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ASPECT

Infrastructure and Services v1.0

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e*Content*plus

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[1] OJ L 79, 24.3.2005, p. 1.

Contents

1 Introduction

Th ASPECT Service-Oriented Architecture (SOA) combines the services of the ASPECT Service Center (ASC) to provide a platform in which existing and emerging standards and specifications are applied to enable the discovery, exchange and reuse of a diverse range of educational resources. Through this architecture,

- Content providers can offer their learning resources to teachers,
- Teachers will be able to discover and use those resources.

This deliverable first gives an overview of the ASPECT infrastructure in section 2. Section 3 presents the services that are deployed in v1.0 of the infrastructure. Note that the ASPECT infrastructure is meant to evolve. This document represents the view of WP2 at the time of writing. For an up-to-date description the ASPECT architecture, please consult deliverable D.2.4 which is a "Wiki with material to support training and dissemination".

2 The ASPECT Infrastructure & Toolset

The ASC includes a number of services, which are added in the overview Figure 1. Note that we distinguish between single services, which are represented in red blocks, and sets of services, which are represented in orange blocks. Section 2.3 describes how these services can be used by content providers for sharing their resources in ASPECT.

2.1 Sets of Services

- A **LOR registry** is a catalog service that provides up-to-date information that is necessary to apply protocols such as OAI-PMH, SQI, SPI, SRU/SRW. It facilitates interoperability between learning object repositories.
- A **registry of application profiles** describes how learning resources in LORs are described.
- The **Vocabulary Bank of Education** (VBE) is a repository in which multilingual terms and vocabularies can be published and disseminated.

2.2 Single Services

- A **harvest** service can be used to copy and save metadata from a repository of the content provider locally into the ASPECT metadata store.
- A **publish** service can be used to upload one or more metadata instances to the ASPECT metadata store.
- An **Identify** service is used to provide persistent digital identifiers to resources within the ASPECT LRE. A persistent digital identifier is intended to provide permanence of identification and is expected to be globally registered, validated and unique.
- A **Validate** service is available for providing validation of metadata instances against multiple application profiles of LOM that exist in various networks.
- An **Enrich** service is provided to enable enrichment of metadata instances that are available in the ASPECT LRE. The goal of this service is to enable better discovery rate of resources.

- A **Transform** service transforms metadata in a format, for example the LRE LOM Metadata application profile, into another format e.g., an application profile of Dublin Core.
- A **Search** service is added to enable discovery of the contents in the ASPECT. This service is based on the medata that describes the content.
- A **Translate** service translates metadata in one language into another language and therefore, enables better discovery rate of resources.
- A **Compliance Test** Service checks the conformance of Content Packages in e.g SCORM packages.

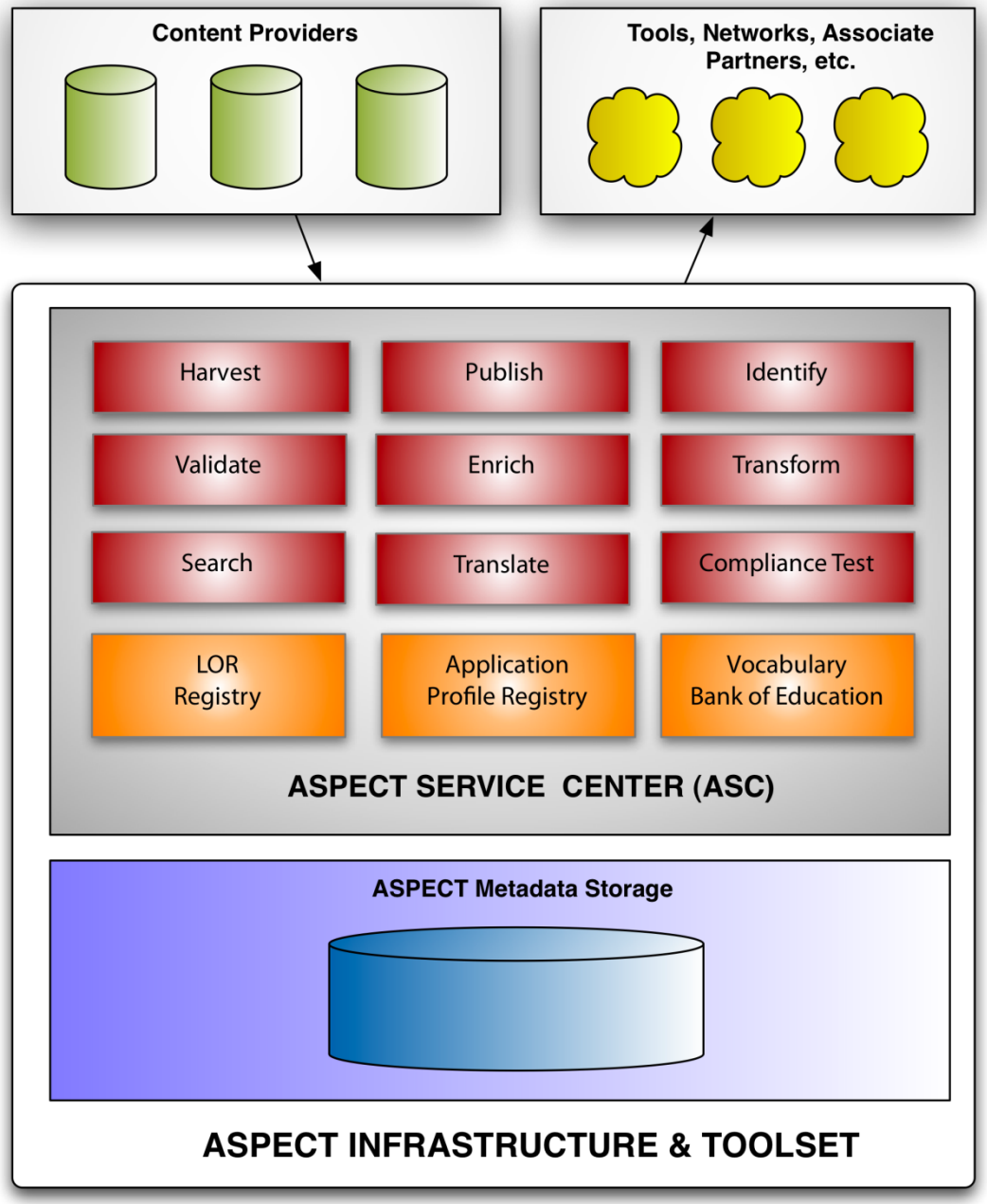

Figure 1: The Aspect Infrastructure

2.3 Sharing of Learning Resources in ASPECT

This scenario illustrates how content providers can use the services in the ASC to share their resources with the ASPECT LRE. The following section uses Figure 2 to illustrate 3 general

steps that are needed in this scenario. Section 2.3.2 provides deeper understanding of the second general step in this harvesting scenario.

2.3.1 General Scenario

The general steps for sharing learning resources in ASPECT are the following:

1. Content providers implement an OAI-PMH target on top of their repository and they register this target in the LOR registry. The registration information and the way how they should register, is described in D2.2 which can be found at http://aspect-project.net/node/28
2. The ASPECT harvest service
    a. queries the registry to find the different collections to harvest from,
    b. actually harvests the metadata from the different providers, and
    c. finally publishes the metadata in the ASPECT metadata store.
3. The ASPECT metadata store is registered in the LOR registry. From the registry, the ASPECT metadata store can be queried and/or harvested.

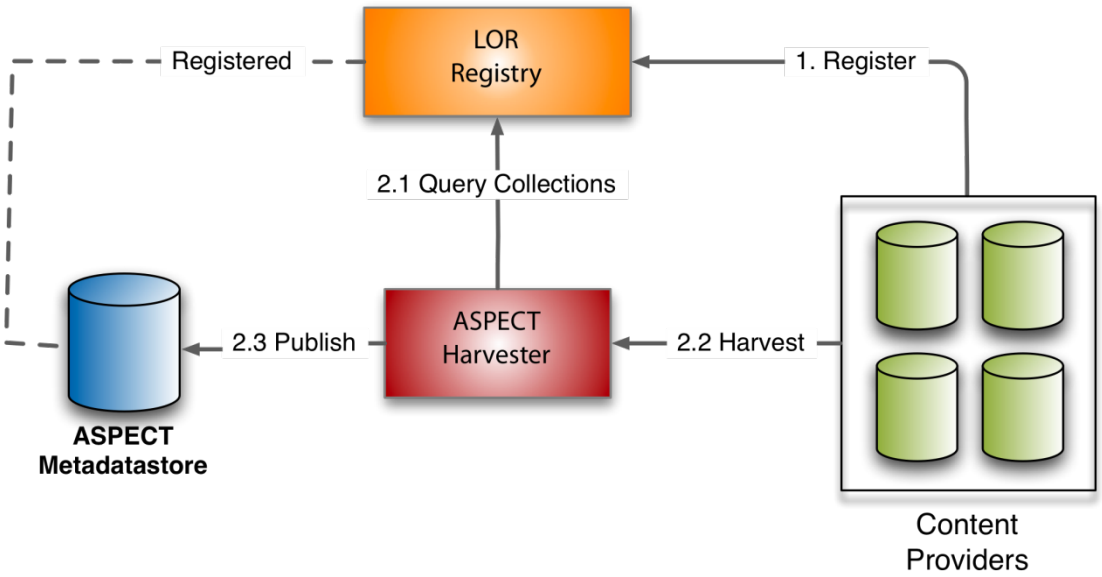

Figure 2: Sharing Learning Resources in ASPECT

2.3.2 Step 2: Actual Harvesting

Before this step, the harvester has already queried the LOR registry and has all the information about the OAI-PMH target and the application profile used. Figure 3 shows a sequence diagram how a number of ASC services work together to make a learning resource available in the ASPECT metadatastore. The different steps for harvesting one metadata instance are:

1. A metadata record reaches the harvester.

1.1. A new persistent identifier is generated by the Identifier service to identify the learning object metadata record[2] when no persistent identifier exists.
1.2. The metadata record is sent to the Enrich Service for enrichment. For instance, this service can try to automatically add keywords to the record.
1.3. The metadata record uses the Validate Service for making sure that the record is in line with the ASPECT LRE application profile v4.0. More information on this application profile can be found in section 3.
  1.3.1. The validation service makes use of the vocabulary bank of education to validate the used terms and vocabularies within the metadata record.
1.4. The validated metadata record is published in the ASPECT metadata store.

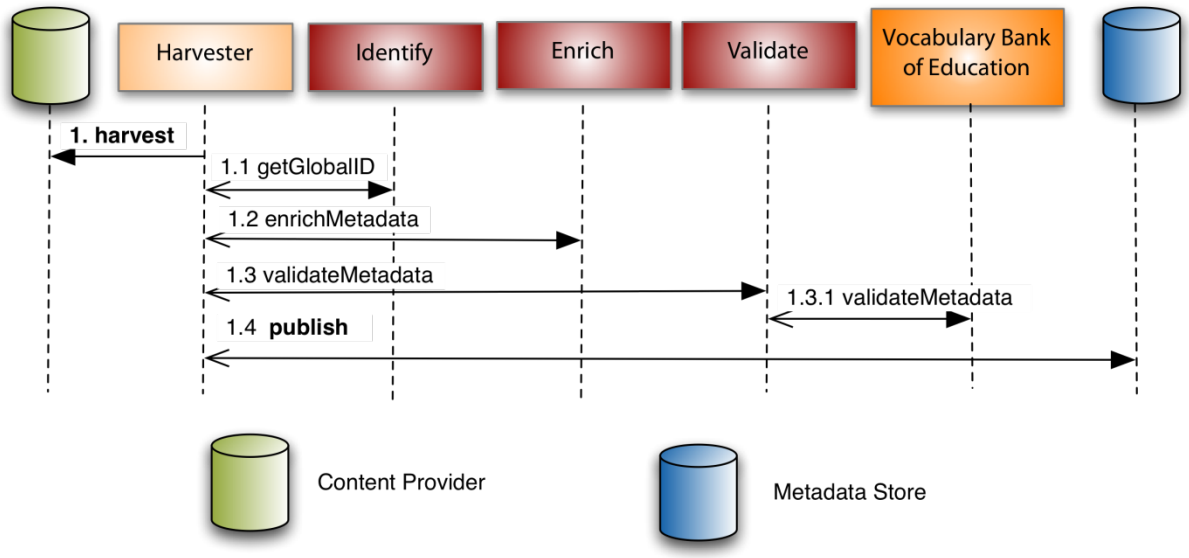

Figure 3: Harvesting Scenario

3 Infrastructure & Services v1.0

The following sections present an overview of the ASPECT Infrastructure & Services v1.0 (i.e.,). Please note that the ASPECT infrastructure & services is meant to evolve. This section describes the ASPECT Infrastructure & Services as implemented by WP2 at the time of writing (M9). For an up-to-date description of the ASPECT infrastructure, please consult deliverable D.2.4 which is a "Wiki with material to support training and dissemination.

3.1 LRE Metadata Application Profile v4.0

The LRE Metadata application profile v4.0 is based on IMS ILOX. This version of the application profile is a clean solution for adding information for learning object exchange. It is available at http://fire.eun.org/LREMAPv4p0.pdf.

[2] Note that we make abstraction of the application profile that is in use. Therefore, we say that we create an identifier for a complete metadata record, although it can be that the generation of items with smaller granularity is needed.

3.2 Transform Service

A number of content providers already support the LRE Metadata Application Profile v3.0. For enabling an easy and rapid migration to the new binding of the profile v4.0, the transform service allows an automatic migration from v3.0 to v4.0. Internally, the transform service uses an XSL-transformer for this. After the automatic migration of the different bindings, content providers are advised to harvest back all their metadata records locally.

3.3 Harvest service

ASPECT uses the Ariadne harvester for harvesting the content of the different providers. The software of the harvester can be found on the ASPECT wiki D2.4. Note that the ASPECT Registry is not available in the first version of the ASPECT infrastructure. Therefore, the harvester does not yet query the registry for the different collections it should harvest from. Until the registry is in place, targets have to be added manually through the configuration page of the harvester (see Figure 4).

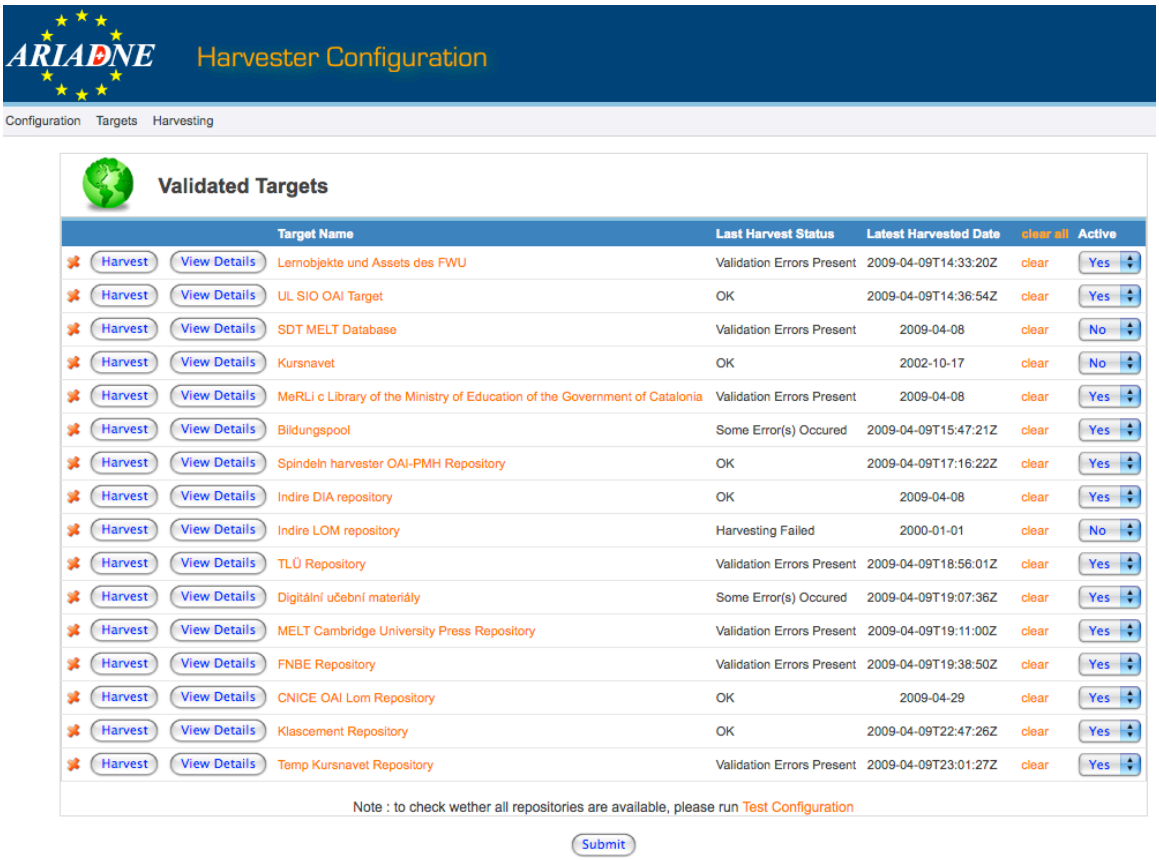

Figure 4: The Ariadne Harvester

3.4 Validate Service

The Validate Service is online available at http://ariadne.cs.kuleuven.be/validationService/
This validate service has been developed in the context of the MELT project but has been extended since and now supports validation of the LRE Metadata Application Profile v4.0.
This profile defines 3 categories of LOM elements: core, recommended, optional. This allows for multiple ASPECT validation schemes for given metadata records.

3.5 Identify Service

For providing persistent identifiers, ASPECT has opted for the use of the Handle System. The Handle System® is a general purpose distributed information architecture designed to provide an efficient, extensible, and secured global name service for use on networks such as the Internet. A description on the use of identifiers within ASPECT can be found through the D2.4 wiki at http://wiki.aspect-project.net/ Version 1 of the infrastructure supports only a basic API which can be used to obtain an identifier for a given resource.

3.6 Publish Service

Version 1.0 of the Publish service supports the Simple Publishing Interface (SPI) which can be used to add one or more metadata records in the ASPECT metadata store.

3.7 Vocabulary Bank of Education (VBE)

Figure 5 shows a screenshot of the first version of the VBE. This version is available at http://aspect.vocman.com. Currently, the VBE is populated with the different vocabularies of the LRE Metadata application profile. This version of the VBE allows both import and export of vocabularies in a number of formats like ZTHES, XVD, etc. A complete overview of the available formats can be found in deliverable D2.3. For the moment, anyone can register to the VBE to download vocabularies.

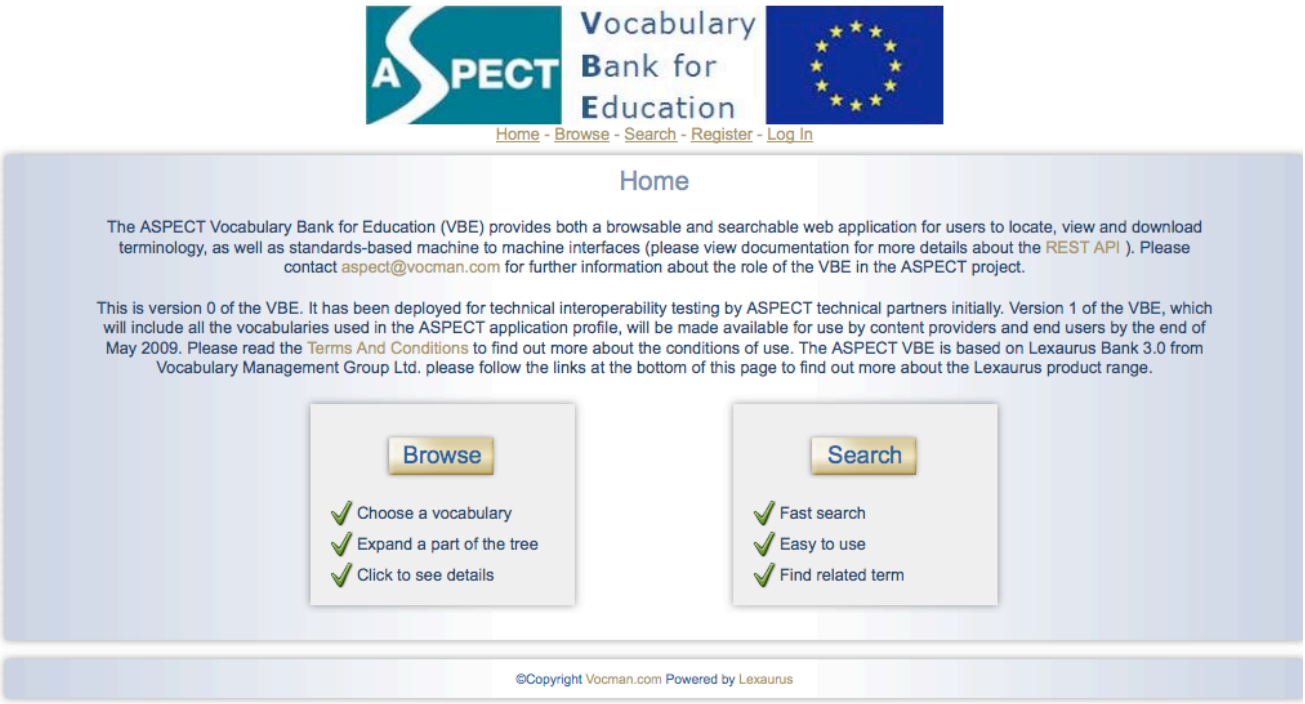

Figure 5: The ASPECT Vocabulary Bank of Education