

VET Learning Object Repository Network

Interoperability specification

Version 1.2

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Document control

Version	Date	Who	Description
Draft 0.1	20 April 2004	Geoff Hendrick	Initial draft
Draft 0.11	27 April 2004	Geoff Hendrick	Minor edits
Draft 0.12	27 May 2004	Geoff Hendrick	Add support for <download> and <preview> in FSP and RSP API
Version 1.0	30 June 2004	Geoff Hendrick	Removed RSP Metadata API and RSP LO Download API. Added support for <view> in FSP and RSP API.
Version 1.1	25 October 2004	Geoff Hendrick	Minor edits and corrections. Added support to the FSP Search API for a 'list all repositories' query.
Version 1.2	16 February 2005	Geoff Hendrick, David Drinkwater	See release notes below.

About this document

This document describes the interoperability specifications 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 Implementation Guidelines
<http://www.flexiblelearning.net.au/vlorn/>
- VET Interoperability Framework website
<http://www.flexiblelearning.net.au/interop/>
- VET Metadata Application Profile (VETADATA)
<http://www.flexiblelearning.net.au/interop/topics/vocab.htm>

Version 1.2 release notes

The substantive differences between versions 1.1 and 1.2 are as follows:

1. Explicit reference to IMS Meta-Data specification 1.2.1 in Table 1. Standards reference table, item 4.
2. Explicit reference to IMS Content Packaging specification 1.1.2 in Table 1. Standards reference table, item 5.
3. RSP search request parameters, Page Size (ps), Search Token (token) and Start Result Number (start) were removed from Table 4 - RSP API search request parameters. It was agreed by VLORN members on October 29 that the FSP does not require this information from the RSP for 2004.
4. The user parameter in Table 4 - RSP API search request parameters, is now mandatory.
5. A schema has been added for RSP response validation (Appendix A). The schema ensures validation and correct sequencing of parameters.
6. The unique identifier returned in RSP search result set must match the identifier field in the LO Vetadata.
7. Changed the order of elements in Table 5 - RSP Search Result Structure, to match vlorn_rsp_v1p2.xsd
8. Added optional elements "error" and "token" to Table 5 - RSP Search Result Structure, from vlorn_rsp_v1p2.xsd.

General notes

1. The RSP Response element Status, discussed by VLORN members on October 29 cannot be implemented in 2004 by the FSP.
2. The request for replacement of Preview with Sample in APIs discussed by VLORN members on October 29 cannot be implemented in 2004 by the FSP due to existing client use of the FSP API. The Implementation Guide will discuss the use of the word Sample and Preview as options for RSPs to implement in HTML delivery and as an option for consideration by CAPs when rendering FSP results.

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Overview

The business model for the VET Learning Object Repository Network (VLORN) is a federation of trusted organisations that cooperate via agreed standards to enable the discovery and use of Learning Objects (LOs). This interoperability is modelled as a set of services that are provided by Service Providers and consumed by Service Consumers.

The following service provider roles are defined:

- Repository Service Provider (RSP): a LOR that enables consumers to discover, preview and download LOs via agreed interoperability protocols.
- Federated Search Provider (FSP): a distributed search manager that enables a single LO discovery experience by distributing a LO search request out to multiple RSPs and presenting the combined results to the consumer.
- Consumer Access Provider (CAP): a search facility provided for consumers (such as a search engine on the internet or a search engine provided by a VET institution on an intranet) that has implemented the search API allowing the CAP to send a search to the FSP and receive the combined results provided by the FSP in return.

The VLORN Interoperability Specification supports the following scenario:

- A number of RSP's expose the information in their Learning Object Repositories (LORs) as a set of web services:
- Search: a simple keyword search that returns information about LOs in the repository
- Preview/Sample: a service that resolves to a URL of a HTML page that allows an end user to preview the LO
- View: a service that resolves to a URL of a HTML page that allows an end user to view the LO online.
- Download: a service that returns an IMS content-packaged (zip) LO for download
- News: an RSS feed of news that relates to the LOR

-
- A FSP acts as an intermediary service to simplify the process of searching across a set of LORs. The search returns information about LOs from the selected repository set.
 - A number of Web Sites (eg web portals, LMSs) use these federated services to deliver LO discovery, preview and download services to end users.

Standards

The VET Learning Object Repository Network (VLORN) interoperability model is based on agreed international standards and specifications where practical.

The initial specification of the model and interoperability specifications is based on a pragmatic assessment of current international standards versus the need for the initial implementation to be simple, easy and fast.

The priority in the development of this initial specification has been to go for a solution that meets the minimum required functionality with maximum simplicity and ease of implementation.

It is expected that the initial VLORN interoperability specification will be enhanced over time to support more functionality and more closely align with international specifications.

The methodology used to produce the interoperability specifications has been to look for solutions at each interoperability point according to the following priorities:

- Formal international standards or specifications
- Existing Australian specifications in common use
- Adaptations of the above
- Invent a new specification

The major reference that informs this specification document is the IMS Distributed Repository Interoperability (IMS DRI) framework. This document describes the implementation of the following IMS DRI Functions:

- Search/Expose. A search intermediary provides a search service across a number of LOR's. Each LOR provides an expose service to enable information about the LOs to be obtained.
- Request/Deliver. Each LOR provides a request/deliver service to enable LOs to be downloaded.
- Alert/Expose. Each LOR can alert users to changes in state of the LOR information content. A simple implementation based on a RSS news feed is proposed.

- Gather/Expose (future). A future implementation may specify the harvesting of LO metadata between repositories or via an intermediary. It is expected that this will be achieved via the OAI-PMH harvesting specification and an intermediary metadata repository (such as EdNA Online – see <http://www.edna.edu.au/edna/page384.html> for more information).

The analysis of candidate specifications and implementation rationale (in the case where this specification deviates from the IMS DRI) for the VLORN Interoperability specifications are described below:

Table 1 – Standards reference table

Interoperability Point	#	Candidate Specifications	Specification Adopted
Search	1	IMS DRI Xquery for IMS LOR's Z39.50, SRW, SRU for digital libraries. EdNA Distributed Search	Adaptation of the EdNA Distributed Search Manager XML Specification to provide a federated search intermediary service. Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation. Future implementations may offer alternate search methods such as Xquery and/or SRW.
LOR Search/Expose	2	IMS DRI Xquery for IMS LOR's Z39.50, SRW, SRU for digital libraries. EdNA Distributed Search	Adaptation of the EdNA XML Search Specification to provide a LOR search/expose service. Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation. Future implementations may offer alternate search methods such as Xquery and/or SRW.
LO Metadata Profile	3	IEEE LOM	VET Metadata Application Profile (VETADATA) 0.2. This new draft specification is based on IEEE LOM and is to be adopted by VLORN RSPs.
LO Metadata Encoding	4	IMS Meta-Data binding specification	IMS Meta-Databinding specification 1.2.1
LO Content Packaging	5	IMS Content Packaging specification	IMS Content Packaging specification. 1.1.2.

Interoperability Point	#	Candidate Specifications	Specification Adopted
LO Identifiers	6	DOI	<p>Leave to RSP as a local implementation. Must be globally unique and persistent across search and downloadable versions including Vetadata references.</p> <p>Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation.</p>
Transport Protocol	7	SOAP/WSDL	<p>Initial implementation is via a light-weight HTTP URI-based GET request mechanism with parameters that returns an XML structure.</p> <p>Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation.</p> <p>Allow for support of SOAP/WSDL transport as an optional alternative.</p>
XML Schemas	8	W3C Schemas	<p>The initial implementation specifies some XML structures in a descriptive form.</p> <p>Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation.</p> <p>The next version will more rigorously describe all XML structures viaW3C-compliant XML schemas and namespaces.</p>
LOR Alert/Expose	9	SMTP	<p>Implementation of a RSS News feed capability to alert end users to LOR changes. News feed formats supported: RSS 0.91; Vet Training Portal News Schema.</p> <p>Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation.</p>

Interoperability Point	#	Candidate Specifications	Specification Adopted
Security	10	SOAP Message Level Authentication	Initial implementation is a simple organisation-level user token carried as a HTTP GET request parameter with each request. This allows low-security coarse-grained authentication and authorisation at the inter-institution level. Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation.
Digital Rights Management	11	ODRL	Initial implementation is a simple text metadata description. Security mechanism allows coarse-grained DRM (access control over LO download) at the inter-institution level. Rationale: Timeframes for initial implementation; simplicity and ease of initial implementation

Security

The initial security mechanism supports very simple low security authentication between systems at the organisation level.

This initial implementation supports the concept of a simple user key that can be sent with each request to identify the requesting organisation. The method of creating and distributing these tokens between the organisations is not prescribed here.

Use Case

End User Searches for LOs across a number of LORs, Preview/Sample some Los and Downloads some Los.

The use case below attempts to describe in a simple manner how the proposed system will operate both from an end user's point of view and technically (in terms of the system interoperating via the agreed specifications).

Description

An end user finds, previews and downloads/retrieves LOs for the purpose of selection in a course.

Context

The user has access to (is logged into) an institution's internal LMS/Portal.

Trigger

The user wishes to find and use LOs for a course. The user wishes to access a wider range of LOs than are held within the institution's local LOR.

Flow

1. The user performs a distributed search from the local LMS/Portal for LOs based on some search query.
2. The local search function sends the query to the federated search provider (FSP) node.
3. The FSP distributes the query to all LOR Service Provider (RSP) nodes in the federation. Each RSP returns in XML format a set of metadata associated with each LO that meets the query request.
4. The FSP combines all search results and returns the federated results back to the LMS/Portal in XML format. The LMS Portal then displays the results to the end user via a HTML page.
5. The user is able to browse the results for each LO
 - Title, description, owner
 - Conditions of Use
 - URL for more information/preview
 - Download (if permitted)
6. The user can click on the URL to preview the LO.
7. If permitted the trainer can then retrieve the LO(s) into a bundle for use in the course. The LO will be downloaded as an IMS Manifest which will be unpacked and stored in the local LMS.

Required Functionality

The FSP supports a federated search API (FSP Search API) that allows a search to be distributed across a number of RSP's.

The RSP supports an API (RSP Search API) that allows a search into the LOR.

The RSP supports a locator (URL) that that is a HTML preview of a LO.

The RSP supports a locator (URL) that that is a full HTML view of a LO.

The RSP supports download of a LO as an IMS content package.

The RSP supports an RSS News feed that allows end users to subscribe to news information about the LOR.

A simple authorisation mechanism allows service consumers (systems) to identify themselves (at the organisational level) to service providers. The service providers can use this identification to apply local security policies (authentication and authorisation) to each service request. For example an RSP may decide that a requesting organisation may preview a LO but may not download.

Example

The user is a teacher who has access to WestOne's LMS and prepares online courses for students. In this imaginary scenario WestOne has an agreement with CLI for full access to all CLI's LOs. WestOne has no agreement with Toolbox.

The user has a desktop RSS News reader and is subscribed to a number of VET LOR News feeds such as <http://www.det.nsw.edu.au/rsp/news>. The user gets a news item that describes some new LOs that have recently been added to the LOR.

The user wishes to find all education and training learning resources (including LOs) to do with management frontline.

The user logs onto his/her local LMS. The LMS presents two search forms:

- Search locally
- Federated Search

The user selects federated search and selects to search across all VET repositories. The LMS is configured to interpret this as a federated search request of the CLI and TOOLBOX LOR's and the EdNA metadata repository.

The LMS takes the search parameters and sends off a HTTP request to the FSP:

```
http://search.edna.edu.au/fsp/xml/search?
q=frontline+management&sr=CLI&sr=toolbox&sr=edna&mr=150&ps=10&kc=all&ss=wa
itall&user=xxxxxxxx
```

This is a request to the FSP to search for resources that match all of the words (frontline and management), across CLI and TOOLBOX and EdNA with a maximum result count of 150 and a result page size of 10 items. The search will only return when results from all repositories have been collected. The institution owning the LMS has previously registered with the FSP and is thus a registered institution with user-id xxxxxxxx.

The FSP in turn takes this request information and sends this request off in parallel to the RSPs' (CLI and TOOLBOX and EdNA). The request to CLI looks like:

```
http://www.det.nsw.edu.au/rsp/search?
q=frontline+management&mr=150&ps=10&kc=all&user=xxxxxxxx
```

This is a request to the CLI RSP to search for resources that match all of the words (frontline and management) with a maximum result count of 150 and a result page size of 10 items. The FSP sends this request on behalf of WestOne and so sends user-id xxxxxxxx.

The CLI RSP identifies from the user-id token that the requestor is WestOne, performs any local authentication and access control mechanisms and returns an XML result set to the FSP that looks like:

```
<?xml version='1.0' encoding='UTF-8'?>
<searchresults>
<summary>
  <count>10</count>
  <found>1</found>
</summary>
<item>
  <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.zip
</download>
  <metadatascheme>VETADATA</metadatascheme>
  <contentpackage>ims</contentpackage>
</item>
...
```

```
<item>
...
</item>
</searchresults>
```

The returned resource (above) is identified as a LO because of the `<metadatascheme>VETADATA</metadatascheme>` element. In this case CLI has decided that WestOne is allowed full access to this LO (preview parts of the LO as HTML, view the full LO as HTML and download the LO as an IMS manifest zip file) and so provides URL's in `<download>`, `<view>` and `<preview>`.

The TOOLBOX request and response is similar. In this case TOOLBOX has decided that WestOne is allowed to preview but not allowed to view or download this LO and so sets `<preview>` but omits `<download>` and `<view>`.

The EdNA request and response is similar. But in this case the returned resources are not LOs and so there are no `<download>`, `<view>`, `<preview>`, `<metadatascheme =VETADATA>` or `<contentpackage>` elements.

The FSP then combines the result sets from all repositories and returns to the LMS/Portal something like:

```
<?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/lo
go.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>
<item source='edna'>
<title>Frontline management pages </title>
<link>http://www.frontline.com</link>
<relevance>0.88</relevance>
<identifier>edna:1234567</identifier>
<description>This is the official Frontline management
page.</description>
<metadatascheme>edna</metadatascheme>
<metadatascheme>dc</metadatascheme>
</item>
</searchresults>

```

This XML response shows that 3 resources were found, 2 of which were LOs. The returned resources identified as LOs are those that have a `< metadatascheme > VETADATA </metadatascheme >` element. The LO from CLI is available to preview, view and download. The LO from Toolbox is available to preview only.

The LMS/Portal converts this XML into a HTML results page and presents to the end user. The following fields are of interest:

-
- Link: is the URL of a HTML page to see more information for that resource. In the case of a LO this page might include a preview capability.
 - Metadatascheme: if the scheme=VETADATA this can be used to flag the resource to the user as a LO (eg via a suitable icon).
 - Preview/Sample: If this field is present it contains a URL that resolves to a HTML web page to preview that LO.
 - View: If this field is present it contains a URL that resolves to a HTML web page to view the entire LO.
 - Download: If this field is present it contains a URL that resolves to a downloadable manifest of that LO (eg an IMS manifest zip file).
 - Identifier: is a unique identifier for that resource. This can be used to build a subsequent request to get the full metadata for that resource. In the case of a LO this would be VETADATA metadata.
 - Rights: describes the rights associated with that resource.

Using the supplied XML result set the LMS/Portal displays 4 hyperlinks next to the description of each LO:

- More Information
- Preview/Sample
- View
- Download

The user clicks on the hyperlink 'More Information'. This is just a hyperlink to the RSP's web interface. The user is redirected to the URL and sees a HTML page that provides information about the learning object.

The user clicks on the hyperlink 'Preview/Sample'. This is just a hyperlink to the RSP's web interface. The user is redirected to the URL and sees a HTML preview of that LO. The implementation and extent of the LO preview is a responsibility of the RSP.

The user clicks on the hyperlink 'View'. This is just a hyperlink to the RSP's web interface. The user is redirected to the URL that provides a full view of the LO as a set of HTML pages. The implementation and extent of the HTML view of the LO and any security access restrictions is a responsibility of the RSP.

The user clicks on the hyperlink 'Download'. This is just a hyperlink to the RSP's web interface. The user is redirected to a downloadable manifest for that learning object. The implementation of this download and any security access restrictions is a responsibility of

the RSP. The LO download is usually a zipped IMS Package Interchange Format (ie a.zip file).

Specifications

Specifications are provided for the following services:

- FSP Search API
- RSP Search API
- RSP News RSS Feed API

FSP Search API

FSP Search Request Parameters (mandatory marked with *):

Table 2 – FSP Search API

Parameter	Description
user *	User Key user=x where x is a 10 character key provided when a user registers to use the API This user=x parameter must be present within each unique request.
q	Query string. q=frontline+management Delimiter: [+] If q is missing, blank or null then no repositories are searched. A valid XML result set is still returned but with no <item> records.
sr	Source repositories sr=CLI <i>and/or</i> sr =toolbox Multiple instances of sr required when specifying more than 1 source. SPECIAL CASE: <i>sr=all</i> specifies all source repositories. TIP: <i>q=&sr=all</i> is a 'list all repositories' query which will return a list of all source repositories in the <sources> XML result set (see below).
cs	Case Sensitive cs=y <i>or</i> cs=n (DEFAULT)

Parameter	Description
th	<p>Thesaurus Type (default none)</p> <p>th=english <i>and/or</i> th=scot <i>and/or</i> th=scot2 <i>and/or</i> th=voced</p> <p>Multiple instances of th required when specifying more than 1 thesaurus</p>
mr	<p>Max Results to return (DEFAULT 100)</p> <p>mr=<i>n</i> where <i>n</i> is 50 to 200 inclusive</p>
ps	<p>Page Size</p> <p>ps=<i>n</i> where <i>n</i> is 10 to 100 inclusive (DEFAULT 10)</p> <p>Specifies number of results to return per request.</p> <p>TIP: use with <i>start</i> and <i>token</i> to enable paging through the entire result set.</p>
kc	<p>Keyword Constraint</p> <p>kc=all (DEFAULT) or kc=any or kc=phrase</p>
token	<p>Search Token</p> <p>Token to obtain further results from a previously initiated search.</p> <p>token=XXXXXXXXXXXX</p> <p>18 digit signed integer and this unique to a client's search attempt.</p> <p>TIP: This token is the only required identifier to obtain more/updates pages/repositories. The token is a key to a cached set of results that is invalidated 3 hours after the search was first commenced.</p>
rset	<p>Repository Filter</p> <p>rset=<source> where <source> is the required repository. This repository must be part of the list the original search was conducted for. Returns a result set for a particular repository.</p> <p>DEFAULT: if rset is not specified a consolidated result set is returned containing the best results across all repositories that were selected with the <i>sr</i> parameter.</p> <p>TIP: <i>rset</i> can be used with <i>token</i> to build a search results page that enables the user to see both a consolidated search results page and also to select to view results from any individual repository.</p>
start	<p>Start Result Number</p> <p>start=<i>n</i> (DEFAULT 1)</p> <p>where <i>n</i> is a number between 1 and max results of the chosen repository (see <i>rset</i>)</p>

Parameter	Description
ss	<p>Search Strategy</p> <p>ss=waitall</p> <p>Wait for all adapters to complete before returning to client.</p> <p><i>or</i></p> <p>ss=waitfast (DEFAULT)</p> <p>Wait for the first batch from the fastest adapter to arrive before returning to client.</p>
dupes	<p>Allow Duplicate Results</p> <p>dupes=true (DEFAULT) or</p> <p>dupes=false</p> <p>Allow duplicate results in the result set. By default, the FSP does not filter out duplicate results. This might arise when one or more adapters have the same result*.</p> <p>*Two results are considered the same when the URL/URI is an exact match.</p>

FSP transport protocol: HTTP GET

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

```
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 search result structure

The FSP search request returns a result set encoded as an XML document according to the following description.

Mandatory elements marked with * in the table below.

Table 3 – FSP Search Result Structure

Element	Description
searchresults *	Contains <summary>, <item>, <thesaurus>, <spellingsuggestion>
summary*	Contains <copyright>, <source>, <token>, <count>, <found>
copyright	Copyright Notice

Element	Description
source	FSP Name
token	Results token (18 digit number) to enable paging through the result set.
count *	number of items returned in this response
found *	Total number of results found that match this query
mode	Type of Search. Vocabulary: simple (simple keyword query search)
theoreticaltotal	Total number of results reported
total	Total number of results actually collected
timetaken	Time (in seconds) to perform the search
completed *	Search of all repositories is complete. True or false (see search strategy parameter)
qp	This element is repeated once to echo each of the submitted query parameters.
sources *	Contains a <source id=x> element for each repository that was queried. The id is the identifier for that repository corresponding to the <i>sr</i> parameter in the search request (see above).
source *	Contains <title>, <description>, <link>, <image> to identify a source repository. Image is the URL of a logo that can be used to brand a resource coming from that repository.
item	An <item source=x> element is repeated for each returned resource. The source is the identifier for that repository. Item contains <title>, <link>, <relevance>, <description>, <location>, <identifier>, <rights>, <metadatascheme>, <contentpackage>.
title *	Title of the item
link *	URL of a HTML page that describes the item.
relevance	Relevance encoded as a decimal number from 0.0 to 1.0
description *	Text description of the resource
preview	Optional preview/sample URL for LOs. Resolves to a URL that enables the user to preview the LO
view	Optional view URL for LOs. Resolves to a URL that enables the user to view the full LO
download	Optional download URL for LOs. Resolves to a downloadable manifest of (zip file) the LO in a format according to the content packaging method specified (see below). For contentpackage=ims the LO Download request resolves to a.zip file as per IMS package interchange format.

Element	Description
identifier	Unique identifier of the resource. Mandatory is the item is a LO.
rights	Text description of item's usage rights.
metadatascheme	Metadata scheme(s) available to describe the item. Vocabulary: (VETADATA, dc, edna, tlf). Mandatory is the item is a LO. It must have a VETADATA metadata scheme.
contentpackage	Content packaging method for LO downloads. Mandatory if the item is a LO. Vocabulary: ims. Ims=zipped IMS package interchange file.
metadata	Used to encode any other miscellaneous metadata element returned for that item by the source repository. Example: <metadata name='VETADATA.metametadata.language'>en</metadata>
categories	Contains a <category> element to describe each category to which this item belongs.
category	Contains <title>, <link> to describe a category. Title is the name of the category. Link is a URL that resolves to a HTML 'category browse' page on the source repository that shows items for that category.
thesaurus	This element set is only provided when one or more thesauri are selected as part of the search criteria. Contains <like>, <narrower>, <broader> elements. Each of these elements in turn contains zero or more <term> elements.
spellingsuggestion	A 'did you mean' spelling suggestion for the search query.

RSP search API

The RSP Search API is called via a lightweight HTTP URI request with parameters:

RSP search request parameters (mandatory parameters are marked with an asterix*):

Table 4 – RSP API search request parameters

Parameter	Description
user*	User Key user=x where x is a key provided to identify and track registered users of the search.

Parameter	Description
q *	Query string. Example: q=frontline+management Delimiter: [+]
mr	Max Results to return (DEFAULT 100) mr=n where n is 50 to 200 inclusive
kc	Keyword Constraint kc=all (DEFAULT) or kc=any or kc=phrase
cs	Case Sensitive cs=y or cs=n (DEFAULT)

Transport protocol: HTTP GET

The RSP Search API is called via a lightweight HTTP URI GET request with parameters:

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

RSP search result structure

The RSP search request returns a result set encoded as an XML document that validates against the RSP response schema (vlorn_rsp_v1p2.xsd). The following tables describes the schema elements. Mandatory parameters are marked with an asterix*:

Table 5 – RSP Search Result Structure

Element	Description
error	An error code to alert the FSP of a request with an invalid user key. Use HTTP code, 401 Unauthorised
searchresults *	Contains <summary>, <item>
summary *	Contains <copyright>, <source>, <count>, <found>
copyright	Copyright Notice
source	RSP name
token	Results token to enable paging through the result set.
count *	number of items returned in this response

Element	Description
found *	Total number of results found that match this query
item	The <item> element is repeated for each result. Item contains <title>, <link>, <relevance>, <description>, <location>, <identifier>, <rights>, <metadatascheme>, <contentpackage>.
title *	Title of the LO
link *	URL of a HTML page at the source repository that describes the LO.
relevance	Relevance of this item to the search query encoded as a decimal number from 0.0 to 1.0
description *	Text description of the LO
identifier *	Unique identifier of the LO. Must be the same as that specified in the VETADATA packaged with the LO.
rights	Text description of LO usage rights
preview	Optional preview URL for LOs. Resolves to a URL that enables the user to preview the LO. The element name "preview" may be also here as a synonym for "preview".
view	Optional view URL for LOs. Resolves to a URL that enables the user to view the full LO
download	Optional download URL for LOs. Resolves to a downloadable manifest of (zip file) the LO in a format according to the content packaging method specified (see below). For contentpackage=ims the LO Download request resolves to a.zip file as per IMS package interchange format.
metadatascheme *	Metadata scheme(s) available to describe the LO. Vocabulary: "vetadata", "lom".
contentpackage *	Content packaging method for LO downloads. Vocabulary: "ims". (zipped IMS package interchange file).

RSP RSS feed

The RSP provides a news feed that relates to the LOR. The news may contain things such as new LOs that have been recently added.

Request Parameters (mandatory parameters are marked with an asterix*):

Table 6 – RSP RSS Feed request parameters

Parameter	Description
user	User Key user=x where x is a text key provided to identify and track registered users of the news service.
format	RSS format to be returned. Vocabulary: rss (DEFAULT rss 0.91); vetportal (VET Training Portal news schema format).

Transport protocol: HTTP GET

The RSP News API is called via a lightweight HTTP URI GET request with parameters:

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

Result structure

The RSP news request returns an XML RSS feed (mandatory parameters are marked with an asterix*):

Table 7 – RSS feed result structure

Element	Description
rss *	News encoded according to the requested RSS format specification.

Appendix A: RSP response schema

vlorn_rsp_v1p2.xsd

The RSP search request returns a result set encoded as an XML document that validates against the following schema.

RSPs can obtain the schema file at the VLORN community website.

```
<?xml version="1.0"?>
<xsd:schema
targetNamespace="http://www.edna.edu.au/schema/vlorn_rsp_v1p2"
  xmlns="http://www.edna.edu.au/schema/vlorn_rsp_v1p2"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified">
  <!-- ***** -->
  <!-- ** Change History ** -->
  <!-- ***** -->
  <xsd:annotation>
    <xsd:documentation>
      2004-11-30 Geoff Hendrick
      Version 1.2 added "sample" as alternate to
"preview"
    </xsd:documentation>
    <xsd:documentation>
      2004-09-30 Geoff Hendrick
      Inital schema for VLORN RSP 1.1 spec
    </xsd:documentation>
  </xsd:annotation>
  <!-- ***** -->
  <!-- ** Element Declaration ** -->
  <!-- ***** -->
  <xsd:element name="searchresults"
type="searchresultsType"/>
  <xsd:element name="error" type="errorType"/>
  <!-- ***** -->
  <!-- ** Complex Types ** -->
  <!-- ***** -->
  <xsd:complexType name="summaryType">
    <xsd:sequence>
      <xsd:element name="copyright"
type="xsd:string" minOccurs="0"/>
      <xsd:element name="source"
type="xsd:string" minOccurs="0"/>
      <xsd:element name="token" type="xsd:string"
minOccurs="0"/>

```

```

                <xsd:element name="count"
type="xsd:string"/>
                <xsd:element name="found"
type="xsd:string"/>
            </xsd:sequence>
        </xsd:complexType>
        <xsd:complexType name="itemType">
            <xsd:sequence>
                <xsd:element name="title"
type="xsd:string"/>
                <xsd:element name="link"
type="xsd:anyURI"/>
                <xsd:element name="relevance"
type="relevanceType" minOccurs="0"/>
                <xsd:element name="description"
type="xsd:string"/>
                <xsd:element name="identifier"
type="xsd:string"/>
                <xsd:element name="rights"
type="xsd:string" minOccurs="0"/>
                <xsd:choice>
                    <xsd:element name="preview"
type="xsd:anyURI" minOccurs="0"/>
                    <xsd:element name="sample"
type="xsd:anyURI" minOccurs="0"/>
                </xsd:choice>
                <xsd:element name="view" type="xsd:anyURI"
minOccurs="0"/>
                <xsd:element name="download"
type="xsd:anyURI" minOccurs="0"/>
                <xsd:element name="metadatascheme"
type="metadataschemeType" minOccurs="0"/>
                <xsd:element name="contentpackage"
type="contentpackageType" minOccurs="0"/>
            </xsd:sequence>
        </xsd:complexType>
        <xsd:complexType name="searchresultsType">
            <xsd:sequence>
                <xsd:element name="summary"
type="summaryType"/>
                <xsd:element name="item" type="itemType"
minOccurs="0" maxOccurs="unbounded"/>
            </xsd:sequence>
        </xsd:complexType>
        <xsd:complexType name="errorType">
            <xsd:sequence>
                <xsd:element name="code"
type="xsd:unsignedShort"/>
                <xsd:element name="reason"
type="xsd:string"/>
            </xsd:sequence>
        </xsd:complexType>
        <!-- ***** -->
        <!-- ** Simple Types ** -->
        <!-- ***** -->
        <xsd:simpleType name="relevanceType">
            <xsd:restriction base="xsd:decimal">
                <xsd:minInclusive value="0.0"/>

```

```
        <xsd:maxInclusive value="1.0"/>
    </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="metadataschemeType">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="lom"/>
        <xsd:enumeration value="vetadata"/>
    </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="contentpackageType">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="ims"/>
    </xsd:restriction>
</xsd:simpleType>
</xsd:schema>
```