

VET Learning Object Repository Network

Implementation guidelines

Version 1.0

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*Managed by the Flexible Learning Advisory Group on behalf of the Commonwealth, all States and Territories
in conjunction with ANTA*



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Document control

Version	Date	Who	Description
Draft 0.1	10 November 2004	David Drinkwater	Initial draft
Draft 0.2	10 December 2004	David Drinkwater	Review draft
Draft 0.3	21 December 2004	David Drinkwater	Changes to metadata sample in Appendix A by Gerry Green. Appendices A and B combined.
1.0	16 February 2005	David Drinkwater	Initial release

About this document

This document describes implementation guidelines for the VET Learning Object Repository Network (VLORN).

Related documents

The following documents should be read in conjunction with this document.

- VET Learning Object Repository Network Business and Functional Requirements
<http://www.flexiblelearning.net.au/vlorn/>
- VET Learning Object Repository Network Interoperability Specification
<http://www.flexiblelearning.net.au/vlorn/>
- VET Interoperability Framework website
<http://www.flexiblelearning.net.au/interop/>
- VET Metadata Application Profile (VETADATA)
<http://flexiblelearning.net.au/interop/topics/vocab.htm>

Introduction

The Australian Flexible Learning Framework (AFLF) established the VET Learning Object Repository Network (VLORN) in 2004 for the exchange of learning objects between states and territories.

VLORN enables the Australian VET sector to share teaching and learning resources that support flexible delivery. The network is based on a business model of trust and cooperation and technical interoperability specifications.

Business model

The LOR Implementation Project (2004) established a sustainable infrastructure which provides access to content in a distributed network of existing repositories, with the potential for new repositories to be developed in the future.

The repositories contain learning objects that are described by metadata and packaged in conformance with IMS content packaging specification 1.1.2.

This interoperability model, known as the VET Learning Object Repository Network or VLORN:

- defines a minimal set of responsibilities for consumer access, the search provider, the repository provider and the governing body
- provides a framework for the understanding and increasing awareness of LOR concepts required to enable national sharing and access
- enunciates the concepts required for organisations to be effective participants in the network
- provides a framework, including terminology and concepts, for describing and analysing interoperability at business policy, technical standards and implementation levels
- provides a foundation for future expansion to cover long term requirements.

Governance of the network

VLORN Management is the overall responsibility of the Flexible Learning Advisory Group (FLAG) (during the life of the Australian Flexible Learning Framework). FLAG is not involved in day-to-day operations, but devolves responsibility for VLORN Management to the Resources for Teaching Learning and Assessment (RTLTA) Program Steering Committee in 2004 and to the Resources and Innovation Program Steering Committee in 2005.

The type of governance performed by VLORN Management includes:

- system establishment and management
- policy and rules for access
- management of service level agreements (see Note below)
- resolution of issues
- system reporting.

In practical terms, VLORN responsibilities are concerned with day-to-day management of the interactions and relationship between the consumer access providers, federated service providers and repository service providers as described in this document.

Membership of the network

The model described in this document comprises a network (or federated system) of producers, linked to consumers by a common services search provider.

Members of VLORN and their roles are:

Repository service provider (RSP)	Manages a repository of learning objects and provides services to enable discovery, sample, view and download of these.
Consumer access provider (CAP)	Provides access to search/discovery services
Federated search provider (FSP)	provides a federated search that allows a search to be distributed across a number of RSPs and return results to a CAP

Joining the network

The process to join VLORN (either as a CAP or a RSP) is based on implementing a set of interoperability specifications and application

programming interfaces (APIs) whilst agreeing to work – in a spirit of cooperation – to advance the interests of the sector, especially in relation to gaining efficiencies from sharing teaching and learning resources.

Full details can be obtained at flexiblelearning.net.au/vlorn/

Network members must meet the following principles of cooperation:

- Commitment to working with other members – in a spirit of cooperation – to advance the interests of the whole sector especially in relation to gaining efficiencies from sharing teaching and learning resources.
- Commitment to exposing a reasonable amount of content so that using the federated search is a rewarding experience for the consumer.
- Agreement to adhere to a minimum set of business and technical specifications.
- Agreement to licence learning objects to users to be reusable within the terms of the associated digital rights (during 2004, learning objects in the repositories should correspond with the AEShareNet-U (unrestricted) and AEShareNet-FfE (free for education purposes) licences).
- Establishment of business policies relating to exposure, acquisition, design, development and quality assurance of their own content, including clarity of rights issues (e.g. third party copyright).
- Warrant that they own the copyright to the material in terms of publication and that such rights are expressed to the consumer as part of exposure in the search result.

Business transaction model

Search transaction

The federated search provider (FSP) manages the initial transaction between a consumer and a producer. The FSP facilitates initial contact between consumers and producers. Beyond the initial inquiry, transactions between a producer and a consumer are the responsibility of the producer. VLORN does not restrict additional transactions between the producer and consumer.

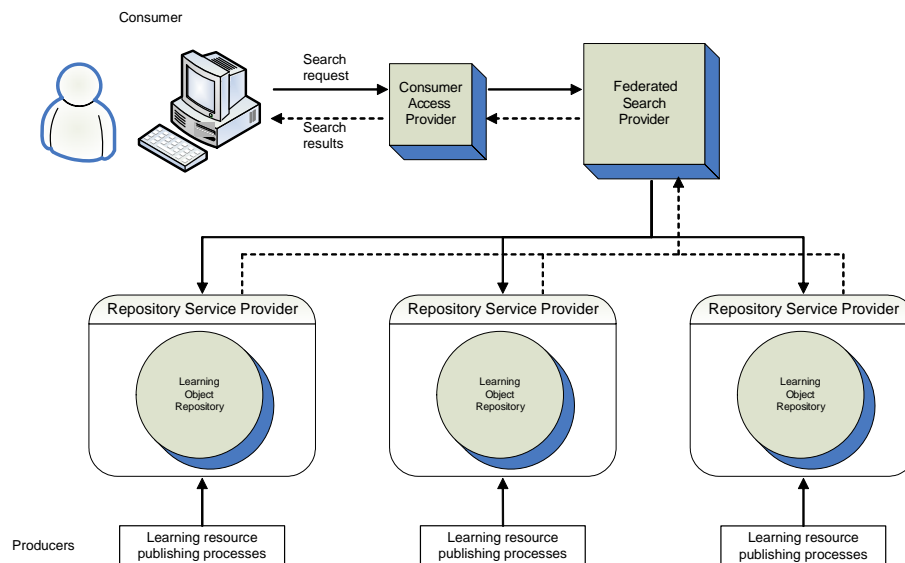


Figure 1: Illustration of a search transaction in VLORN.

In the search transaction illustrated in Figure 1:

- ‘Producer’ is the role played by organisations that publish learning objects.
- ‘Repository service provider’ (RSP) is the role played by organisations that manage repositories that provide the learning objects.
- ‘Consumer’ is the role played by those persons, or consumer systems, that interact with a consumer access provider (CAP) to find and acquire learning objects.
- ‘Search provider’ is the role played by the FSP in brokering contact between consumers and producers.

Figure 2 illustrates the search transaction in more detail, showing the VLORN model in an international context. Scenarios are shown where searches are initiated by three consumers:

- **Consumer A** is from a sector other than the VET sector and is searching via a public internet search portal (such as EdNA) that has implemented the federated search API.
- **Consumer B** is from the VET sector and is searching via a public internet search portal (such as EdNA) that has implemented the federated search API.
- **Consumer C** is from the VET sector and is searching from within a VET organisation (via an intranet search portal) that has implemented the federated search API.

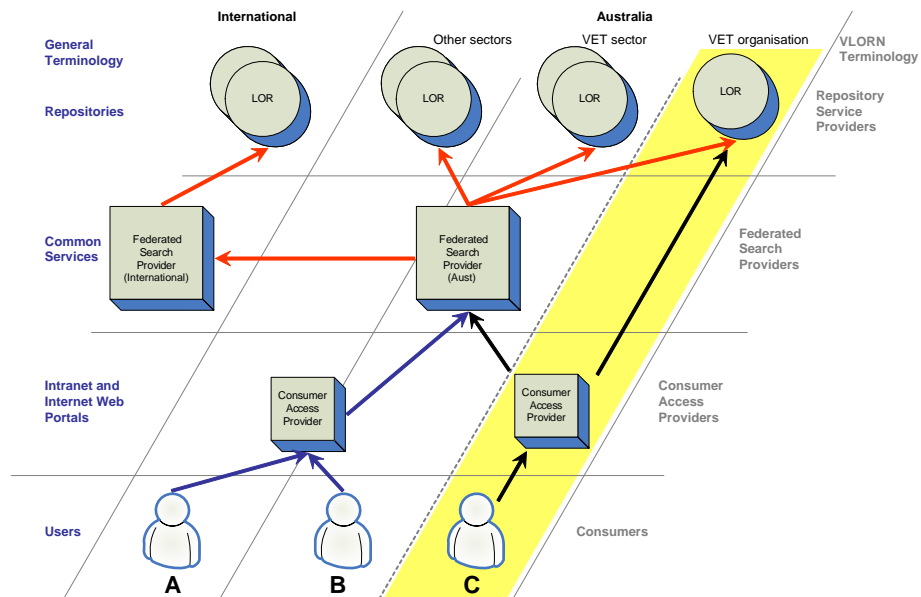


Figure 2: The VLORN model in an international context – showing searches initiated by consumers from within different educational sectors in Australia.

In each scenario, using the VLORN model:

- the intranet and internet web portal search facilities are CAPs which have implemented the Search API
- the CAP sends a search request to the FSP which distributes the search request to a number of repositories in Australia and possibly other international federated search engines
- responses are returned to the FSP where they are combined and returned to the CAP for display to the consumer
- the CAP displays the search results in a way that is consistent with their own interface design and business needs.

Security authentication

The notion of ‘trusted organisation’ in VLORN is supported by security authentication between the CAPs and the FSP and the CAP and the RSP.

An authorisation mechanism allows CAPs to identify themselves (at the organisational level) to RSPs. The RSP can use this identification to apply local security policies (authentication and authorisation) to each service request. The RSP can implement a range of differing options for each learning object in its repository. The approach adopted by VLORN provides the greatest flexibility for RSPs in

agreeing to expose learning objects for searching, while controlling the options for 'sample', 'view' and 'download'.

Example of using authentication to service a request

In the search scenarios shown in Figure 3

- Consumers A and B are searching from an internet search portal, meaning that the consumer is essentially unknown to the RSP. The RSP may choose to limit access to their learning objects, based on their own business policies and allow the consumer to –say – discover and sample a learning object but not to view or download it.
- Consumer C, searching from an intranet based search engine, will be identified at an organisation level and the RSP may apply different access rules to the service request compared to Consumers A and B. The RSP may have a bilateral arrangement with the organisation from where the search originated and provide access to the consumer to search, sample, view and download learning objects (as per Access Level 1 in Table 1).

Function	Access Level				
	1	2	3	4	5
Search	Yes	Yes	Yes	Yes	No
Sample	Yes	Yes	Yes	No	No
View	Yes	Yes	No	No	No
Download	Yes	No	No	No	No

Table 1: Example of different options for access that RSPs may implement.

Further transactions

If a consumer chooses further transactions with the RSP, the FSP does not manage or participate in those transactions.

Further transactions are conducted between the consumer and the RSP and this relationship is the responsibility of the RSP to define and implement. No restrictions are placed on the business relationship between the consumer and the RSP.

Figure 3 illustrates the extent of relations in this transaction.

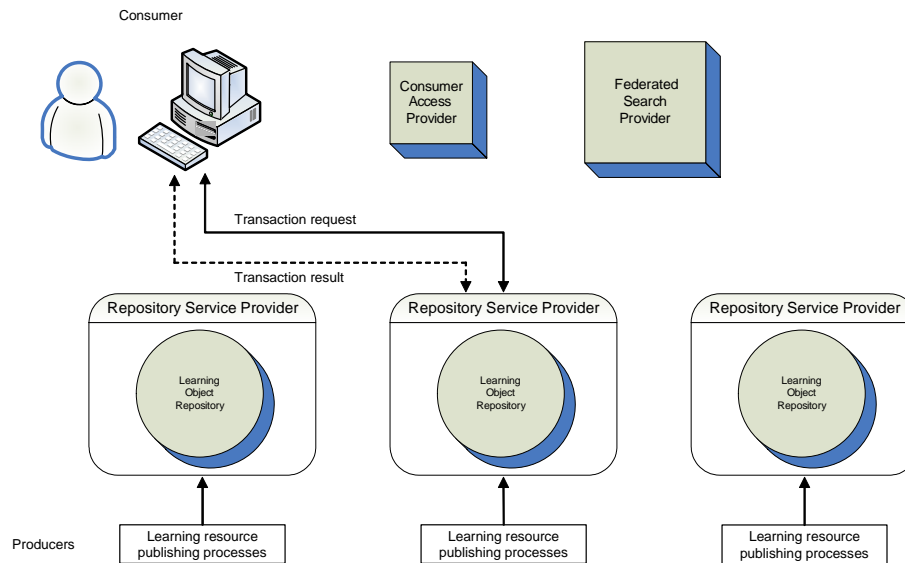


Figure 3: Example of different options for access that RSPs may implement.

The interoperability model

The interoperability model comprises a network of 'trusted organisations' that cooperate via agreed standards to enable the discovery and use of learning objects.

The interoperability model is based on four guiding principles:

- **Open standards**, based on national and international standards, eschewing closed networks and proprietary standards that are not in the spirit of the open standards approach promoted by the IMS.
- **Common services infrastructure** to aid discovery, viewing and delivery of teaching and learning resources.
- **Distributed and democratic modelling** to build on existing organisation technologies and collaborative frameworks
- **Long term requirements specification** for future services associated with learning object publishing.

In the network, interoperability is developed at three levels:

1. business policy – agreement to a broad set of business policies
2. technical standards – interoperability of hardware, software and information systems
3. implementation – alignment of practical considerations when implementing the technical standards.

Interoperability is provided by service providers and consumed by service consumers as shown in Figure 4:

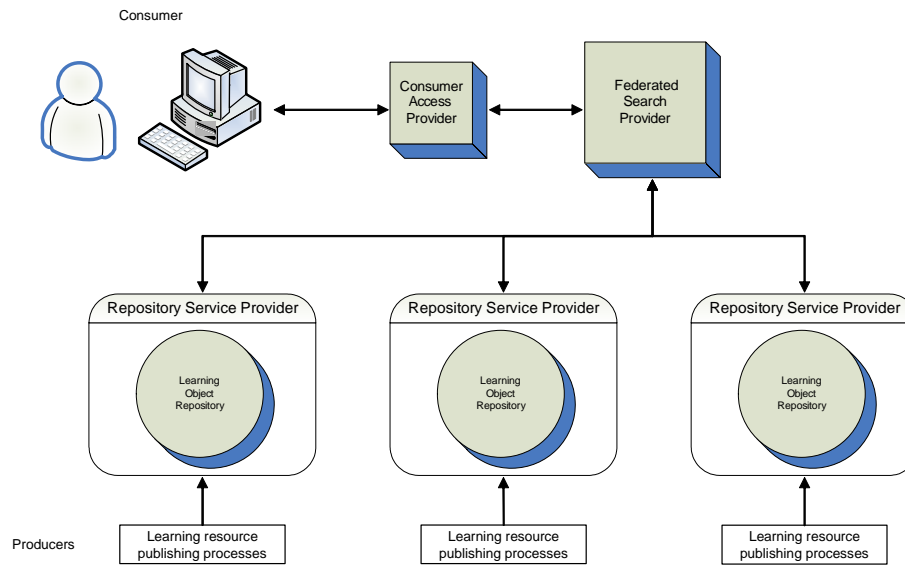


Figure 4: diagrammatic representation of the interoperability model.

Figure 4 illustrates:

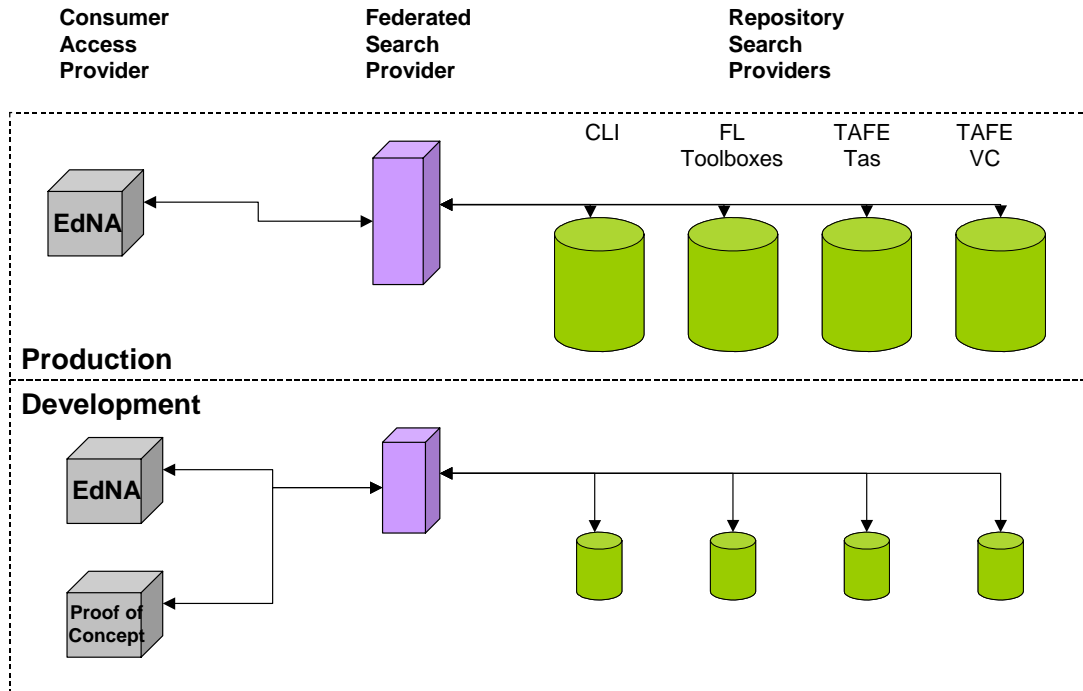
- Consumers initiating a search via a consumer access provider (CAP) that sends a search request.
- Federated search provider, (FSP) which receives the request and enables a single learning object discovery experience by distributing a learning object search request to multiple repositories and presenting the combined results to the consumer.
- Repository service providers, (RSPs) which enable consumers to discover, sample, view and download learning objects, stored in resource repositories, via agreed interoperability protocols.
- Producers, which manage processes for publishing learning resources and storing them in an LOR.

The repositories contain learning resources that are described by metadata and comprise a properly formed IMS content package.

VLORN technical environment

Development and production environments

VLORN provides development and production environments for use by CAPs, RSPs and the FSP.



The development environment can be used to test existing and new functionality.

The production environment supports the most current approved technical specification.

RSP implementation

Technical standards

See the separate document *VLORN Interoperability Specification* available at <http://www.flexiblelearning.net.au/vlorn/>)

Repository core functionality

The major reference that informs the repository core functionality is the IMS Distributed Repository Interoperability (IMS DRI) framework. Participating repositories will support the following areas of core functionality:

- Search/Expose
- Request/Deliver
- Alert/Expose.

Further information about this functionality is available in:

- The *VET Learning Object Repository Network Business and Functional Requirements* (available at <http://www.flexiblelearning.net.au/vlorn/>)
- The VET Learning Object Repository 2003 project final report (available at <http://flexiblelearning.net.au/projects/learningobject.htm>). See in particular the VLOR Final Project Report, available at http://flexiblelearning.net.au/projects/resources/VLOR_final_report.pdf
- The IMS Digital Repository Specification available from http://www.imsglobal.org/digitalrepositories/driv1p0/imsdri_infov1p0.html and other specification information is available at <http://www.imsglobal.org/specifications.cfm>

Learning object requirements

Participating repositories must contain learning objects configured to meet the following criteria:

- Designed to be “discoverable, interoperable, context-able, editable and re-usable” as described in the VET Learning Object Repository 2003 final report, p.6-7, available from http://flexiblelearning.net.au/projects/resources/VLOR_final_report.pdf
- Conforming to IMS content packaging compliance (see <http://www.imsglobal.org/content/packaging/index.cfm>)
- Comprising a self contained piece of learning and ready for publishing
- Corresponding with one of AShareNet licences – in particular U (unrestricted) and FfE (Free for Education). See <http://www.aesharenet.com.au/coreBusiness/> for more information.

Search and discovery criteria

RSP search functionality is defined by the APIs in the *VLORN Interoperability Specification*.

Search capacity of the network is built upon the implementation of the VET Metadata Application Profile described in the next section. RSPs must implement a technical solution to make the information in the profile searchable. For example, RSPs may chose to reflect the metadata in a searchable database structure.

Generating a VET Metadata Application Profile

All learning objects must include the VET Metadata Application Profile in the IMS package.

Refer to the Australian Flexible Learning Framework website, under the VET Interoperability Framework section for the most current information

<http://www.flexiblelearning.net.au/interop/topics/vocab.htm>

The Vet Metadata Application Profile:

- Is based on IEEE Standard for Learning Metadata (IEEE 1484.12.1, LOM v1.0 (where all elements are optional)
- Is compliant with SCORM (in terms of SCORM mandatory elements)

-
- Consists of 28 elements but only 21 contain information, and several have default values assigned to them, the rest are aggregate elements

Guidelines for implementing VETADATA

Refer to Appendix A.

Security requirements

The nature of this project is that initially the business model will be a federation of trusted organisations that cooperate in a reasonably closed environment.

The initial security mechanism supports low security authentication between systems at the organisational level. Proponents need to be aware of the low security environment that will initially exist in this federation.

Testing requirements

Repository and interoperability testing will be the responsibility of each RSP as follows:

- testing learning objects with the IMS compliancy tests
- testing of search and retrieval facilities with the federated search engine.

Allowing for CAP display of results

RSPs are advised that CAPs can choose how results are displayed. Irrespective of how many links to content forms (link, view, preview, download) may be provided in the RSP response a CAP can display the results in any way they choose.

RSPs are advised to develop a strategy to have results displayed how the RSP chooses. One such strategy is to provide a link to a LO home page that provides subsequent links to preview and download and so on.

Another strategy is to negotiate with CAPs and deliver specific results to specific CAPs based on a service level agreement. CAPs can be identified by their unique user key which is passed via the FSP to the RSP.

CAP request for FSP Search

Technical standards

See the separate document *VLORN Interoperability Specification* available at <http://www.flexiblelearning.net.au/vlorn/>

Overview of the search process

1. The CAP constructs and sends a HTTP GET request the FSP.
2. The FSP distributes the query to all repository service provider (RSP) Each RSP returns in XML format a set of metadata associated with each LO that meets the query request.
3. The FSP combines all search results and returns the federated results back to the CAP in XML format.
4. The CAP displays the results to the end user via an HTML page.
5. The user is able to browse the results for each LO:
 - title, description, owner
 - rights
 - if permitted, separate URLs for preview, view and/or download.
6. If Download is available the user can retrieve the IMS Packaged LO to be unpacked and stored in the local LMS.

Send a search request to the FSP

The FSP Search API is called via a HTTP URI GET request with parameters.

Once you have your CAP user code you can start testing and send a request.

GET request syntax

```
http://host:port/fsp/xml/search?param_1=value_1
  param_2=value_2
{ & param_2=value_2.1 &...& param_2=value_2.n }
...
param_n=value_n
```

FSP API address

<http://search.lor.edna.edu.au/dsm/xml/search?>

Search parameters

Parameters are defined in the VLORN Interoperability specification. The following example request to the FSP is described below.

```
http://search.lor.edna.edu.au/dsm/xml/search?q=frontline+management&mr=50&kc=all&user=12345678
```

Parameter	Description
q=frontline+management	Query string is the words frontline and management
mr=50	Maximum records to be returned is 50
kc=all	Keyword constraint is "All words"
user=12345678	user key for requesting CAP

Display results from the FSP

The FSP sends the search results back to the requesting CAP in XML format.

The following is a sample of results that need to be interpreted and rendered on the users screen as HTML.

```
<?xml version='1.0' encoding='UTF-8'?'>
<searchresults>
<summary>
  <token>5988901638099897208</token>
  <count>10</count>
  <found>2</found>
</summary>
<sources>
  <source id='CLI'>
    <title>CLI</title>
    <link>http://www.det.nsw.edu.au</link>

    <image>http://www.det.nsw.edu.au/images/logo.gif<
  /image>
```

```

</source>
<source id='toolbox'>
  <title>TOOLBOX</title>

  <link>http://toolbox.flexiblelearning.net.au/</link>

  <image>http://toolbox.flexiblelearning.net.au/images/logo.gif</image>
</source>
<source id='edna'>
  <title>EdNA</title>
  <link>http://www.edna.edu.au/</link>

  <image>http://www.edna.edu.au/images/logo.gif</image>
</source>
</sources>
<item source='CLI'>
  <title>Develop trust and confidence</title>
  <link>http://www.det.nsw.edu.au/info/12345.html</link>
  <relevance>0.98</relevance>
  <description>This Learning pack contains information,
resources and activities to help you: identify and
assess interpersonal styles; deal with people openly
and fairly; manage poor work performance use coaching
and mentoring skills to provide support to colleagues;
keep records.</description>
  <identifier>CLI:12345</identifier>
  <rights>Free for Use</rights>
  <preview> http://www.det.nsw.edu.au/preview/12345.html
</preview>
  <view> http://www.det.nsw.edu.au/view/12345.html
</view>
  <download>http://www.det.nsw.edu.au/download/12345.html
</download>
  <metadatascheme>VETADATA</metadatascheme>
  <contentpackage>ims</contentpackage>
</item>
<item source='toolbox'>
  <title>Frontline management</title>
  <link>http://toolbox.flexiblelearning.net.au/info/56789
.html</link>
  <relevance>0.90</relevance>
  <description>Surviving on the frontline while the
fatcat bosses eat their swill.</description>
  <identifier>toolbox:56789</identifier>
  <rights>Free for Use</rights>
  <preview>http://toolbox.flexiblelearning.net.au/preview
/56789.html </preview>
  <metadatascheme>VETADATA</metadatascheme>
  <contentpackage>ims</contentpackage>
</item>
</searchresults>

```

The search results sample indicates that three resources were found (one resource each from Flexible Learning Toolbox and DET NSW-CLI).

The results need to be rendered on screen to display the Title, Description, and links to the various forms of the content.

- link (title) – link to a page that describes the LO
- preview – see an HTML preview of the LO
- view – see a full view of the LO as a set of HTML pages
- download – the user is redirected to a zipped IMS Package Interchange Format, that is, a .zip file).

Sample CAP site

Education Network Australia (EdNA) has implemented the CAP specification. It can be used and viewed at the Advanced VET Search page.

<http://www.edna.edu.au/edna/search?SearchMode=Advancedvetmode>

Intellectual property and copyright

Licensing

There is no limitation on the type of licensing RSPs apply to learning objects made available through VLORN.

Examples of licensing

AEShareNet-S	Shared use among Members	AEShareNet members http://www.aesharenet.com.au/coreBusiness/#s
AEShareNet-U	Unrestricted use.	AEShareNet members ¹ http://www.aesharenet.com.au/coreBusiness/#u
AEShareNet-FfE	Free for Educational purposes. Very limited modifications allowed. Other rights reserved.	AEShareNet non-members ² http://www.aesharenet.com.au/coreBusiness/#ffe

1. Permission is granted from AEShareNet to enable VLORN RSPs to use the U licence without the requirement to list the resource in the AEShareNet catalogue.
2. RSPs must apply to AEShareNet to use the FfE license.

Digital Rights Management

The VLORN implementation does not support Digital Rights Management (DRM)

The business and interoperability models do restrict the implementation of DRM by RSPs.

Appendix A: VLORN Metadata guidelines

These guidelines should be read in conjunction with the draft VET metadata application profile (Vetadata) available from <http://flexiblelearning.net.au/interop/topics/vocab.htm>

Table 2, below of Vetadata elements is provided with notations relevant to VLORN. Mandatory, desirable and optional elements are noted along with instructions for the content of the elements for this project. Asterix (*) indicates the elements required for this iteration of VLOR Search.

The mandatory elements for SCORM SCO compliance are indicated. Repository owners may implement other elements from the full Vetadata v0.2 and LOM v1.0 set if desired.

Where a controlled vocabulary and/or format is indicated, the description must be confined to the format and/or vocabulary prescribed (available in the full VETADATA or full LOM documents).

Table 2: Guidelines for implementing VETADATA

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
1.0 <general>			
1.1 <identifier>	A globally unique label that identifies this resource. This is a container element in LOMv1.0. Leave this element empty		
1.1.1* <catalog>	The name or designator of the identification scheme for this entry. This will be the prefix identifier that is unique to each repository eg: CLI, TAFETAS, TAFEVC. Repository owners are encouraged to register with OAI (Open Archives Initiative).	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
1.1.2* <entry>	Each organization to use a unique key which combines with the prefix in <catalog> to ensure a globally unique identifier. Eg: database identifier number.	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
1.2 * <title>	Name given to this learning object.	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs)
1.3 <language>	The primary human language used within the learning object. Default is en-AU	Controlled Vocabulary LanguageID= Langcode as defined by ISO 639-2:1988	Desirable VLOR Optional in SCORM

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
1.4 * <description>	A textual description of the content of the object being described.	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
1.5 * <keywords>	Keywords or phrases describing the object. Do not use this element for characteristics that can be described by other elements. Do not use comma delimited terms, but follow the format shown below this table.	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
1.8 <aggregation level>	<ul style="list-style-type: none"> 1 the smallest level of aggregation, eg. raw media data or fragments 2 a collection of level 1 learning objects, eg. an element, a lesson or a topic 3 a collection of level 2 learning objects eg. a unit of competency 4 the largest level of granularity, eg. a course leading to a certificate, a Toolbox 	Controlled Vocabulary LOM 1.8	Mandatory Select code (from 1,2,3,4) - different for each object. Optional in SCORM
2.0 <lifecycle>			
2.1 <version>	Version nomenclature as used by originating repository. See Vetadata for recommended practice.	Freetext	Mandatory Mandatory in SCORM for Content Aggregations and SCOs only.
2.2 <status>	The completion status or condition of the resource. (draft, final, revised, unavailable)	Controlled Vocabulary LOM 2.2	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
2.3 <contribute>			

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
2.3.1 <role>	Kind of contribution. This element can be repeated to cover multiple roles. Default: Content Provider	Controlled	Mandatory
2.3.2 <entity>	The identification of the person/organization contributing to this resource whose role is identified in 3.2.1. Default: Name of the Learning Object's originating organization.	Controlled Format V-Card Format	Mandatory Optional SCORM
2.3.3 <date>	Date of the contribution identified in 2.3.1 yyyy-mm-dd Default: Date resource originally created or published.	Controlled ISO format	Mandatory Optional in SCORM
3.0 <metametadata>			
3.3 <metadatascheme>	LOM v1.0 VETADATA v0.2 Follow the format for repeated elements as shown for keywords below this table.	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
4.0 <technical>			
4.1 <format>	At least one MIME type (eg text/html). The officially registered MIME types are available at http://www.iana.org/assignments/media-types/ More recent types may be chosen. Follow the format for repeated elements as shown for keywords below this table.	Controlled Vocabulary MIME values	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
4.3* <location>	URL of a home page in the repository for each object, giving a description from the metadata and links to various versions. (Sample, view etc)	Freetext	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
5.0 <educational>			
5.2 <learningresourcetype>	Specific type of learning object. Use the most dominant kind for description. Use LOM 5.2 Vocabulary values in conjunction with Vetadata Educational Use values as repeated elements. See Vetadata for more information. Follow the format for repeated elements as shown for keywords below this table.	Controlled Vocabulary LOM 5.2 + Vetadata Ed. Use	Desirable VLOR. Highly Recommended Vetadata. Optional in SCORM
5.6 <context>	The principal environment within which the learning and use of this resource is intended to take place. (school, higher education, training, other) Default = Training	Controlled Vocabulary LOM 5.6	Mandatory Optional in SCORM
6.0 <rights>			
6.1 <cost>	Whether use of this resource requires payment (yes/no)	Controlled Vocabulary LOM 6.1	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content Aggregations and SCOs.
6.2 <copyrightandotherrestrictions>	Whether copyright or other restrictions apply.	Controlled Vocabulary LOM 6.2	Mandatory Mandatory in SCORM for assets (and SCAs) as well as for Content

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
		(Yes or No)	Aggregations and SCOs.
6.3 <description>	Organisation's Copyright statement – can be a URL to organizations copyright/disclaimer page.	Freetext	Mandatory Optional in SCORM
9.0 <classification>			
9.1 <purpose>	1. Discipline 2. Competency 3. Education Level This element is repeated for each value selected in 9.1	Controlled Vocabulary LOM 9.1 These three values have been chosen by Vetadata from the LOM 9.1 vocab.	Mandatory Mandatory in SCORM for Content Aggregations and SCOs only
9.2 <taxonpath>			
9.2.1 <source>	1. MyFuture Industry 2nd level http://myfuture.edu.au/services/default.asp?FunctionID=5106 Note: where MyFuture not applicable use VOCED	Freetext – name and URL of vocabulary used.	Mandatory but only to be used where value chosen in 9.1 requires controlled vocabulary values. Optional in SCORM
	2. NTIS http://www.ntis.gov.au		
	3. AQF http://aqf.edu.au/thirteen.htm		
9.2.2 <taxon>			
9.2.2.1 <id>	Optional. Only to be used where taxonomy has an identifying code eg: NTIS Code	Controlled Vocabulary as per 9.2.1	Mandatory but only to be used where value chosen in 9.1 requires controlled vocabulary values. Optional in SCORM

LOM Schema	VLOR Entry guidelines	Vocabulary	Comment
9.2.2.2 <entry>	The textual entry according to Taxonomy selected	Controlled Vocabulary as per 9.2.1	Mandatory but only to be used where value chosen in 9.1 requires controlled vocabulary values. Optional in SCORM
9.3 <description>	A textual description of the resource relative to the purpose selected in 9.1.	Freetext	Mandatory Mandatory in SCORM for Content Aggregations and SCOs only
9.4 <keyword>	Keyword description of the resource relative to the purpose selected in 9.1.	Freetext	Mandatory Mandatory in SCORM for Content Aggregations and SCOs only

Example of format for keywords in 1.5 and 9.4

```
<KEYWORDS>  
<LANGSTRING lang="en">operant conditioning</LANGSTRING>  
<LANGSTRING lang="en">psychology</LANGSTRING>  
<LANGSTRING lang="en">simulation</LANGSTRING>  
<LANGSTRING lang="en">program</LANGSTRING>  
<LANGSTRING lang="en">shaping</LANGSTRING>  
<LANGSTRING lang="en">mouse</LANGSTRING>  
</KEYWORDS>
```

AQF Levels

Check website for updates <http://aqf.edu.au/thirteen.htm>

Note: This terminology must be used. AQF level number is not acceptable.

VET Sector	Higher Education Sector
Certificate I	Diploma
Certificate II	Associate Degree, Advanced Diploma
Certificate III	Bachelor Degree
Certificate IV	Graduate Certificate
Diploma	Graduate Diploma
Advanced Diploma	Masters Degree
	Doctors Degree

My Future Industry Codes – 2nd Level

Check website for updates

<http://myfuture.edu.au/services/default.asp?FunctionID=5106>

Accounting Services	Agriculture	Ambulance Services	Animal Care and Management	Architectural and Design Services
Archives	Automotive Industry	Building and Construction	Business, Labour and Professional Organisations	Civil Aviation Transport
Communications Services	Community Care and Welfare	Community Recreation	Defence Forces	Drilling

Education - Other	Education and Training	Electricity Supply	Electrotechnology	Emergency Services
Engineering Services	Environment Management	Finance System Industry	Financial Enterprises, Banks and Insurance	Financial Markets
Fire and Rescue Services	Fitness Industry	Food Manufacturing	Foreign Government Representation	Forensic Science
Forest and Forest Products	Furnishing	Gambling	Gas Supply	Government Administration
Horticulture	Hospitality	Information Technology and Telecommunications	Information, Communication, Computer Technology	Justice, Legal and Corrective
Leisure Activity	Library Services	Logistics	Manufactured Mineral Products	Maritime Industry
Marketing Services	Medical, Dental and Health Services	Metal Products Manufacturing	Mining	Movie, Video, Radio and Television Services
Museums	Outdoor Recreation	Parks and Gardens	Payments System	Performing Arts
Pest Management	Petroleum, Chemical and Plastics	Police Forces	Political Parties and Community Interest Groups	Post Secondary Education
Postal and Courier	Precision and Electrical Products Manufacturing	Preschool Education	Print, Packaging and Visual Communication	Project Management Industry
Property	Racing and Equine Industry	Rail Transport	Religious Organisations	Retail Industry
Road Transport	School Education	Scientific Research	Seafood	Security and Investigative Services
Service Industries	Space Industry	Spatial Information	Sport	Technical Services
Textile, Clothing and Footwear	Tourism	Transport Industry Manufacturing and Engineering	Waste Management and Recycling	Water Supply, Sewerage and Drainage Services
Wholesale Trade				

Example of encoded Metadata Record

This is for information only.

This is an example of VETADATA metadata encoded in XML (IMS Learning Resource metadata binding 1.2.1 transformed to IEEE LOM v1.0)

http://www.imsproject.org/metadata/mdv1p3pd/xslt/samples-LOM/test_schema_LOM.xml

The example refers to a Horticulture Toolbox (Toolbox code 304) unit called Prune shrubs and small trees.

Notes:

1. Data elements have been bolded to distinguish them from coding.
2. Order elements are entered is not important

```
<general>
  <identifier>
    <catalog>Australian Flexible Learning
Toolboxes</catalog>
    <entry>304oA1</entry>
  </identifier>
  <title>
    <string language="en-AU">Prune shrubs and small
trees</string></title>
  <language>en-AU</language>
  <description>
    <string language="en-AU">This unit of competence
contains activities that focus on why plants need
to be pruned and the identification of plants
that require pruning. It also examines the
different pruning techniques, the situations in
which they are used and the results of these
techniques as well as looking at how to use and
maintain different pruning and clean up tools.
The final activity focuses on cleaning up the
worksite, the type of pruned material suitable
for recycling and the use of mulchers and
shredders.</string>
  </description>
  <keyword>
    <string language="en-AU">horticulture</string>
  </keyword>
  <keyword>
    <string language="en-AU">trees</string>
  </keyword>
  <keyword>
    <string language="en-AU">shrubs</string>
  </keyword>
  <keyword>
    <string language="en-AU">pruning</string>
  </keyword>
```

```

        <aggregationlevel>3</aggregationlevel>
</general>
<lifeCycle>
  <version>
    <string language="en-AU">v1.0</string>
  </version>
  <status>
    <source>LOMv1.0</source>
    <value>final</value>
  </status>
<contribute>
  <role>
    <source>LOMv1.0</source>
    <value>content provider</value>
  <entity>
    <vcard>
      begin:vcard
      orgname: WestOne
      end:vCard
    </vcard>
  </entity>
  <date>
    <datetime>2004</datetime>
  </date>
</contribute>
</lifeCycle>
<metametadata>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>VETADATAv0.1</metadataSchema>
</metametadata>
<technical>
  <format>text/html</format>
  <format>image/jpeg</format>
  <format>image/gif</format>
  <format>application/x-shockwave-flash</format>
  <location>http://www.westone.wa.gov.au/toolboxes/horticulture/index2.html</location>
</technical>
<educational>
  <learningResourceType>
    <source>LOMv1.0</source>
    <value>narrative text</value>
  </learningResourceType>
  <learningResourceType>
    <source>VETADATAv0.1 Educational Use
http://flexiblelearning.net.au/interop/vetadata/index.htm</source>
    <value>learner resource</value>
  </learningResourceType>
  <context>
    <source>LOMv1.0</source>
    <value>training</value>
  </context>
</educational>
<rights>
  <cost>
    <source>LOMv1.0</source>
    <value>no</value>

```

```

</cost>
<copyrightAndOtherRestrictions>
  <source>LOMv1.0</source>
  <value>no</value>
</copyrightAndOtherRestrictions>
<description>
  <string language="en-AU">Copyright is owned by
  the Australian National Training Authority
  (ANTA). This material may be freely used by
  Australian training organisations for educational
  purposes. On selling of the material in any form
  requires agreement from ANTA</string>
</description>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>competency</value>
  </purpose>
  <taxonpath>
    <source>ntis http://www.ntis.gov.au</source>
    <taxon>
      <id>RUHHRT208a</id>
      <entry>
        <string language="en-AU">prune shrubs
        and small trees</string>
      </entry>
    </taxon>
  </taxonpath>
  <description>
    <string language="en-AU">RUHHRT 208A prune shrubs
    and small trees </string>
  </description>
  <keyword>
    <string language="en-AU">RUHHRT 208A</string>
  </keyword>
  <keyword>
    <string language="en-AU">prune shrubs</string>
  </keyword>
  <keyword>
    <string language="en-AU">prune small
    trees</string>
  </keyword>
</classification>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>discipline</value>
  </purpose>
  <taxonpath>
    <source>myfuture Industry Classification
    http://www.myfuture.edu.au</source>
    <taxon>
      <id></id>
      <entry>
        <string language="en-
        AU">horticulture</string>
      </entry>
    </taxon>
  </taxonpath>

```

```

        </taxon>
    </taxonpath>
    <description>
        <string language="en-
            AU">horticulture</string>
    </description>
    <keyword>
        <string language="en-AU">horticulture</string>
    </keyword>
    <keyword>
        <string language="en-AU"> prune shrubs </string>
    </keyword>
    <keyword>
        <string language="en-AU"> prune small trees
        </string>
    </keyword>
</classification>
<classification>
    <purpose>
        <source>LOMv1.0</source>
        <value>educational level</value>
    </purpose>
    <taxonpath>
        <source>AQF http://www.aqf.edu.au</source>
        <taxon>
            <id></id>
            <entry>
                <string language="en-AU"> Certificate
                    II</string>
            </entry>
        </taxon>
    </taxonpath>
    <description>
        <string language="en-AU"> Certificate II
        </string>
    </description>
    <keyword>
        <string language="en-AU"> Certificate II</string>
    </keyword>
</classification>

```