

THE PHOTODENTRO AGGREGATOR FEDERATED SYSTEM ARCHITECTURE

A POWERFUL METADATA AGGREGATOR BACKEND, COUPLED WITH A WEB PORTAL FRONTEND
FOR A MOBILE-FRIENDLY, ACCESSIBLE AND SOCIALLY INTERACTIVE USER EXPERIENCE.

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11th EdReNe Conference, May 6th 2014, Athens, Greece

OUR TEAM

A 'digital' team for implementing and supporting the 'digital services' of the digital school!

- Headed by **Prof. Christos Kaklamanis**
- Coordinated by **Dr Elina Megalou**
- An efficient **software team**
 - 11 full-time, in-house developers & dev-ops
 - a team of ~10 external colleagues doing part-time work
- A great **back-office team** for supporting our work, the digital services and the associated content



THE CONTEXT: PHOTODENTRO IS THE ...

Greek National Aggregator of Educational Content for schools.

*It has been designed and developed in the framework of the
"Digital School" National Initiative of the Greek MoE*



PHOTODENTRO AGGREGATOR

A multi-layer and service oriented **architecture** has been used for the **Photodentro Aggregator**, with the following layers:

1. the **Ingestion layer**, that processes metadata from various external sources,
2. the **Collection Management Layer**, that manages the collections that are to be aggregated in the Federation and provides an environment for their metadata enrichment,
3. the **Aggregation Layer**, where the metadata harvesting, validation, and storing take place, and
4. the **Photodentro Web portal**, that provides general services to portal users as well as access to the resources of various repositories in a uniform way.

SYSTEM ARCHITECTURE

THE MAIN COMPONENTS

- Sources of related material
- Repositories with learning resources
 - Photodentro *instances*
 - Other, compliant repositories
- The **Photodentro aggregator**
- The **Photodentro portal**

PHOTODENTRO AGGREGATOR

THE MAIN COMPONENTS

DSpace

- LOM AP builder
- Unique Identifier service
- OAI-PMH target
- Support services
 - Vocabulary server
 - LOM Validator

Aggregator engine

- OAI-PMH Harvester
- Quality Control engine
 - Link check
 - Photodentro LOM AP validation
- Schedule management (cron)
- Reporting
- SOLR Indexing

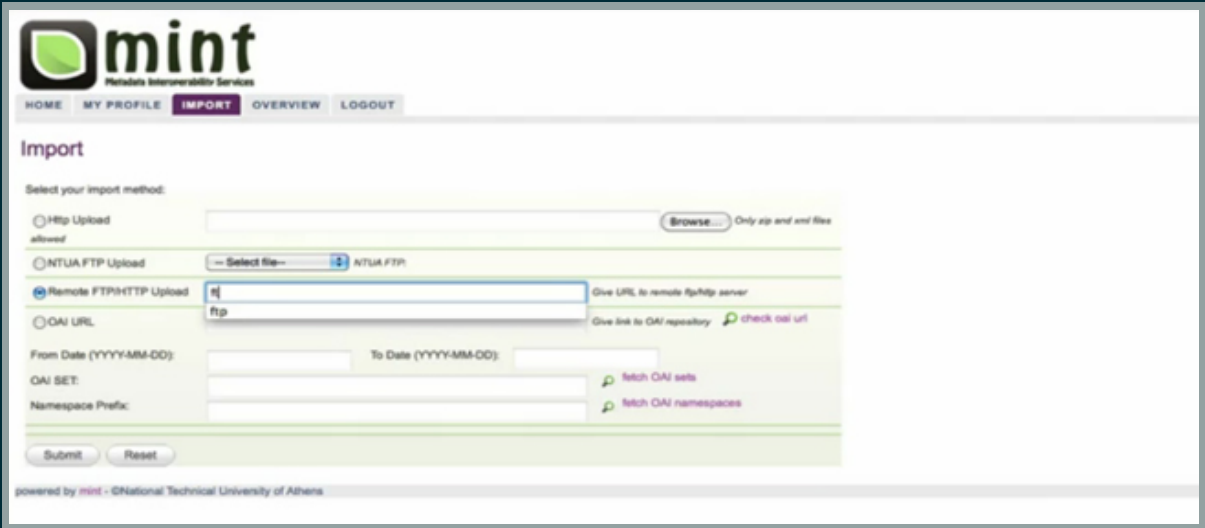
Portal frontend

- Transformation
- Publish
- Layout
- Social Features

INJECTION & COLLECTION MANAGEMENT

METADATA INJECTION & TRANSFORMATION

Photodentro uses the **MINT tool** (part of the **Metadata Interoperability Services**) for gathering metadata from external repositories as well as for facilitating the metadata mapping process.



The screenshot displays the MINT tool interface, which is part of the Metadata Interoperability Services. The interface is titled "Import" and features a navigation menu with "HOME", "MY PROFILE", "IMPORT", "OVERVIEW", and "LOGOUT". The "Import" section includes a "Select your import method:" label and four radio button options: "Http Upload", "NTUA FTP Upload", "Remote FTP/HTTP Upload", and "OAI LURL". The "Remote FTP/HTTP Upload" option is selected. Below the radio buttons, there are input fields for "From Date (YYYY-MM-DD)", "To Date (YYYY-MM-DD)", "OAI SET", and "Namespace Prefix". There are also "Submit" and "Reset" buttons at the bottom. The footer of the page reads "powered by mint - ©National Technical University of Athens".

COLLECTION MANAGEMENT

Three different cases of repositories:

- **Case 1:** Full support
 - Fully support the Photodentro IEEE LOM AP, *and*
 - Provide an OAI-PMH target, *and*
 - there is no need for metadata enrichment
- **Case 2:** Different IEEE LOM AP or other standard (e.g. LIDO)
- **Case 3:** Partial support
 - Fully support the Photodentro IEEE LOM AP *and*
 - Provide an OAI-PMH target, but
 - metadata enrichment *is needed*

METADATA PREPARATION

A (heavily customised version of) **DSpace** is used to provide:

- a **Unique Identifier** service
- mapping to the **Photodentro LOM Application Profile**
- an **OAI-PMH target**

The **HANDLE system** is used as the backend service to create globally unique, persistent and independent identifiers.

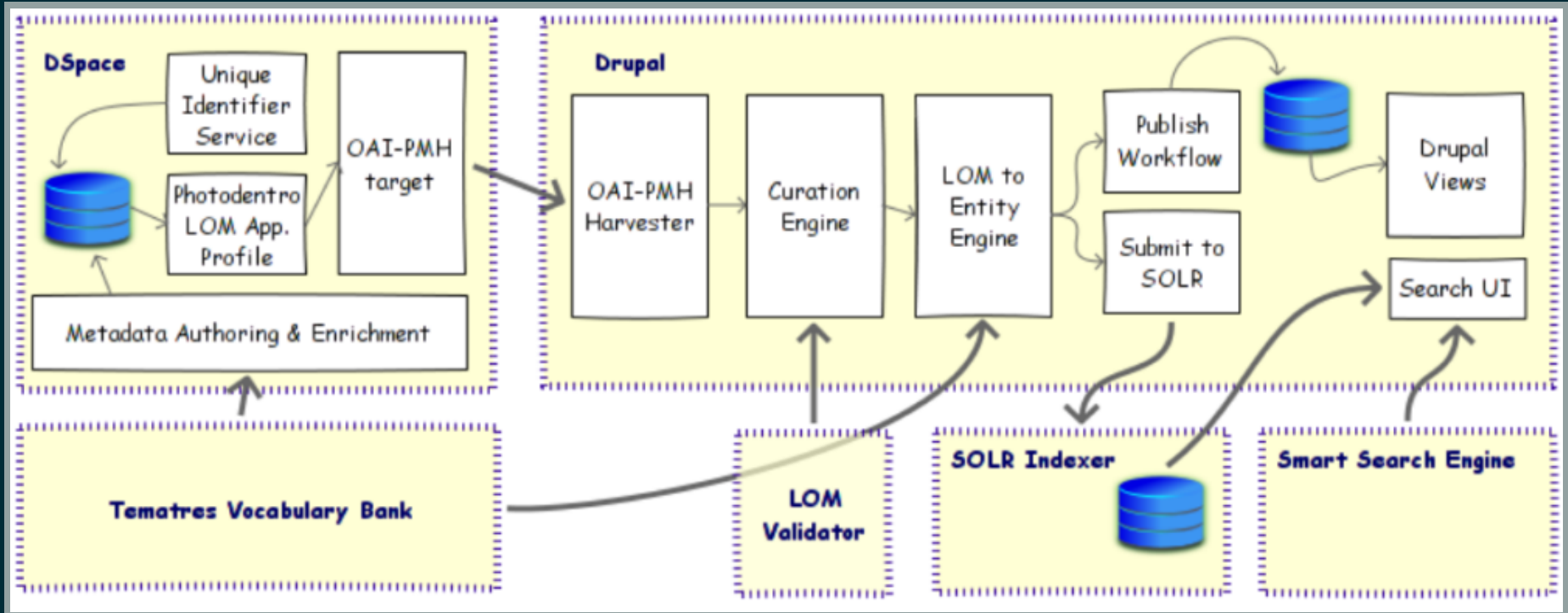
AGGREGATOR REQUIREMENTS

- collect metadata records from the Photodentro ecosystem
- enforce quality and unique identifiers
- prepare metadata to be used by the Photodentro portal
- link metadata against the taxonomies and terms of the **Vocabulary Bank**
- facilitate smart indexing and advanced query services (Athena)
- facilitate association of metadata with related social data and analytics

OUR APPROACH: DRUPAL BASED

The main workflow

1. An OAI-PMH module is used as and **aggregator** to harvest all connected repositories.
2. A set of **curation tasks** are performed
3. Each valid metadata record is transformed to a **Drupal entity**
4. Each entity is submitted to the **SOLR indexer**
5. Drupal entities enter the normal **publishing workflow**



ACTION PLEASE!

Content types ⊕

[My account](#) [Log out](#)

[Home](#) » [Administration](#) » [Structure](#)

[+ Add content type](#)

NAME	OPERATIONS			
Article (Machine name: article) Use <i>articles</i> for time-sensitive content like news, press releases or blog posts.	edit	manage fields	manage display	delete
Basic page (Machine name: page) Use <i>basic pages</i> for your static content, such as an 'About us' page.	edit	manage fields	manage display	delete
Learning Object (Machine name: lo) Represents teh Learning Object with its IEEE LOM metadata	edit	manage fields	manage display	

[Home](#) » [Administration](#) » [Structure](#) » [Content types](#) » [Learning Object](#)

[Show row weights](#)

LABEL	MACHINE NAME	FIELD TYPE	WIDGET	OPERATIONS	
+ Title	title	Node module element			
+ Language	language	Language selection			
+ oai.id	field_oai_id	Text	Text field	edit	delete
+ oai.datestamp	field_oai_datestamp	Date (Unix timestamp)	Text field	edit	delete
+ oai.setSpec	field_oai_setspec	Text	Text field	edit	delete
+ provider.serverName	field_provider_servername	Text	Text field	edit	delete
+ g.id.entry	field_g_id_entry	Text	Text field	edit	delete
+ g.title	field_g_title	Text	Text field	edit	delete
+ g.lang	field_g_lang	Term reference	Check boxes/radio buttons	edit	delete
+ g.desc	field_g_desc	Long text	Text area (multiple rows)	edit	delete
+ g.keyword	field_g_keyword	Text	Text field	edit	delete
+ g.aglevel	field_g_aglevel	Term reference	Select list	edit	delete
+ g.coverage	field_g_coverage	Text	Text field	edit	delete
+ lc.version	field_lc_version	Text	Text field	edit	delete
+ Flags	flag	Checkboxes for toggling flags			
+ lc.status	field_lc_status	Term reference	Select list	edit	delete

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Default

Teaser

Search result

Content items can be displayed using different view modes: Teaser, Full content, Print, RSS, etc. *Teaser* is a short format that is typically used in lists of multiple content items. *Full content* is typically used when the content is displayed on its own page.

Here, you can define which fields are shown and hidden when *Learning Object* content is displayed in each view mode, and define how the fields are displayed in each view mode.

[Show row weights](#)

FIELD	LABEL	FORMAT
+ g.title	Above ▼	Default ▼
+ g.desc	Above ▼	Default ▼
+ g.id.entry	Above ▼	Default ▼
+ g.keyword	Above ▼	Default ▼
+ g.coverage	Above ▼	Default ▼
+ lc.version	Above ▼	Default ▼
+ mm.id.entry	Above ▼	Default ▼
+ mm.lang	Above ▼	Default ▼
+ mm.metaschema	Above ▼	Default ▼
+ t.size	Above ▼	Default ▼
+ t.location	Above ▼	Title, as link (default) ▼














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Default

Teaser

Search result

[Show row weights](#)


FIELD	LABEL	FORMAT
 Social Share		Visible ▼
Hidden		
 hasPreview	Above ▼	<Hidden> ▼
 hasThumbnail	Above ▼	<Hidden> ▼
 isShawnAt	Above ▼	<Hidden> ▼
 lc.contribute	Above ▼	<Hidden> ▼
 g.lang	Above ▼	<Hidden> ▼
 g.aglevel	Above ▼	<Hidden> ▼
 e.ieur	Above ▼	<Hidden> ▼
 e.itype	Above ▼	<Hidden> ▼
 e.lrt	Above ▼	<Hidden> ▼
 e.tar	Above ▼	<Hidden> ▼
 lc.status	Above ▼	<Hidden> ▼
 mm.contribute	Above ▼	<Hidden> ▼

Default

Teaser

Search result

[Show row weights](#)

FIELD	LABEL	FORMAT
+ g.title	Above ▼	Default ▼
+ Social Share		Visible ▼
+ t.location	Above ▼	Title, as link (default) ▼
+ t.format	Above ▼	Plain text ▼
+ e.context	Above ▼	Plain text ▼
+ hasThumbnail	Above ▼	Image ▼
		Image style: Thumbnail (100x100) 
+ cl.discipline	Above ▼	Plain text ▼
+ provider.serverName	Above ▼	Default ▼
Hidden		
+ g.desc	Above ▼	<Hidden> ▼
+ g.id.entry	Above ▼	<Hidden> ▼
+ g.keyword	Above ▼	<Hidden> ▼
+ g.coverage	Above ▼	<Hidden> ▼
+ lc.version	Above ▼	<Hidden> ▼

Scheduled harvests ⊕

[LIST](#)[ADD SCHEDULED HARVEST](#)[EMPTY HARVESTER QUEUE](#)[UNLOCK HARVESTS](#)

[Home](#) » [Administration](#) » [eXtensible Catalog \(XC\)](#) » [Metadata Harvester](#)

NAME	REPOSITORY NAME	RECURRENCE	IS RUNNABLE BY CRON?	STATUS
Photodentro Video - Weekly	Photodentro Video	Weekly	active	running
Photodentro LOR - Weekly	Photodentro LOR	Weekly	inactive	not running

Currently there are 0 items in queue.

The 'oaiharvester_processing_cron' variable status is 'NOT_RUNNING'.

Step 1: Select repository

LIST

ADD SCHEDULED HARVEST

EMPTY HARVESTER QUEUE

UNLOCK HARVESTS

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Select repository

Photodentro Video ▼

The name of the harvestable OAI-PMH repository

SCHEDULE

Select the frequency of harvest

HOURLY

Hourly —

Run at

0 ▼ minutes past the hour

DAILY

Daily —

Run at

00:00 ▼ each day

WEEKLY

Weekly —

Run every

Monday ▼

at

00:00 ▼

Metadata Harvester

[Home](#) » [Administration](#) » [eXtensible Catalog \(XC\)](#)



Repositories

Add, modify and view remote metadata repositories



Scheduled harvests

Create, modify, and view OAI-PMH harvest schedules



Sets

View all sets supported by any OAI-PMH repository.



Formats

View a list of repositories organized by the metadata formats they offer

Repositories

LIST

ADD REPOSITORY

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SERVER NAME	URL	SCHEDULES
Photodentro Video	http://photodentro.edu.gr/oai-video/request	Photodentro Video - Weekly
Photodentro LOR	http://photodentro.edu.gr/oai-lor/request	Photodentro LOR - Weekly

Pages

Photodentro LOR +

[VIEW](#)[EDIT](#)[REVALIDATE](#)[SETS](#)[FORMATS](#)

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PROPERTY	VALUE
The name of the repository	Photodentro LOR
The original name of the repository given by the provider itself	Photodentro/Digital_school
URL of the server	http://photodentro.edu.gr/oai-lor/request
Repository type	Real OAI-PMH server
Textual description of the repository, the nature of content	
Email of server administrator	photodentro@cti.gr
Phone number of server administrator	
Is the service ready to harvest?	Yes
When this provider were created?	2014-03-21 16:05:19
When this provider were updated?	2014-03-21 16:05:22
The last time the provider was validated	2014-03-21 16:05:22
Latest end date of a successfull selective harvest	
Earliest start date of a successfull selective harvest	
Last date when this provider were harvested	
Which OAI-PMH protocol does the provider support?	2.0
The finest harvesting granularity supported by the repository	YYYY-MM-DDThh:mm:ssZ

Photodentro LOR +

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Name of repository

The name of the harvestable OAI-PMH repository

URL of repository

The URL of the harvestable OAI-PMH repository

Type of repository

Real OAI-PMH server

Files in the local filesystem

The type of repository

Photodentro LOR +

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NAME	NAMESPACE	SCHEMA LOCATION
oai_lom	http://ltsc.ieee.org/xsd/LOM	http://ltsc.ieee.org/xsd/lomv1.0/lomLoose.xsd

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SET	NAME	DESCRIPTION
hdl_123456789_262	Αγγλικά Γυμνασίου	
hdl_123456789_191	Άλγεβρα	
hdl_123456789_250	Άλγεβρα Λυκείου	
hdl_8521_3777	Αρχαία Ελληνική Γλώσσα και Γραμματεία (Γυμνασίου - Λυκείου)	
hdl_8521_356	Βιολογία Γυμνασίου	
hdl_8521_3451	Βιολογία Δημοτικού	
hdl_8521_357	Βιολογία Λυκείου	
hdl_8521_299	Γαλλικά Γυμνασίου	
hdl_8521_2708	Γεωγραφία	
hdl_123456789_251	Γεωμετρία Λυκείου	
hdl_8521_553	Εικαστικά	
hdl_8521_3779	Ελληνική Γλώσσα Δημοτικού	
hdl_123456789_190	Θρησκευτικά	

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Taxonomy is for categorizing content. Terms are grouped into vocabularies. For example, a vocabulary called "Fruit" would contain the terms "Apple" and "Banana".

[+ Add vocabulary](#)[Show row weights](#)

VOCABULARY NAME	OPERATIONS		
 discipline	edit vocabulary	list terms	add terms
 e.context	edit vocabulary	list terms	add terms
 e.ieur	edit vocabulary	list terms	add terms
 e.itype	edit vocabulary	list terms	add terms
 e.lrt	edit vocabulary	list terms	add terms
 e.tar	edit vocabulary	list terms	add terms
 eduobj	edit vocabulary	list terms	add terms
 g.aglevel	edit vocabulary	list terms	add terms
 g.lang	edit vocabulary	list terms	add terms
 langlevel	edit vocabulary	list terms	add terms
 lc.c.role	edit vocabulary	list terms	add terms
 lc.status	edit vocabulary	list terms	add terms
 mm.c.role	edit vocabulary	list terms	add terms

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You can reorganize the terms in *Discipline* using their drag-and-drop handles, and group terms under a parent term by sliding them under and to the right of the parent.

[+ Add term](#)

[Show row weights](#)




NAME	OPERATIONS
 Αγγλική Γλώσσα	edit
 Αθλητισμός	edit
 Κατανόηση γραπτού λόγου	edit
 Κατανόηση προφορικού λόγου	edit
 Λεξιλόγιο (σημασία - χρήση - μορφή)	edit
 Διατροφή και αγορά	edit
 Κατανόηση γραπτού λόγου	edit
 Κατανόηση προφορικού λόγου	edit
 Λεξιλόγιο (σημασία - χρήση - μορφή)	edit
 Εκπαίδευση	edit
 Γραμματική (σημασία - χρήση - μορφή)	edit
 Κατανόηση γραπτού λόγου	edit

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 The Solr server could be reached.

A search server and search index are used to execute searches. Several indexes can exist per server.
You need at least one server and one index to create searches on your site.

[+ Add server](#) [+ Add index](#)

STATUS	CONFIGURATION	TYPE	NAME	OPERATIONS
	Overridden	Server	localhost server	Edit ▼
	Overridden	Index	Default multilingual node index	Edit ▼
	Custom	Index	Default node index	Edit ▼

Edit Learning Object Παιχνίδι με τις κάρτες βασισμένο στις αλκοόλες ⊕

[Home](#) » [Παιχνίδι με τις κάρτες βασισμένο στις αλκοόλες](#)

Title *

Language

oai.id *

OAI.DATESTAMP

Format: 06/05/2014 - 15:23:46

cl.discipline

- Καταστάσεις της ύλης
- Φυσικές μεταβολές
- Οργανική χημεία
- Αλκοόλες - Αιθέρες

HANDS ON. LIVE!

Note: This is only for demonstration purposes. System under heavy development!

WEB SERVICES & TOOLS

- Vocabulary Bank
 - [Human view](#)
 - [Web services](#)
- Photodentro OAI-PMH target (DSpace)
 - [Photodentro LOR](#)
 - [Photodentro Video](#)
- Photodentro portal (Drupal)
 - [Frontend](#)
 - [Backend](#)

PLANNING...
... AND THE FUTURE

PLANNING

The system is currently under development

*1st working version is expected **by September 2014***

- Potential user base: approx. **1.5 million**, mostly members of the Greek K-12 community.
- Everyone will be motivated to **register as a member**
- Emphasis on **community-oriented** features
- **Responsive, finger-friendly** user interface
- **Faceted search, intuitive search** mechanism
- **Accessibility** is facilitated (WCAG 2.0 Level AA) and expanded with **speech-enabled web components**
- Architected for **scalability**

THE FUTURE

- Integration of the Photodentro aggregator and portal to the other dschool components.
- Explore the micro-sites paradigm
- Management of social data & paradata, processing of analytics
- Further support the Linked-Data paradigm
- Link to more repositories, both inbound and outbound
- ... more to come. We listen to our users!

