

The e-Learning Framework

Tish Roberts & Sam Easterby-Smith

What have we got ?

- JISC work in e-learning system (+ MLE) development has shown
 - very bespoke, institutional specific,
 - Battle of giant system (VLE, LMS, SRS)
 - Duplication of functionality (AA, student + course info, etc)
 - Complicated and expensive
 - Very limited transfer of development outcome
 - But more importantly the
- Lack of pedagogical flexibility and innovation in the design of e-learning tools, environments and architectures.

What we would like

- Interoperability of mission critical system
- Flexible solutions that can be suited to individual institutions
- Integration that is affordable and repeatable
- R&D outcomes that can be shared outside of their incubator projects
- Control of our own destiny

Framework Approach

- Breaks down the functionality of e-learning system (VLE, SRS, LIS) into smaller bits call 'services'
- Organise into layer model, dependant on service they offer (service orientated approach)
- Use 'web-services' + open standards as basis for intergrations

ELF Today

Learning Domain Services			
Activity Author	Activity Management	Assessment	Competency
Course Management	Course Validation	Curriculum	Grading
Learning Flow	Marking	Personal Development	Quality Assurance
Reporting	Resource List	Sequencing	Tracking
ePortfolio			

Common Services			
AV conferencing	Alert	Archiving	Authentication
Authorisation	Calendaring	Chat	Content Management
Context	DRM	E-mail management	Federated Search
Filing	Format Conversion	Forum	Group
Harvesting	Identifier	Logging	Mapping
Member	Messaging	Metadata Management	Metadata Schema Registry
Packaging	Person	Presence	Rating / Annotation
Resolver	Role	Rules	Scheduling
Search	Service Registry	Terminology	User Preferences
Whiteboard	Workflow		

Learning Domain services

- Functions that at the moment seem unique to the L&T domain
- Each function expressed as a service analysis, with links to specification and R&D activity
- Eventually, each service will have toolkits, specifications and implementation patterns

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Common Services

- Functions that at this time seem to be shared by other domains, such as IT services, information environment, and e-science
- Effort may be lead by the e-learning sector, follow efforts lead by other sectors, or investigate in collaboration

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Open the Box

- For each 'service' :-
 - Definition of function
 - Specification, standards and application profiles
 - Open source toolkits and tools
 - Reference models that use it
 - System and application that implement it
 - Maturity model – state of adoption

Development Approach

- Why Service Oriented ?
- Why open standards ?
- Why Open Source ?

Why Service Oriented ?

- other major vendors also adopting the SOA/Web Services approach (Microsoft, SAP, IBM, Oracle, Sun, etc)
- Builds on work of others ADL/Carnegie-Mellon, Sun/UKeU, MIT/OKI, the IMS Framework
- development of Web technologies and standards, (HTTP and XML) support cross-organisational interoperability
- development of Web service specifications (SOAP, WSDL, UDDI, WS Security, et al)

Why Open standards

- Agree unified set of standards
 - Support interoperability
 - Minimise integration costs
 - Service components more widely usable
 - Mix commercial, in-house and open source systems
 - Open, component service specifications allow services to be selected, tailored and mixed according to needs and budget

Why Open Source

- Open reference implementations accelerate adoption
-
- Build on other development work
-
- Sustainability model
-
- Open to commercial sector

3 aspects (Faces) of the Framework

■ Strategic tool

- Co-ordination and joint planning tool, that can be used to produce 'roadmaps'

■ Definitions

- a common vocabulary and agreed service factoring and definitions

■ Deployment

- Set of resources to supporting the institutions and individuals design, develop and implement system their meet their organisational context, objectives and priorities.

The JISC ELF Toolkits

Sam Easterby-Smith - CETIS



Why component based

- As development project deliverables are 'context free' at the technical level
 - it is easier for diverse users to integrate these into their environment
 - which aids in achieving sustainable outcomes
- Each small component development represents a smaller risk
- Each application can be smaller and more focused on its unique aspects
- Each development effort becomes a cumulative contribution to a coherent whole

The e-Learning Framework

Sample User Agents

Assignment marking tool	Authoring applications	Library System	Portal
Student Enrolment Portlet	Timetabling	VLE / LMS	

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The projects:

■ 2004

8 ELF Toolkits

22 DEL eTools



■ 2005

ELF Toolkits

ELF Reference Models

ELF Demonstrators

DEL eTools

Regional Projects

The 2004 ELF Toolkit projects

<p>D+ Resource Discovery</p>	<p>MDC Middleware for Distributed Cognition Resource Discovery</p>
<p>APIS Assessment Provision through Interoperable Segments</p>	<p>ISIS Integrating Simple Sequencing</p>
<p>PSE Portal Service Embedder</p>	<p>SLED Service-based Learning Design</p>
<p>SWEET.net Enterprise webservices</p>	<p>WS4RL Webservices for Reflective Learning</p>

D+ Resource Discovery

The image displays two overlapping browser windows from the JISC ELF d+ reference service consumer application. The left window shows search results for the query 'cabbage', displaying two items with their metadata. The right window shows the search interface with 'cabbage' entered in the search box and a list of current search sites, including Glasgow, which is selected.

JISC ELF d+ search service - reference services consumer application
 http://localhost:8080/elf/searchaction1.jsp

Local ▾ DEV ▾ CETIS ▾ JISC ▾ eLearning ▾ Travel ▾ Misc ▾ Entertainment ▾ Berlin ▾ Homes ▾

localhost >> localhost ... JISC ELF d+ search serv... Downloading File: /apis...

British Library Google
 COLIS - learning objects IntraLibrary - learning objects
 COPAC Union Catalogue PubMed

Results of search: 12 matches , displaying 1 - 10 : [srw](#) | [ims-cp](#)

◀ 1 2 ▶

1. Comm check :the final flight of Shuttle Columbia /
 Includes index.
 ■ **author:** Cabbage, Michael, / **editor:** Harwood, William. /
 ■ **publisher:** Free Press,
 ■ **date:** 2004. **isbn:** 0743260910 (hbk.)
 ■ **keyword:** Space flights. / Columbia (Spacecraft) /

2. The young Oxford book of train stories /
 Mystery train / David Belbin -- Don't let go / Marilyn Watts -- The tunnel / Rusty of ghosts / Douglas Hill -- Corder's spur / Marjorie Darke -- North / Laurence Sanders -- Adèle Geras -- A puff of steam / William Mayne -- Grease monkey Jack - the engineer / Robert Dawson -- Penalty for improper use / Hilary McKay -- Dust / John Gordon -- Train boy to the rescue / Nicola Robinson -- Cabbage soup / Alison Prince -- The circle game / Linda Newbery -- Danny's last Duchess / Dennis Hamley.
 ■ **editor:** Hamley, Dennis. /
 ■ **publisher:** Oxford University Press,
 ■ **date:** 2001. **isbn:** 0192781715 (pbk.) **isbn:** 0192781707 (hbk.)
 ■ **keyword:** Railroads / Locomotives / Short stories /

JISC ELF d+ reference service consumer application
 http://localhost:8080/elf/

Local ▾ DEV ▾ CETIS ▾ JISC ▾ eLearning ▾ Travel ▾ Misc ▾ Entertainment ▾ Berlin ▾ Homes ▾

localhost >> localhost ... JISC ELF d+ reference s... Downloading File: /apis...

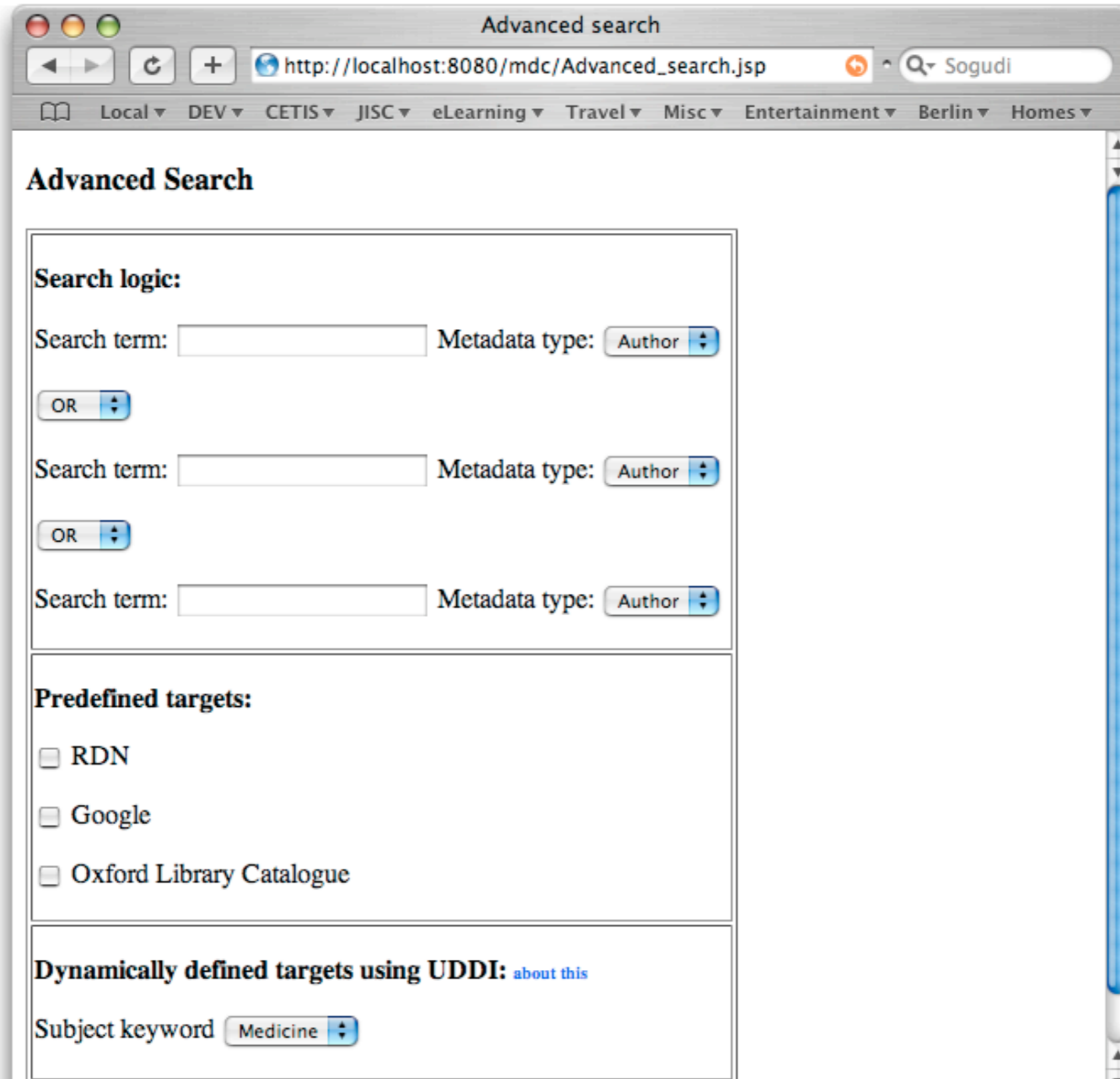
Find resources:

cabbage 10 per page search

Current search site:

Adlib - learning objects Edinburgh University Library RDN - peer-revi
 Amazon - annotations & reviews ePrints UK - national e-print papers Safari e-Refer
 BIOME - peer-reviewed websites Glasgow SOSIG - peer-re
 British Library Google Wellcome Libran
 COLIS - learning objects IntraLibrary - learning objects ZETOC - serial a
 COPAC Union Catalogue PubMed Xgrain - login

MDC - federated search



The screenshot shows a web browser window titled "Advanced search" with the URL `http://localhost:8080/mdc/Advanced_search.jsp`. The browser's address bar contains the text "Sogudi". Below the address bar is a navigation menu with items: Local, DEV, CETIS, JISC, eLearning, Travel, Misc, Entertainment, Berlin, and Homes. The main content area is titled "Advanced Search" and contains three sections:

Search logic:

Search term: Metadata type: Author

Search term: Metadata type: Author

Search term: Metadata type: Author

Predefined targets:

RDN
 Google
 Oxford Library Catalogue

Dynamically defined targets using UDDI: [about this](#)

Subject keyword

APIS - Assessment

APIS testing!

http://localhost:1024/renderitem?file=%2FUsers%2Fsam%2F

Local ▾ DEV ▾ CETIS ▾ JISC ▾ eLearning ▾

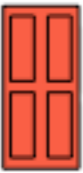
localhost >> localhost ... APIS testing!



APIS item rendering test


Monty Hall has hidden a prize behind one of the three doors.

Monty opens one of the other doors to reveal - a goat!

He then asks you if you would like to change your mind or to stick with the door you originally chose. It's time to make your mind up, which door are you going to open?



  - this door is now open revealing a goat!



Server running on http://127.0.0.1:1024/

APIS test host

Item director Browse

Media director Browse

Applet director Browse

Item debug mode

ISIS - simple sequencing

The screenshot displays the ISIS Visualizer application window. The main area shows a hierarchical tree structure of learning objects. At the top is a red cube, followed by a green cube, and then a yellow cube. The yellow cube branches into two green cubes, which further branch into two grey cubes each. A green play button is visible in the top right corner of the main window.

Below the main window are three smaller windows:

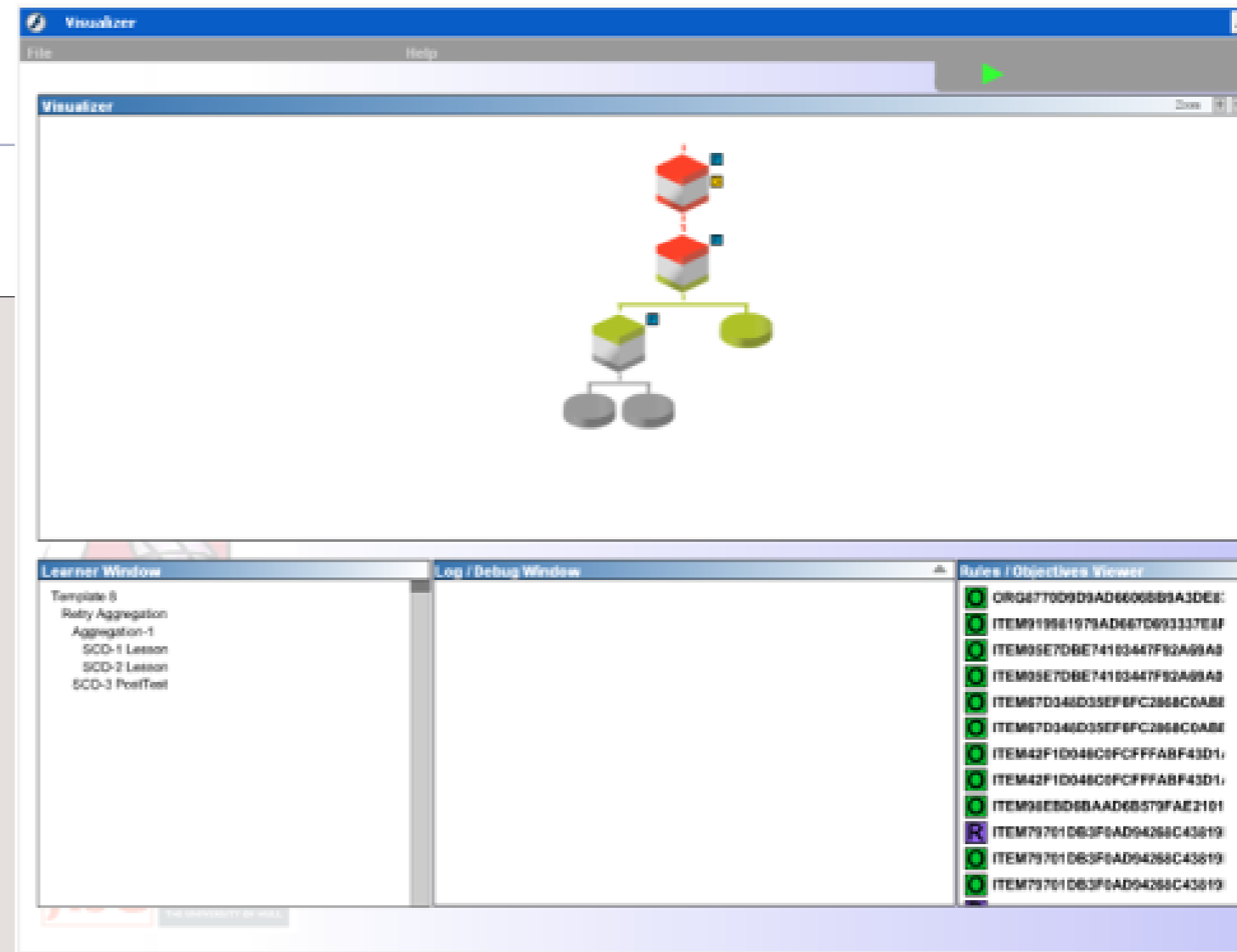
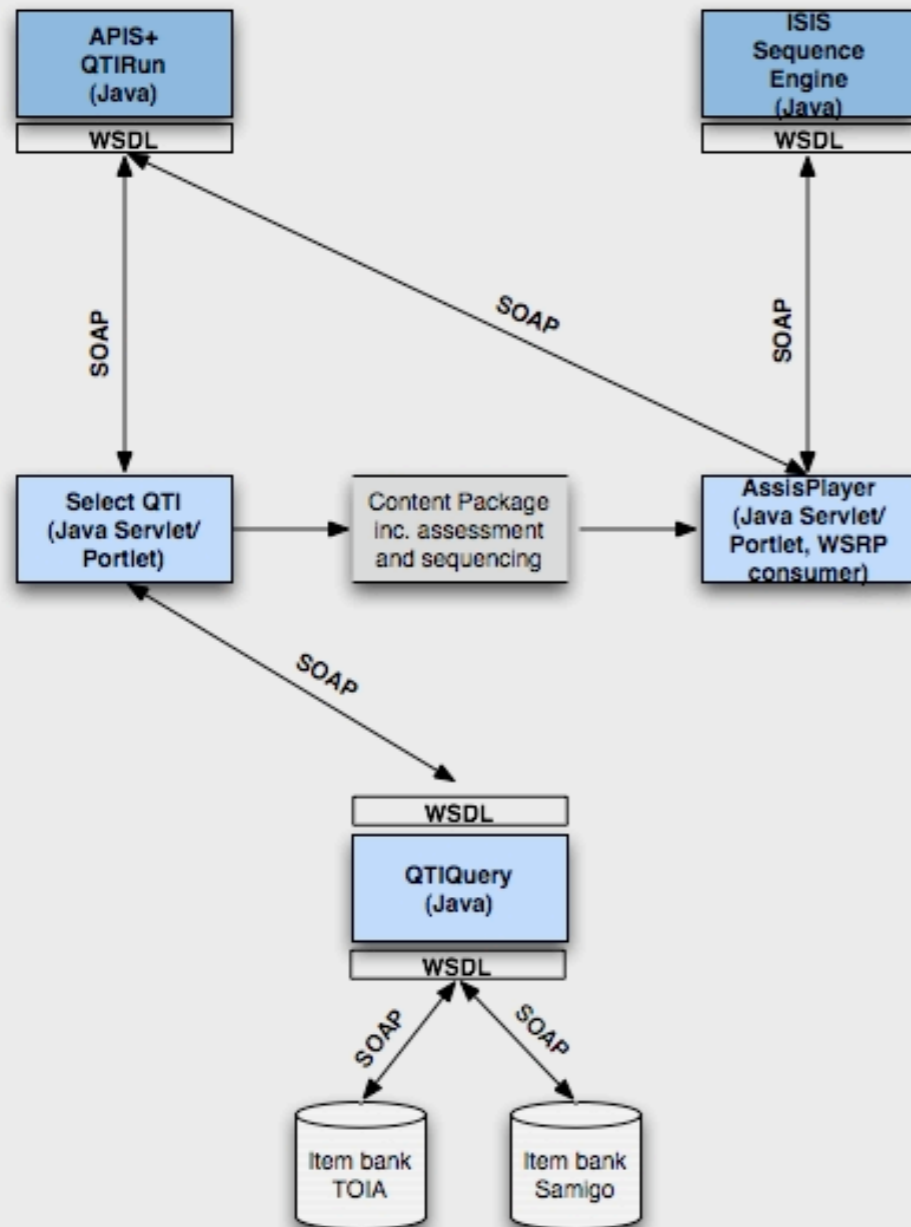
- Learner Window:** Shows a list of learning objects:
 - Template 0
 - Roby Aggregation
 - Aggregation-1
 - SCD-1 Lesson
 - SCD-2 Lesson
 - SCD-3 PostTest
- Log / Debug Window:** Currently empty.
- Rules / Objectives Viewer:** Lists several identifiers, each preceded by a status icon (green circle with a checkmark or a red circle with an 'R'):
 - OR0677009D9AD66068B9A3DEE:
 - ITEM919981979AD667D693337E8F
 - ITEM05E7D8E74103447F82A69A8
 - ITEM05E7D8E74103447F82A69A8
 - ITEM67D346D35E9F6FC2668C0A8E
 - ITEM67D346D35E9F6FC2668C0A8E
 - ITEM42F1D048C0FCFFABF43D1:
 - ITEM42F1D048C0FCFFABF43D1:
 - ITEM98E8D68AAD6B579FAE2101
 - ITEM79701D63F6AD94268C43819
 - ITEM79701D63F6AD94268C43819
 - ITEM79701D63F6AD94268C43819

The University of Hull logo is visible in the bottom left corner.

ASSIS

(not a toolkit - one of the DEL Tools)

Assis systems



Integration of:
APIS (IMS QTI)
ISIS (IMS SS)
 and **QTIQuery**

uses **BPEL!**

SWEET.NET :: Java Demo GUI

File Help

Person Group

Title: First Name:
 Last Name:
 Email:
 URL:
 Gender: Birthday:
 Disabilities:
 Address:

 Town:
 County:
 Postcode: Country:


Phone Numbers:

Type:	Number:
Home	01234 567890
Mobile	07890 123456
Work	0432121 987654
Fax	04321 987653

User ID Editor

Photograph of beaver

Lee H. Oswald



Change Picture

Group Memberships:

Save Changes

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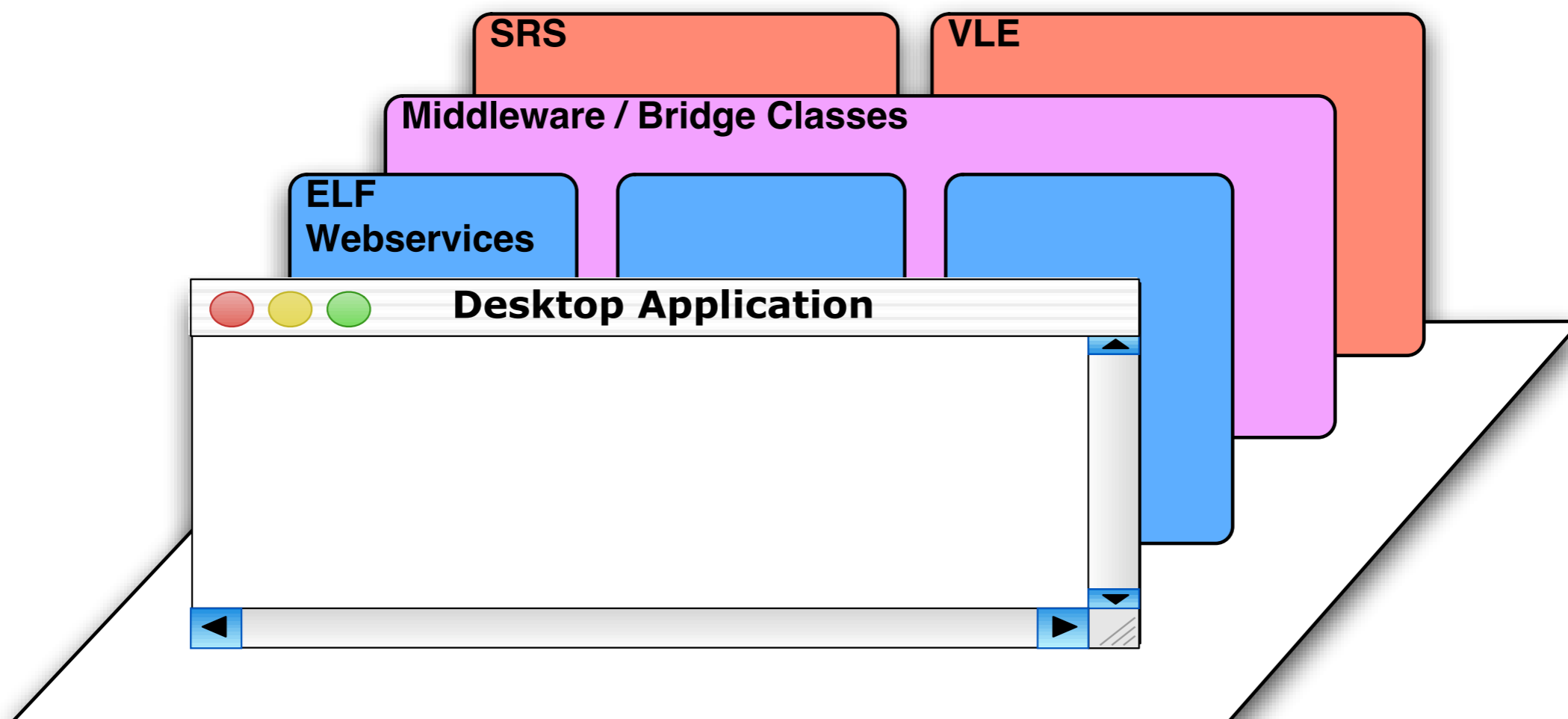
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Reference model projects

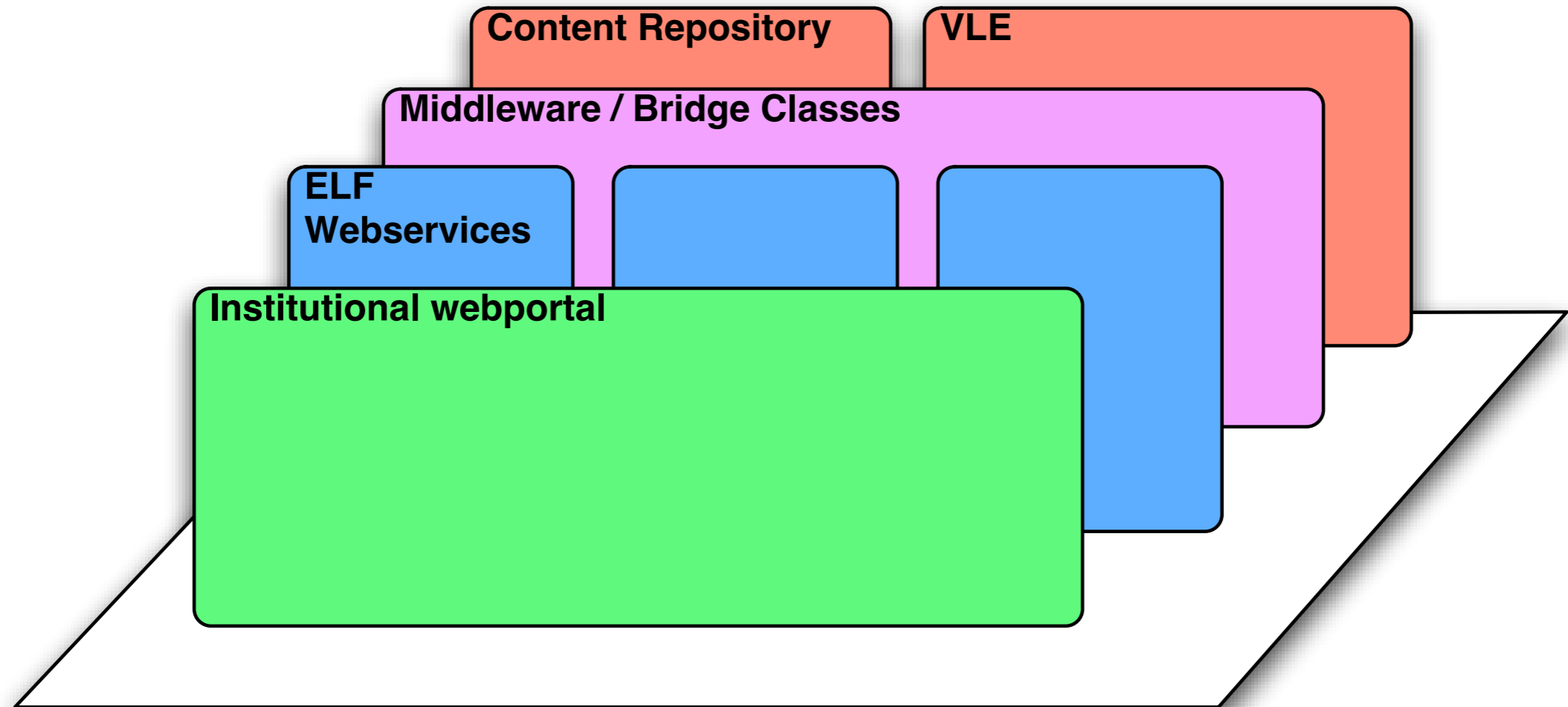
ePortfolio for Lifelong learning	Nottingham University
XCRI eXchanging Course-Related Information	Manchester Metropolitan University
COVARM Course Validation Reference Model	Thames Valley University
LADIE Learning Activity Design in Education	Southampton University
FREMA e-Learning Framework Reference Model for Assessment	Southampton University

ELF's not an architecture

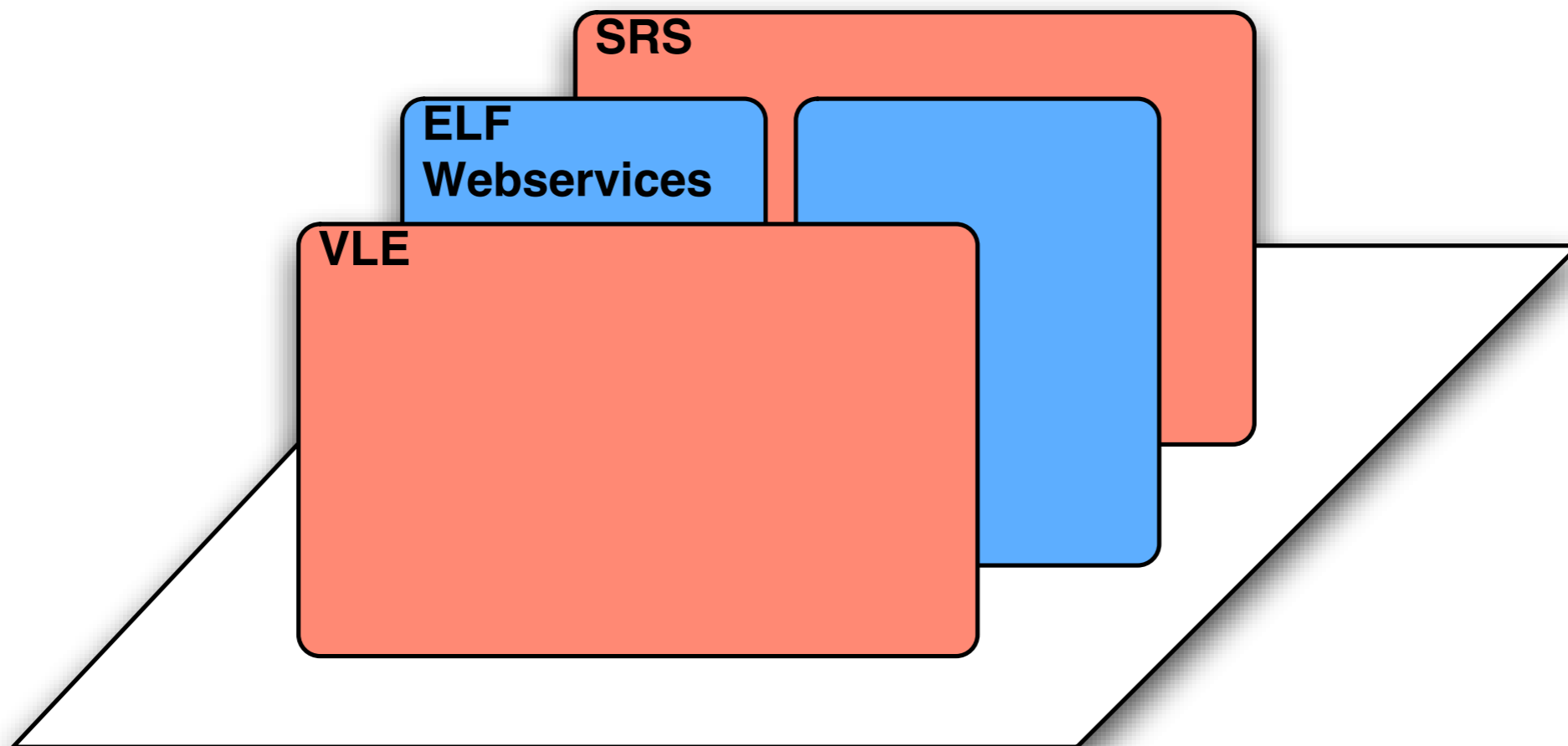
(but you might use it like this)



or like this...



...you can use these things in all sorts of crazy ways



Thank you

Sam - se5@bolton.ac.uk
Tish - t.roberts@jisc.ac.uk

ELF website - www.elframework.org
e-Learning Focus - www.jisc.ac.uk/elearningfocus
e-Learning Programme - www.jisc.ac.uk/elearning