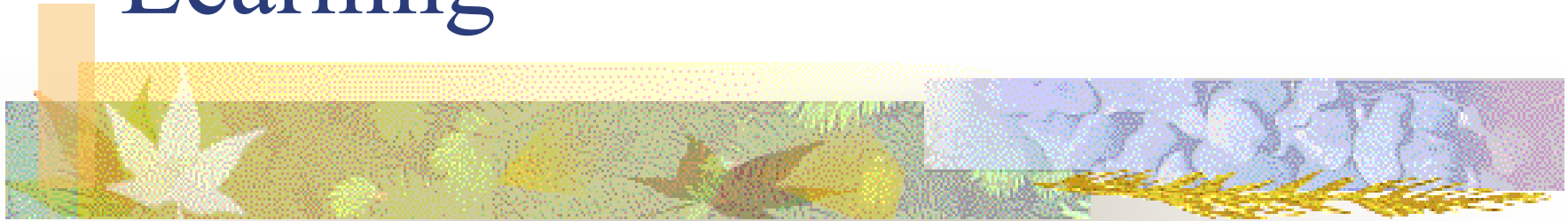# Emerging Technologies in E-Learning
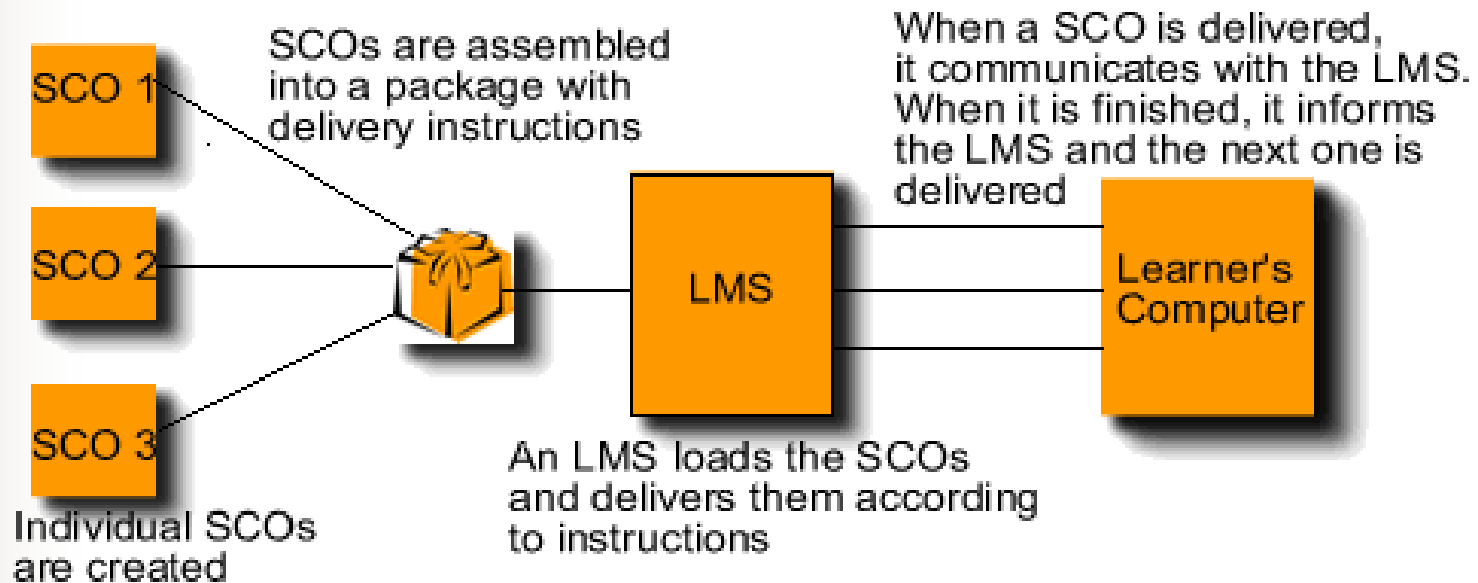
Stephen Downes

National Research Council Canada

March 15, 2004

First Concept: Learning Objects


SCO 1

SCOs are assembled into a package with delivery instructions

When a SCO is delivered, it communicates with the LMS. When it is finished, it informs the LMS and the next one is delivered

SCO 2

LMS

Learner's Computer

SCO 3

An LMS loads the SCOs and delivers them according to instructions

Individual SCOs are created

Learning objects (SCO) are combined into packages and distributed to students using learning management systems (LMS)…

Learning Design

Learning is *designed* using a specification that describes the sequencing of learning objects…

The metaphor of the *play* is used, where students and instructors fill different *roles…*
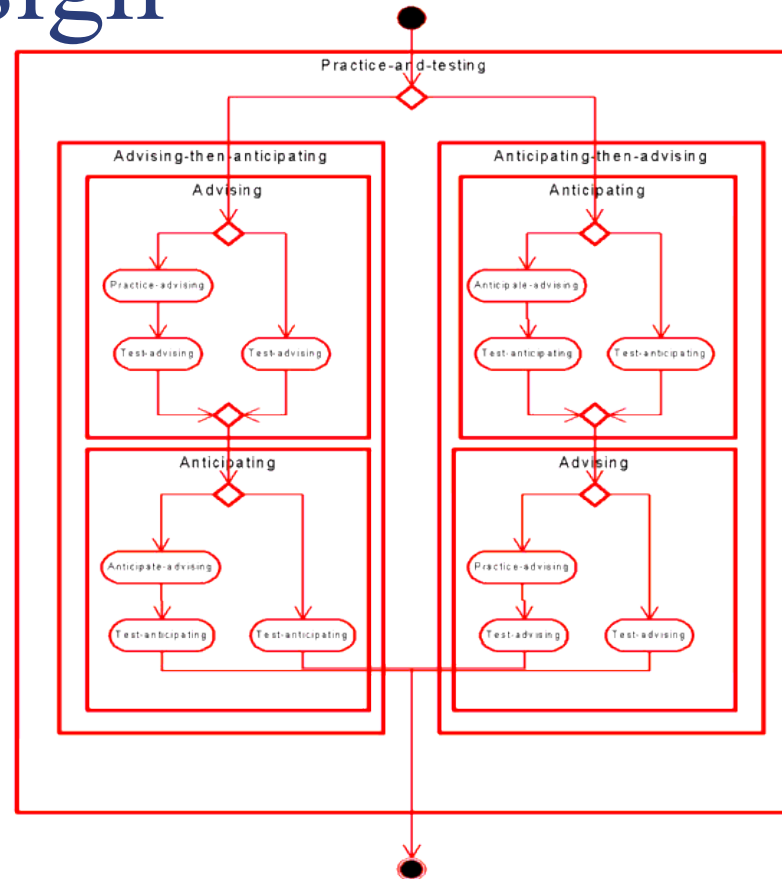
LO Standards

- Learning Object Metadata (LOM)
  - IMS, IEEE-LOM, CanCore, SCORM
- Content Packaging
- Learning Design
  - EML
- Question and Test Interoperability

And more… http://www.imsglobal.org/specifications.cfm

Second Concept: Repositories

Store Content

Search Metadata

Select Metadata

Locate Content

Deliver Content

Interact

LON Network Demo

1 – Register/Store Content
LON – Registry/DOI
LON – Metadata Store
LON – Content Repositories

6 – Interact with Content
Learnframe LMS - User Interface

2 - Search Metadata
Learnframe LMS - User Interface
LON – XMLQuery Search

5 – Deliver Content
LON – Repositories
LON - Network

3 – Select Metadata

4 – Locate Content   Learnframe LMS - User Interface
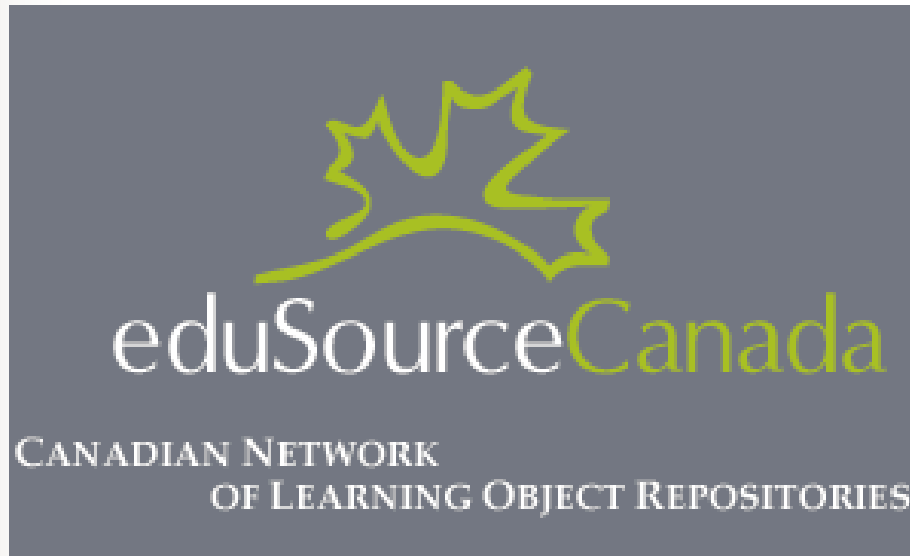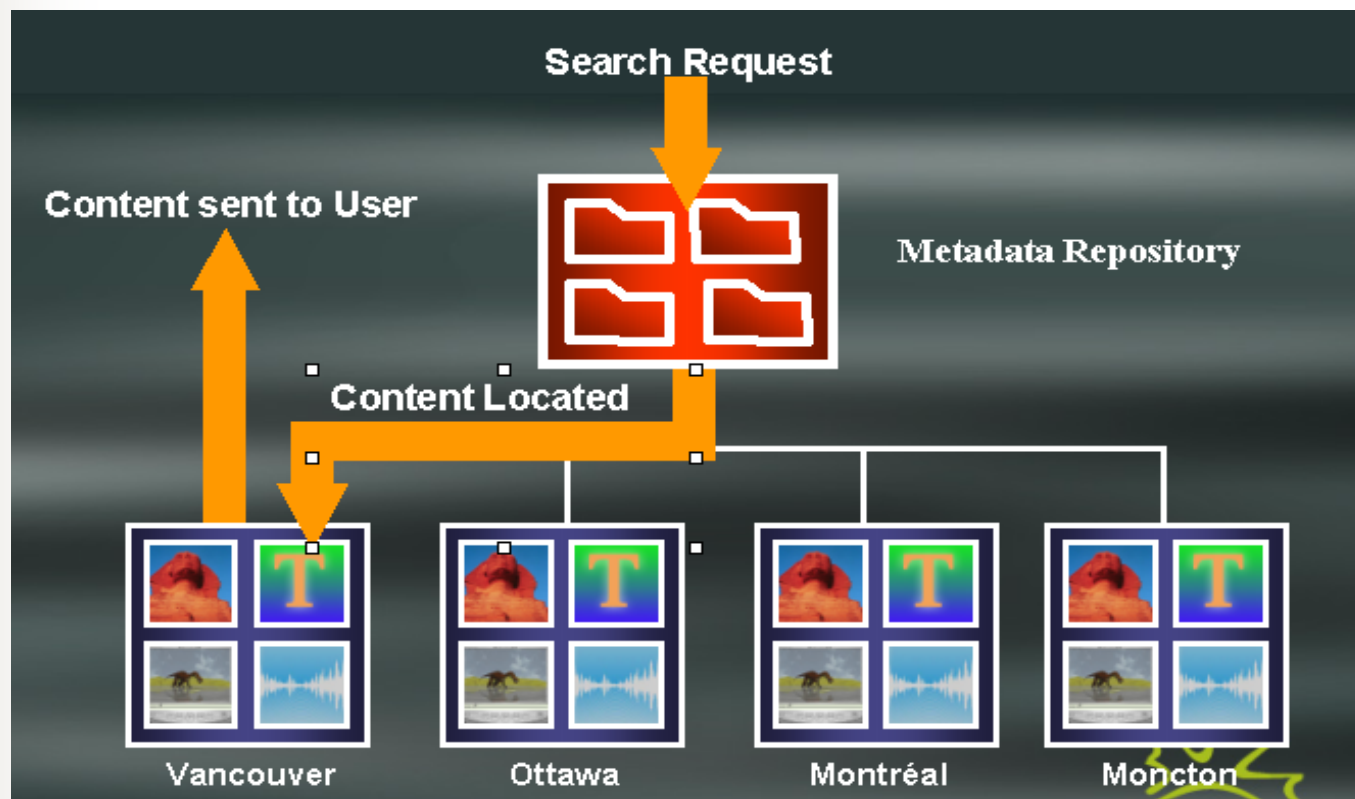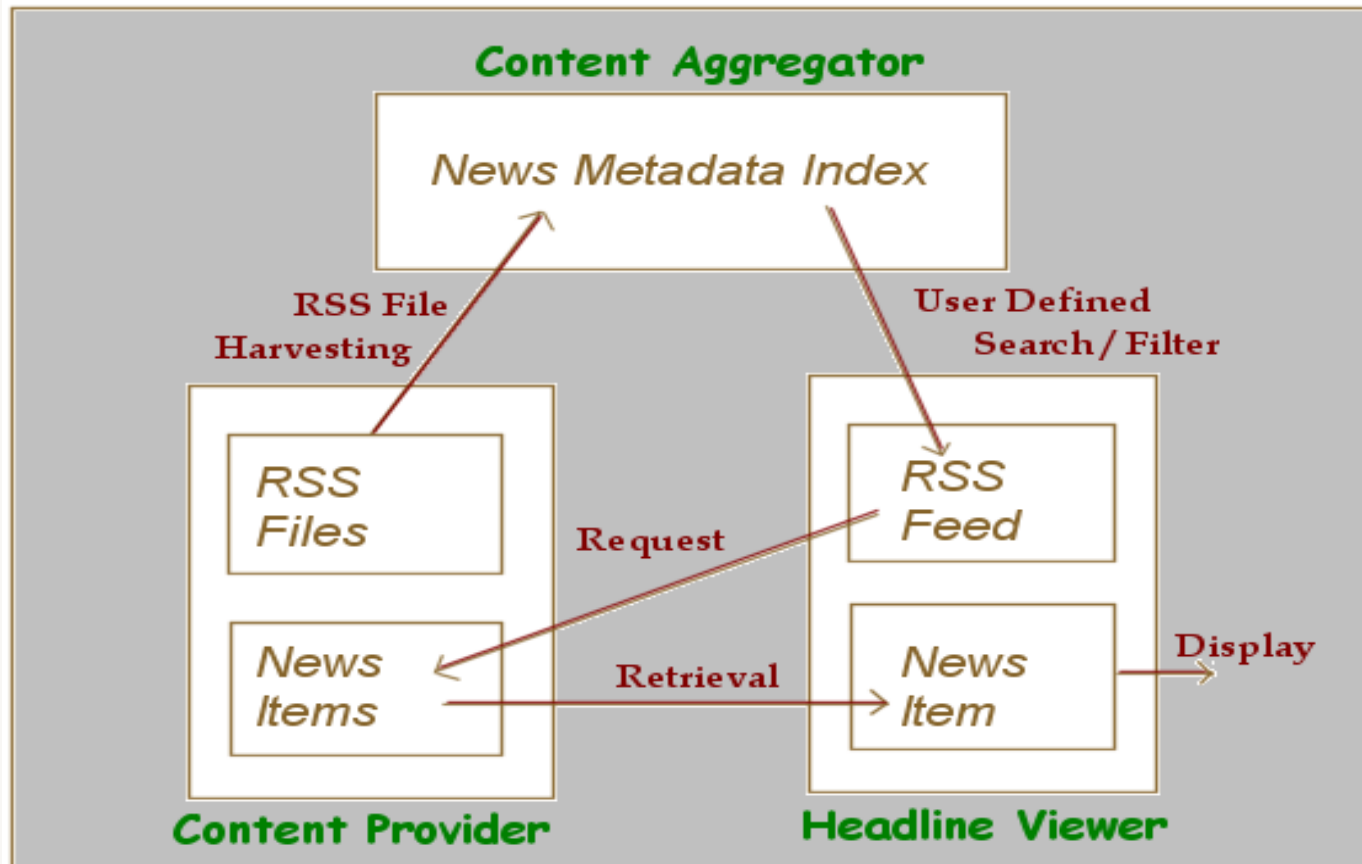LON – DOI Registry
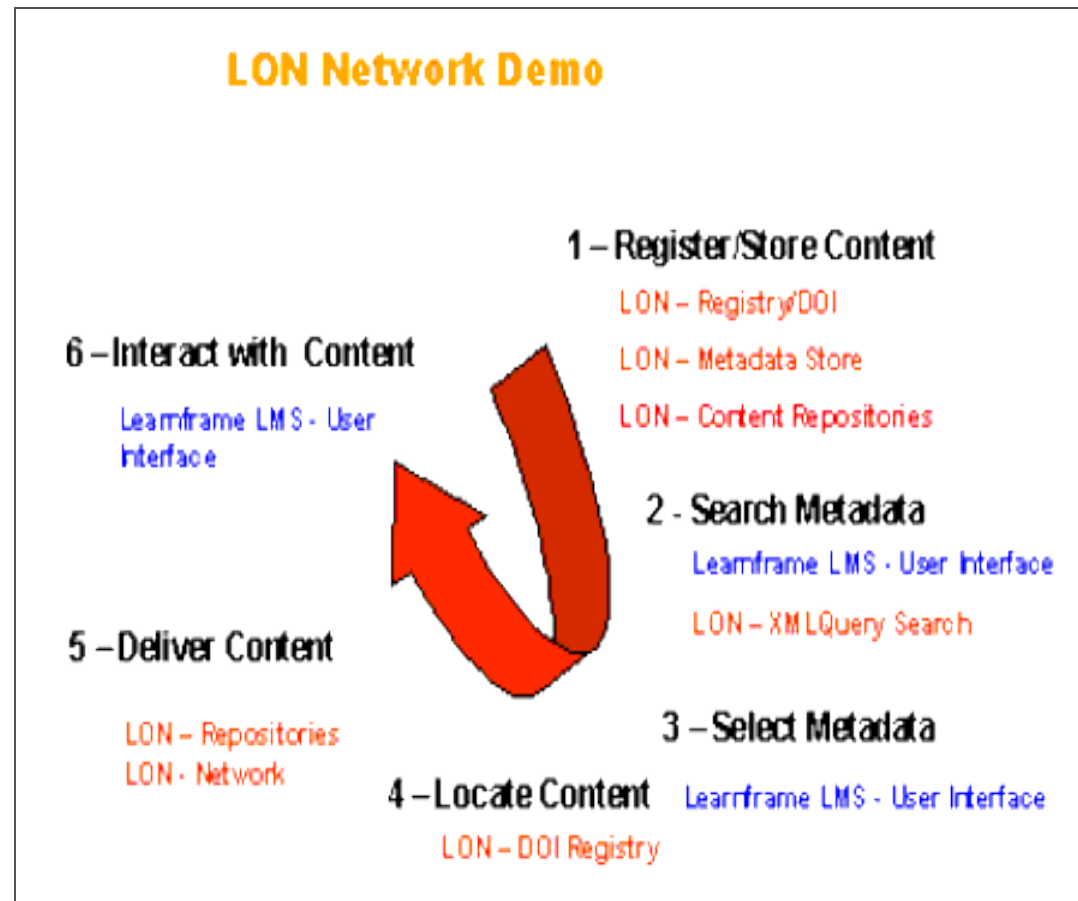
IMS Repository Specification
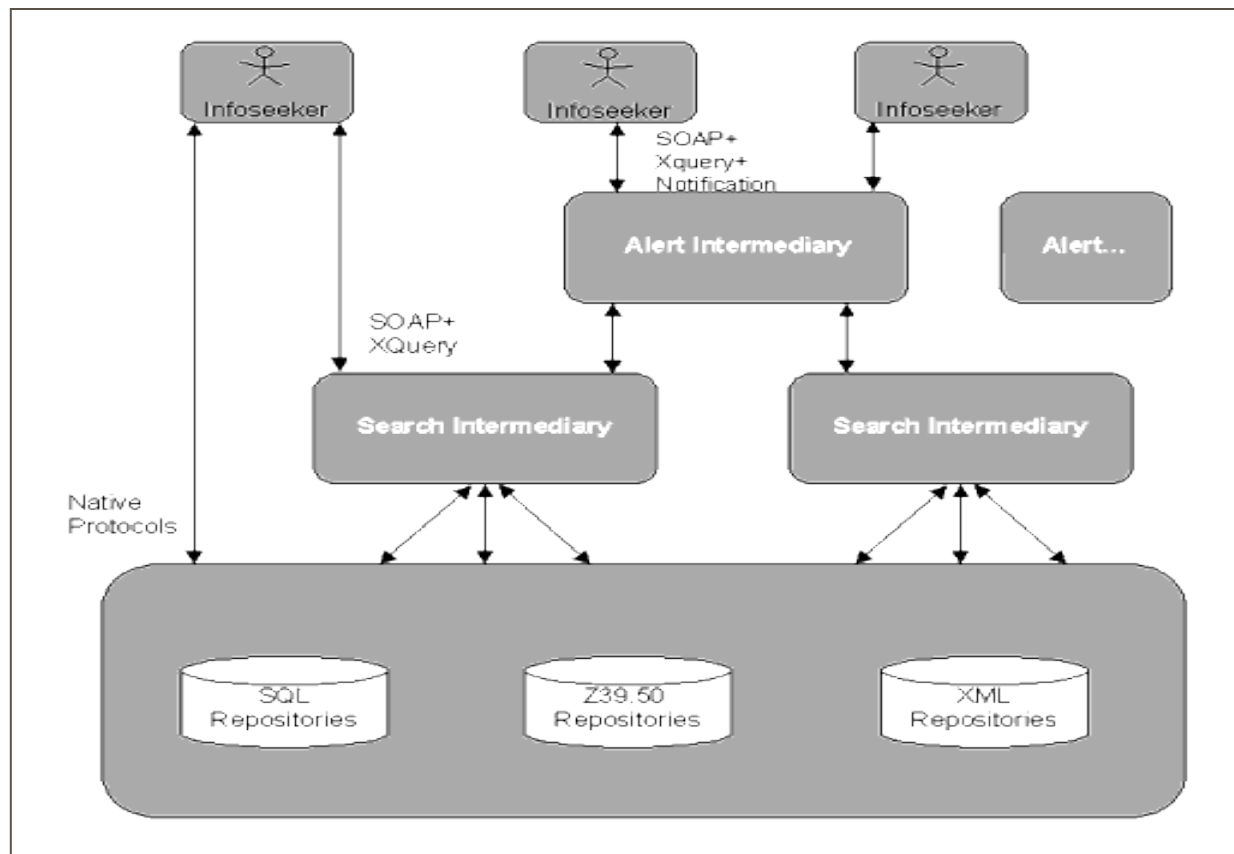
EduSource

A national network of linked learning object repositories

EduSource Network

Third Concept: Syndication

Syndication Formats

- RSS – Rich Site Symmary
    - Originally used for news headline syndication
    - Now used to distribute blog content
    - Widespread adoption, millions of sites
- OAI – Open Archives Initiative
    - Used to index e-prints archives
    - Massive base of resources, millions of papers

Syndicating Learning Objects

- Distributed Learning Object Repository Network (DLORN) and Edu_RSS

  - http://www.downes.ca/cgi-bin/dlorn/dlorn.cgi

  - http://www.downes.ca/cgi-bin/xml/edu_rss.cgi

- RSS-LOM syndicated metadata

Fourth Concept: Personalization

who do yOu know?

Origins in social software services such as Friendster, Orkut (pictured)…

The Semantic Social Network

- The idea: combine social software with syndication technologies

- Allows for the combination of content filtering and resource selection

- See http://www.downes.ca

Fifth Concept: Environments

Seymour Papert and Learning Games: Learning games won't be easy… they will be challenging and therefore rewarding

Content in Environments

- The Idea: to syndicate learning content on a real-time basis into learning environments

- The selection and display of learning resources depends not only on subject and student but also on the learning *context*

- Both packaged learning content and live data feeds (such as statistics, news, etc)

LOs in a Wider Content

- Linear → Multi-threaded
- Content Delivery → immersive, interactive
- Static, paced → dynamic, unpaced
- Demonstration → inference
- Learning objectives → learner goals
- Motivation → desire

More…

- Stephen Downes
  - OLDaily, Edu_RSS, DLORN, more…
- http://www.downes.ca