model: whether the data model sufficiently separates data structure and data values, e.g. schemas and code lists.*
  This can be viewed as a concrete example of a check during the assessment of CAMSS 3.16.

- *Is the data model designed to fit the requirements?*
  This is a very general description of the CAMSS Business Need criteria. To assess this criterion, it is required that the asset owner documents the business needs the asset addresses.

- *Is the data model easy to understand?*
  The criterion leaves too much room for interpretation. In order to make this criterion usable, one would have to define some parameters that define 'easy', which might as well be done for CAMSS 3.16 instead.

- *Are all data exchange formats and mappings made available?*
  A broader criterion is CAMSS 1.4, although that criterion should be made more concrete as well.

- *Are all data fields named appropriately?*
  Are all data types defined and described?
  Are all integrity constraints described?
  These syntactic criteria can be viewed as concrete examples of CAMSS 1.4 and 3.9.

- *Is the data model unambiguous?*
  Are the scales of all values well defined?
  Are the representation schemes of all data fields described?
  Does the data mode avoid redundancies?

Similarly, these semantic criteria can be considered to more concrete questions when using CAMSS 1.4 and 3.9. Some of these criteria might also not be assessable until the specification is implemented.

- *Are all context dependent requirements clearly expressed?*
  This corresponds more or less to CAMSS 1.1.

- *Are focus, goals, and scope of the data exchange described and defined?*
  This corresponds more or less to CAMSS 1.1.

- *Is the documentation complete?*
  CAMSS only assesses the availability of the documentation in the context of its standardization criteria (2.1 – 2.5), but one can question the usefulness of this criterion. A definition of 'completeness' should be given, but instead of defining that for this criterion, one might do it all the same for the CAMSS criteria.

- *Is the documentation well structured, transparent, and easy to understand?*
  CAMSS only assesses the availability of the documentation in the context of its standardization criteria (2.1 – 2.5), but in addition, fulfilment of this criterion can also be viewed as a combination of CAMSS 3.9, 3.16 and 3.23.

- *Is the possibility for reuse given?*
  This is a one-liner for several CAMSS criteria: 3.11, 3.12, 3.14, 3.3, 1.20, 1.19, 1.18.
  If reuse in this case is limited to an IPR issue, it can also be seen as 2.8 and 2.9.

- *Are enough measures in place to prevent errors in implementation?*
  This is foreseen in CAMSS 1.5 and 2.11-2.14.

- *Platform independence*
  If platform independence on a technical level is a requirement, the actual targeted platforms should be defined. In this case, this could also be done by further specifying CAMSS 3.15 – 3.17.

- *Extensibility of the asset*
  See CAMSS 1.19.

- *Transparent strategy for extensions to the asset*
  See CAMSS 2.11 – 2.33, and 2.28 in particular.

- *Does the asset have a transparent change process?*
  This is a one-liner for several CAMSS Standardization criteria: 2.11 – 2.33.

V.3 CONCLUSION

From the 2 sets of SEMIC.EU criteria, only formal criteria seem to be necessary. The formal criteria should be slimmed down however to make the evalutation better manageable.

The maturity criteria appear to be redundant when taking the existence of CAMSS into account. Each criterion is easily translated into one or more CAMSS counterparts. Using CAMSS would therefore appear to be a better alternative than writing a new set of assessment criteria. This is subject to one important remark however. The CAMSS criteria are often defined in a very general manner and are susceptible to interpretation. In order to be really usable, a clear guide or set of instructions should be provided in order to make the assessment process as objective as possible. The SEMIC.EU criteria on the other hand are often more detailed (which is why they can be considered part of CAMSS) and can be used as good starting points for such a guide. The downside to using CAMSS is the volume of criteria that can be used. This can be mitigated however by using just a subset of CAMSS and by tailoring the criteria to the Clearing Process.

Annex VI. APPLYING THE SCOPE CRITERIA TO THE ASSET REPOSITORY

The scope criteria listed in Section 3.1 have been applied to the assets that were in the SEMIC asset repository in August 2011. A detailed analysis is included in the Excel document embedded below.

D4.1 - clearing process- try-out of sc

Table 11 lists the result of applying these criteria.

Table 11 Scope criteria applied to the current asset repository

II.1	II.2	II.3	Assets
No	No	No	**15**
No	No	Yes	**321**
No	Yes	Yes	**89**
Yes	Yes	No	**3**
Yes	Yes	Yes	**103**
			531

These figures show that the first criterion is the strongest differentiator and that the assets supporting the implementation of a EU policy or activity, always contribute to cross-border or cross-sector interactions. Only 103 assets (19.40%) in the Joinup repository are considered to be in scope. Of the assets that are not in scope, most are either related to a broader, international standard or have only a national use.

Also of note is the fact that some of the assets within scope have been split into separate assets (e.g. the E3L and E3S ....) and that other assets, such as the NACE taxonomies can be grouped. The splitting or regrouping of assets has an effect on the reported statistics, as shown in Table 12.

Table 12 Scope criteria taking split assets into account

II.1	II.2	II.3	Split?	Assets
Yes	Yes	Yes	No	**55**
Yes	Yes	Yes	Yes	**48**
				103

Taking this into account, the actual number of assets that qualify all three scope criteria is as actually low as 55 (10% of the assets currently listed in the asset repository).

Annex VII. APPLYING THE CAMSS CRITERIA TO THE EUROPASS XML ASSET

The CAMSS Assessment Criteria have been applied to the Europass XMLasset. The detailed assessment is included in the embedded Excel document. Table 13 contains an overview of the number of assessment criteria on which the Europass XML asset could pass, fail, for which we require additional information, and the criteria that are not applicable.

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Table 13 Applying the CAMSS assessment criteria to the Europass XML asset

Results	#	%
Pass	36	40,4
Fail	9	10,1
Unknown	36	40,4
Not Applicable	8	9
Total	89	100

This assessment shows it is difficult to use the complete set of CAMSS criteria on a candidate semantic asset. The CAMSS criteria should be tailored to meet the requirements of the Clearing Process.