

Intrallect Ltd

Future of Repositories

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- The future that was
- Where we are now
- Benefits of repositories
- 2010: Repository systems
- 2010: Applications of Repositories

Part 0: What the future was

The Nineties

The Plan:

- “Intelligent” Tutoring Systems
- Adaptive Content
- Global re-use of content

Requiring:

- Networks of repositories with precisely catalogued content
- Disaggregation and re-aggregation of structured, reusable content



2001: Start of a Repository Odyssey

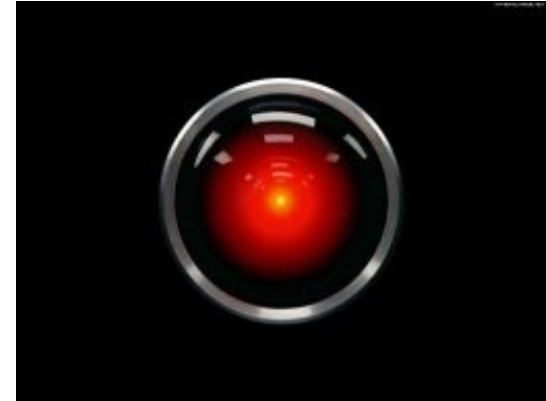
(intraLibrary 1.0:
development begins)



Part 1: Where are we now?

The Noughties

Where is HAL?



- Computers aren't as intelligent as we thought
- No one talks about "Intelligent Tutoring Systems"
- Discovered it's hard to make content "adaptive"
- Maybe this metadata stuff isn't that useful
- Web search, e.g. Google, seems to be good enough for many people

Proposition:

“Google made metadata
obsolete”

Rob Abel, recent IMS Meeting

Multiple Content Silos

- Scholarly works
 - e-Prints, e-Theses
- Digital Assets
 - images, video, audio
- Learning Content
 - IMS, SCORM packages
 - Lecture notes, tutorial papers etc
- Past exam papers
- Question Banks
 - QTI

Multi-Stop Maintenance

- Managed by different groups
 - LT/Media services, Library Services
 - Departments and Projects
- Using different software
 - ePrints, DSpace, Fedora, intraLibrary...
- At different stages of development
 - Trial, research project, service
- Applying different standards
 - Metadata: MARC, DC, LOM, VRA Core, Z39.87
 - Packaging: IMS, METS, MPEG 21 DIDL
 - Search/Retrieve, Identifiers, DRM....

Learning Object Repositories

- Technologies maturing
- Adoption low, but growing
- Integration becoming feasible
- Amount of catalogued content still too small for biggest benefits to be realised
- Federation is feasible, but clumsy

Part 2: Benefits of Repositories

Management of Content

- Long-term Maintenance
- Rights (Policy) Management
- Automatic Updates
- Accounting (quantity, use, value)

Questions:

- Important?
- Being realised now?
- Realisable by 2010?

Sharing of Content

- Most content visible to the community
- Critical mass of content
 - Enough incentives for educators
 - Enough incentives for publishers
- Easier to “buy” than steal

Questions:

- Important?
- Being realised now?
- Realisable by 2010?

Re-Use of Content

Ability to:

- Access sub-components of content
- Re-configure content
- Re-style content
- Have confidence licensing issues are covered

Questions:

- Important?
- Being realised now?
- Realisable by 2010?

Part 3:

2010 Repository 2 (intraLibrary 5.0?)

Repository Systems

- Even more configurable
- Single system supports a range of object, metadata types:
 - Learning objects
 - Media assets, e.g. images
 - Questions
 - Papers

Repository Infrastructure

- Identifiers
 - National/international registration and resolution services
- Vocabulary, application profile registries:
 - Catalogue vocabularies, taxonomies, profiles
 - Referencable
 - Harvestable
- License registries
- Common authentication, authorisation
- Complete service frameworks

Repository Services

- Exposed using well-defined, open service interfaces
- Profiles of generic services
- New services
 - Deposit, update of content, metadata
 - Exchange of structured content
- Consumed by:
 - VLE/LMS/CMS
 - Or as part of an open learning architecture
 - learning portals, aggregating a range of services

Requirements

	Policy	Content	Discovery	Delivery	Management	User	Workflow
	Authorizing	Ingesting (Depositing)	Searching	Exposing (Harvester)	(Repository) Registering	Supporting (Help)	Data Validating
	Authenticating	Ingesting (Harvesting)	Resolving	Obtaining	Auth Managing	Customizing	Workflow Logging
	Policy Enforcing	Indexing	Spell Checking	Data Transforming	Policy Managing	Personalizing	
	Rights Management	Identifying (Minting +)	Thesaurus Synonyming	Rendering	Configuration Managing	Identity Management	
		Updating (Various)	Language Translating	Delivering (Content)	Analyzing (Analytics)		
		Metadata Generating	Browsing	Packaging/Encoding	(Registry) Inspecting		
		Classifying	Notifying		Monitoring		
		Annotating	Subscribing		Identifier Management		
		Ranking	Recommending		Repository Access & Management		
		Rating			Portal Management		
		Archiving			Systems Management		
		Escrowing					

Functions

Services

Building on Services

Example of applications consuming and combining repository services:

- Aggregators – super-catalogues, “Google Learning”?
- Making content connections - “Relation builders”
- Secondary metadata
 - people who used this object also used...
 - the most downloaded LOs on the planet!
 - Folksonomies – link them by finding the same object in different folksonomy nodes
- News agregators (e.g. Yahoo Pipes)
- Apply automatic translators to metadata

Proposition:

Organisations will use a single repository system to manage a range of object types

Proposition:

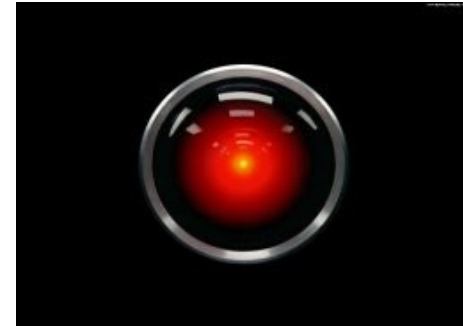
Repositories will be mainly consumed as a set of interlinked services

Part 4:

Future application of repositories

The Tenties

Still no sign of HAL?



- Computers aren't even as smart as we thought in the noughties
- Efficiency of web search has dropped - you can only squeeze so much out of limited information
- To progress e-learning any further, we need to make our content "adaptive"
- Maybe we should be getting people to describe their resources in a more systematic way?

Limitations of “Web” search

- Google not as smart as we thought in the early noughties
- Runs out of ways to use the information that’s just hanging around out there
- Metadata starts sounding like a really neat idea again
- Especially when semantic interoperability is enhanced, e.g. with RDF

Adaptive, appropriate content

- Delivering content that is tuned to the learner's...
 - Access preferences
 - Tuned to device
 - Accessibility
 - Learning styles
 - e.g. expositive or problem-based “views”
- Question Bank
 - Randomised questions targeted at a specific learning objective, competency

Proposition:

A “Google Learning”, and other services, will depend on quality assured metadata harvested from registered repositories

Proposition:

Publishers will expose structured learning content in their own repositories

Proposition:

A critical mass of users will form a community around one or more learning content portals, emulating Flickr, YouTube...

Proposition:

“Authoring” tools will enable users to create re-configurable objects, assembled from components hosted in remote repositories

Proposition:

The management of repositories is responsibility of library services. The skills of information professionals will be in serious demand

Back in 2004

In Gartner “Hype Cycle” report on Learning Technologies, repositories were the only technology rated as “transformational”

In 2010?