Implementing a funder repository with heterogeneous material and advanced presentation capabilities

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Agenda

- Aims and scope of the project
- Methodology and approach
- Implementation / DSpace extensions
- Conclusions – future work

Project context

- Hellenic Ministry of Education programmes for education and lifelong learning, co-funded by the EU structural funds
  - Three phases: 1994-1999, 2000-2006, 2007-2013
  - Overall funds in the range of billion Euros
- Activities funded:
  - Face-to-face courses / seminars
  - Creation of educational material
  - Studies, surveys, reports
  - Conferences, workshops
  - Research: theses, collaborative projects

Aims and scope of the project

- Decision by funding authority to create a repository (autumn 2010)
- Aims: Dissemination, reuse and preservation of the digital material produced in the frame of the funded programmes
- Single point of (persistent) access to material, standards-based documentation/metadata, interoperability, link of content to project / funding programme
- Repository available (since spring 2011)
  - http://repository.edulll.gr

Project inputs and outputs

- Input material:
  - Digital files arranged in folders – (hopefully) according to project
  - List of projects
  - No metadata!
- Output aimed for:
  - Repository with standards compliant metadata records along with processed digital files, suitable for dissemination
  - User-friendly interface for human users
  - Programmatic interface (OAI-PMH) for reuse by third-party software applications

Methodology and approach

- Investigate input material
  - Identify content of archival value – exclude all other material (e.g. administrative documents)
  - Assign priorities to content
- Documentation / cataloguing of material according to standards – application profile created
  - Subject cataloguing
  - No self-archiving at this phase
- Digital processing of input files to produce copies suitable for preservation and dissemination – both initial and processed files kept in repository
- A lot of effort allocated to user-friendly interfaces for browsing metadata and accessing content

Metadata schema

- Custom application profile developed based on common international schemata
  - Qualified Dublin Core
  - LOM
  - PREMIS
  - CERIF
- Vocabularies used
  - Eurovoc for thematic indexing – due to inter-disciplinarity and multi-linguality
  - Eurydice vocabulary for education levels

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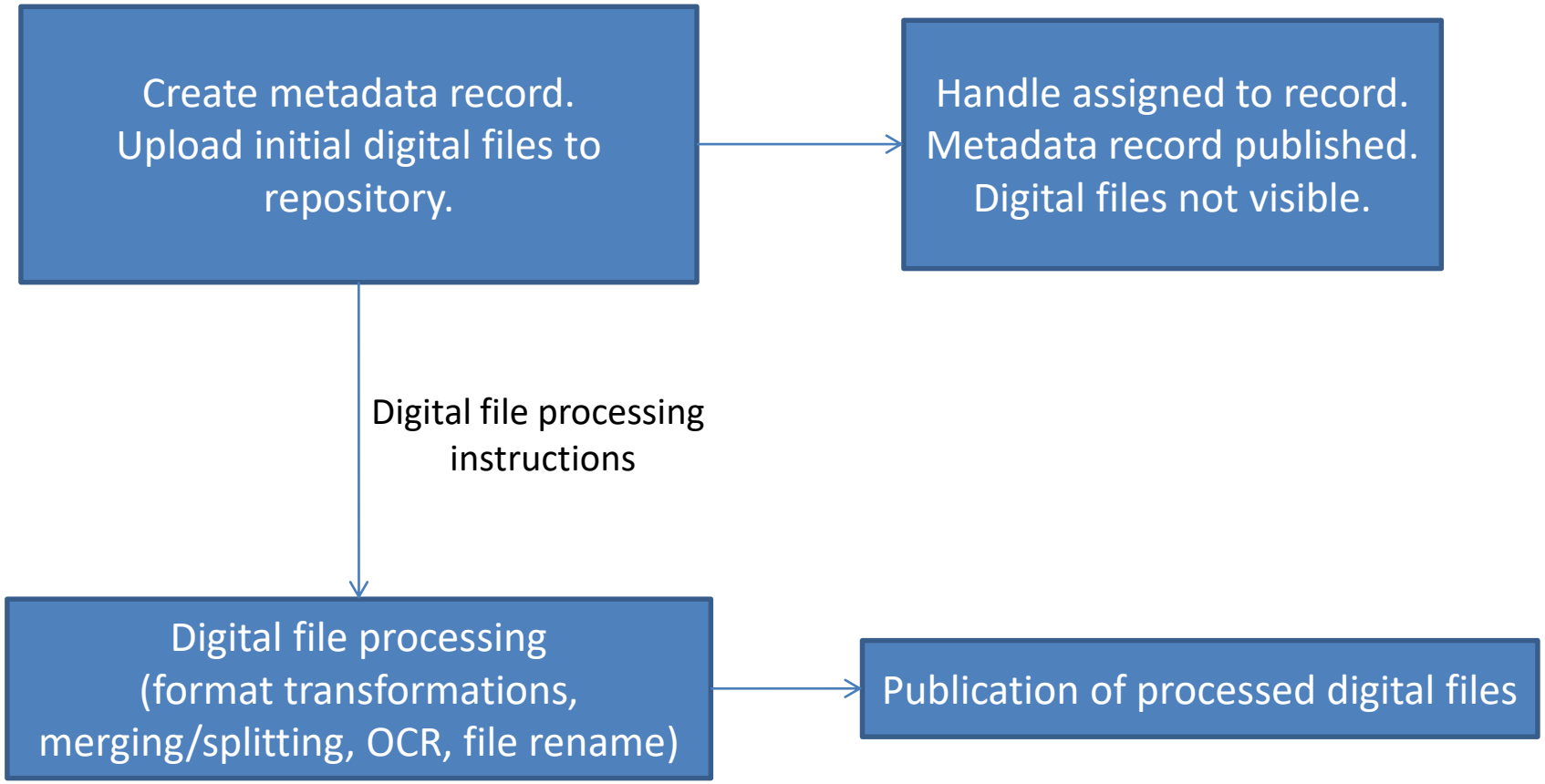
Processing workflow

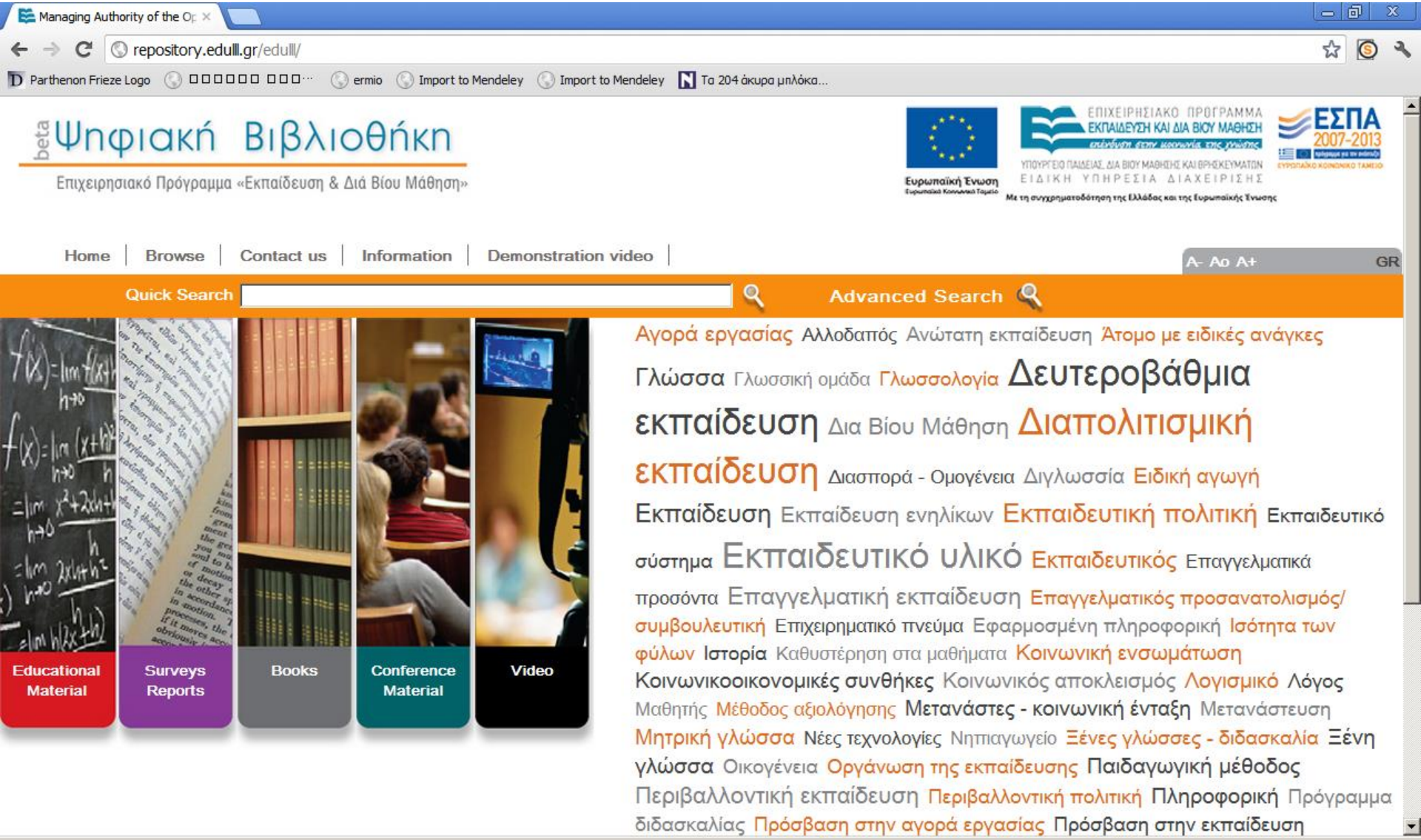


DSpace extensions

- Submission form enhancements
- User-friendly browsing (tagcloud, image-based type browsing)
- Embedding of video files
- Online reading / streaming of text material

Submission form enhancements

- Simplify procedure, fewer steps
- Enter metadata and upload multiple files from single form
- Subsequently edit metadata from submission form
- Multi-lingual controlled vocabularies with user-friendly values
- Various new widgets (e.g. language selection for fields, name processing)


Managing Authority of the Op
repository.edulll.gr/edulll/
Parthenon Frieze Logo
ermio
Import to Mendeley
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Τα 204 άκυρα μπλόκα...
beta Ψηφιακή Βιβλιοθήκη
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Ανώτατη εκπαίδευση
Άτομο με ειδικές ανάγκες
Γλώσσα
Γλωσσική ομάδα
Γλωσσολογία
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Δια Βίου Μάθηση
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Διασπορά - Ομογένεια
Διγλωσσία
Ειδική αγωγή
Εκπαίδευση
Εκπαίδευση ενηλίκων
Εκπαιδευτική πολιτική
Εκπαιδευτικό σύστημα
Εκπαιδευτικό υλικό
Εκπαιδευτικός
Επαγγελματικά προσόντα
Επαγγελματική εκπαίδευση
Επαγγελματικός προσανατολισμός/ συμβουλευτική
Επιχειρηματικό πνεύμα
Εφαρμοσμένη πληροφορική
Ισότητα των φύλων
Ιστορία
Καθυστέρηση στα μαθήματα
Κοινωνική ενσωμάτωση
Κοινωνικοοικονομικές συνθήκες
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Μαθητής
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Μετανάστες - κοινωνική ένταξη
Μετανάστευση
Μητρική γλώσσα
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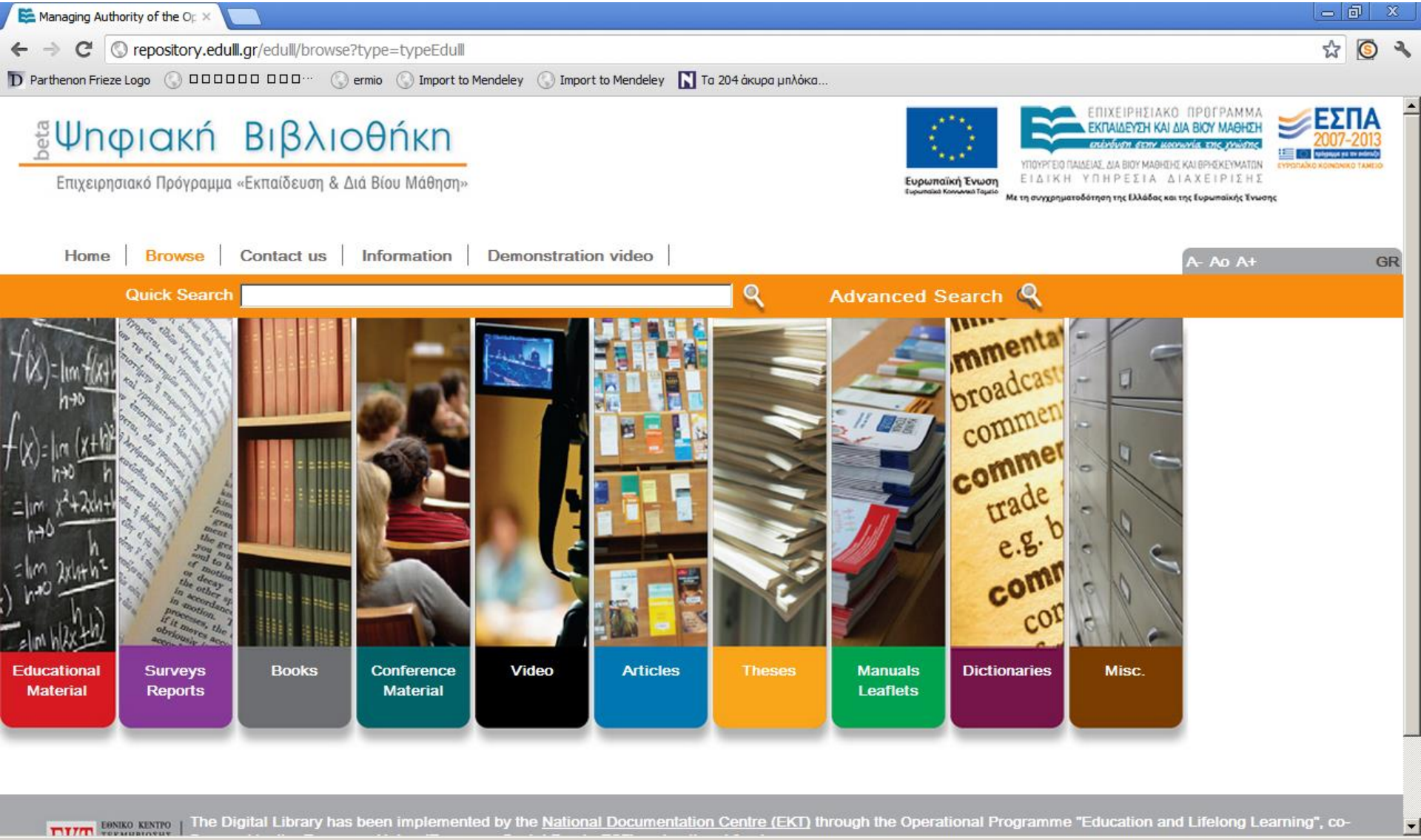
Νηπιαγωγείο
Ξένες γλώσσες - διδασκαλία
Ξένη γλώσσα
Οικογένεια
Οργάνωση της εκπαίδευσης
Παιδαγωγική μέθοδος
Περιβαλλοντική εκπαίδευση
Περιβαλλοντική πολιτική
Πληροφορική
Πρόγραμμα διδασκαλίας
Πρόσβαση στην αγορά εργασίας
Πρόσβαση στην εκπαίδευση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Dictionaries
Misc.
The Digital Library has been implemented by the National Documentation Centre (EKT) through the Operational Programme "Education and Lifelong Learning", co-

User-friendly browsing

- Tag cloud for subjects
- Configurable from dspace.dfg – can be used for any other field indexed for browsing
- Image-based browsing for content types

Configurable tag cloud (examples)

```
# Select the browse index to create a tag cloud for in the home page
# Possible values: any of the browse indices
webui.tagcloud.home.bindex = subject
#
# Select the total tags to show
# Possible values: any integer from 1 to infinity
webui.tagcloud.home.maxtags = 50
#
# Should display the score next to each tag?
# Possible values: true | false
webui.tagcloud.home.showscore = false
#
# The score that tags with lower than that will not appear in the rag
cloud
# Possible values: any integer from 1 to infinity
webui.tagcloud.home.cutlevel = 5
```

Embedding video files

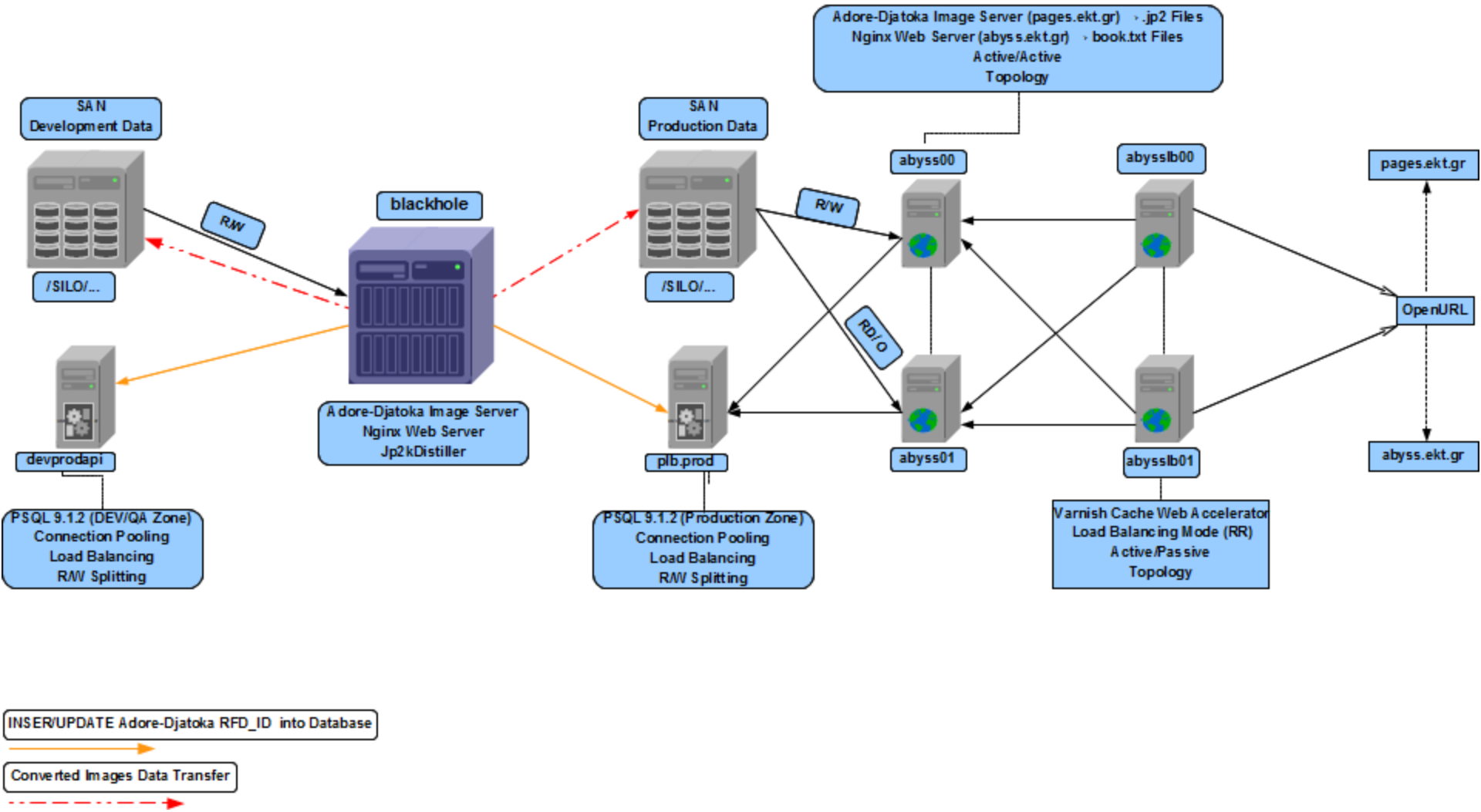
- H.264 enconding using a F4V video file container
- Video stream provided by Woowza
- Flowplayer selected from embedding video on metadata record page on repository
- Video-related fields included to the metadata submission/edit form

Online reader for text

- No need to download big files
- Bookmarking/sharing at the page level
- User access statistics at the page level
- Compatible with multitouch interfaces / tablets
- Based on the Internet Archive Book Reader
- Pages are JPEG2000 files served by an image server
- Sophisticated infrastructure for back-end processing

Online reader backend

- Two-tier backend:
  - content delivery and
  - content transformation
- Content delivery:
  - Nginx/Varnish load balancer/caching to 2 node tomcat/djatoka cluster serving JPEG2000 over a shared SAN storage and utilising a 3 node Postgres 9 cluster
- Content transformation
  - “Shadow” backend with specialized multithreaded content types transformation server
    - After transformation content copied to the delivery backend
  - Interfaced to OJS/Dspace
  - Manages the automatic batch conversion of content
  - Available as OSS (jp2k-distiller) http://code.google.com/p/jp2k-distiller/


Adore-Djatoka Image Server (pages.ekt.gr) › .jp2 Files
Nginx Web Server (abyss.ekt.gr) › book.txt Files
Active/Active
Topology
SAN
Development Data
/SILO/...
R/W
blackhole
Adore-Djatoka Image Server
Nginx Web Server
Jp2kDistiller
devprodapi
PSQL 9.1.2 (DEV/QA Zone)
Connection Pooling
Load Balancing
R/W Splitting
SAN
Production Data
/SILO/...
R/W
RD/O
plb.prod
PSQL 9.1.2 (Production Zone)
Connection Pooling
Load Balancing
R/W Splitting
abyss00
abyss01
abysslb00
abysslb01
Varnish Cache Web Accelerator
Load Balancing Mode (RR)
Active/Passive
Topology
pages.ekt.gr
OpenURL
abyss.ekt.gr
INSER/UPDATE Adore-Djatoka RFD_ID into Database
Converted Images Data Transfer

Jp2k-distiller & dpool – features

- Available as OSS (http://code.google.com/p/dpool/)
- Set of python scripts that schedules and manages batch conversion of content files to different formats, exploiting multithreaded batch conversion features.
  - Need to run multiple encoders/per server in order to achieve high sustainable conversion ratesortunity window lasts until the batch ends.
- Three (3) different conversion options over various Queues
  - PDF/TIFF → PNG Conversion Queue
  - PNG → JP2000 Conversion Queue
  - JP2000 → Publishing Queue
- Interfaced with OJS and DSpace over a HTTP interface
- New version: **dpool** (so radically improved we had to change names! ☺)
  - Tool for modular batch handling of any type of content conversion
  - Truly multinode: a central dispatcher server and an artibitaty amount of distributed "slave" workers over multiple physical or virtual servers
  - Technologies: Python, ZeroMQ – for master-slave node communication, GlusterFS as common filestore, MongoDB for statistics, NodeJS – for web based dashboard
  - You can start with one conversion machine and scale to hundreds

Future work

- Support self-archiving (two phase cataloguing)
- Include CRIS functionality – through a separate CERIF based system
- Various new features for presentation of content

Thank you for your attention!

- More info:

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