

Towards Digital Mathematics Library: from DML-CZ to EuDML

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FI MU, NLP seminar, October 6th, 2010



Vision of WDML/EuDML

At the beginning there was a vision of all mathematical knowledge, *peer reviewed and verified* (100 000 000 pages) on one spot and in the digital form.

It starts to happen, but slowly: three year EU projekt EuDML (programme EU CIP-ICT-PSP, type Pilot B) from February 2010 (MU and MU AV).

As a basis serve current DML repositories as DML-CZ or NUMDAM (bottom-up build up).

Example of DML-CZ: up and running digital mathematic library with nearly 30,000 papers. For more, see (who, what, browse, browse similar, how to search).

All comments to DML-CZ welcome!

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DML-CZ – data: scientific math published in Czech and Slovak

Proof. Let \hat{K} be a cube, $\hat{K} \subset \hat{\Omega}$; put $K = \varphi^{-1}(\hat{K})$. According to theorem 50 we have $K \in \mathfrak{U}$ and it follows from theorem 24 that

$$P(K, v) = \int_K f(x) \, dx. \quad (89)$$

The functional determinant T of the mapping $\varphi = \varphi^{-1}$ fulfils the relation $T(\varphi(x)) \cdot \det M(x) = 1$, so that

$$\int_K f(x) \, dx = \int_{\hat{K}} f(\varphi(y)) \cdot |T(y)| \, dy = \int_{\hat{K}} \hat{f}(y) \, dy. \quad (90)$$

From theorem 50 (and relation (89)) we see that $P(K, v) = P(\hat{K}, \hat{v})$; relations (89), (90) show therefore that $P(\hat{K}, \hat{v}) = \int_{\hat{K}} \hat{f}(y) \, dy$, which completes the proof.

Remark. The reader may compare this paper with [6].

REFERENCES

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Резюме

ПОВЕРХНОСТНЫЙ ИНТЕГРАЛ

ЯН МАРШИК (Jan Mařík), Прага.

(Поступило в редакцию 10/X 1955 г.)

Пусть m — натуральное число; пусть E_m — m -мерное евклидово пространство. Для всякого ограниченного измеримого множества $A \subset E_m$ положим $\|A\| = \sup \int_A \sum_{i=1}^m \frac{\partial v_i(x)}{\partial x_i} \, dx$, где v_1, \dots, v_m — многочлены такие, что $\sum_{i=1}^m v_i^2(x) \leq 1$ для всех $x \in A$. Пусть \mathfrak{U} — система всех ограниченных измеримых множеств A , для которых $\|A\| < \infty$. Теорема 18 тогда утверждает: Пусть $A \in \mathfrak{U}$; пусть D — граница множества A . Тогда на системе \mathfrak{B} всех борелевских подмножеств множества D существует мера μ и на



ИОСИФ ВИССАРИОНОВИЧ СТАЛИН

1879—1953

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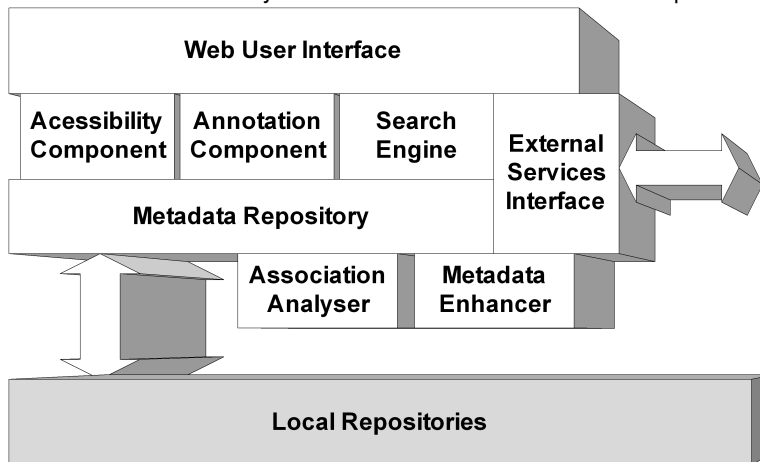


ИОСИФ ВИССАРИОНОВИЧ СТАЛИН

1879—1953

EuDML as a virtual library portal

EuDML will be *virtual* library based on data from smaller DLs and publishers:



EuDML – data: legacy scientific math

- By 2013, EuDML should integrate *12 repositories*, have content from *200 integrated collections* (journals, book series, conference proceedings,...), more than *160,000 digital items* (papers, book chapters), *500,000 links between database objects*.
- It should be ‘live’ DL, having more than *1,000 users* contributing annotations, and more than *10,000 annotation* by 2013.
- Concept of *moving wall*: legacy data even from commercial publishers.

But how to actually implement it?

Experience from iproject partners from current digital library development.

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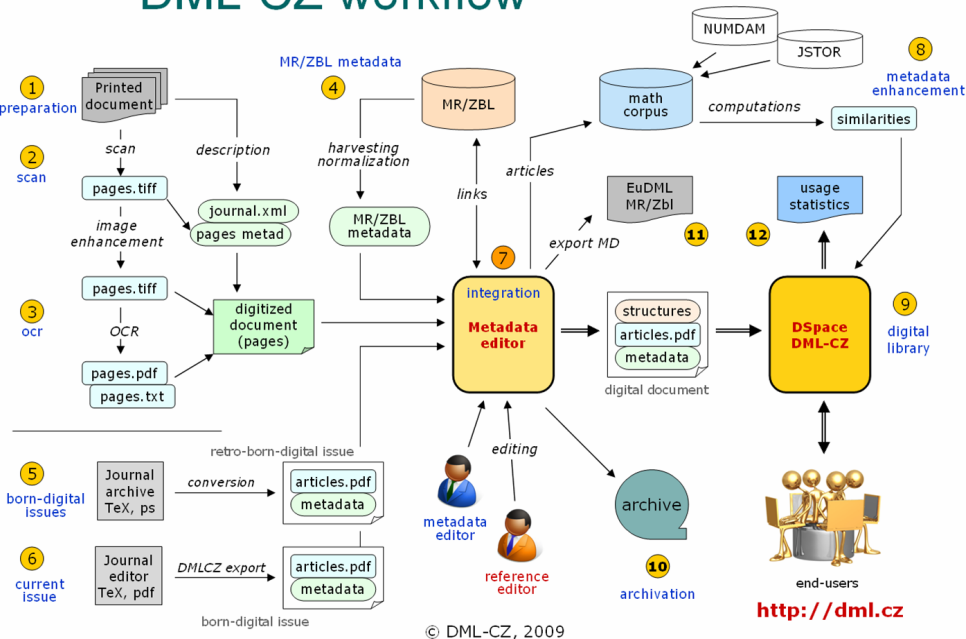
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Take care!

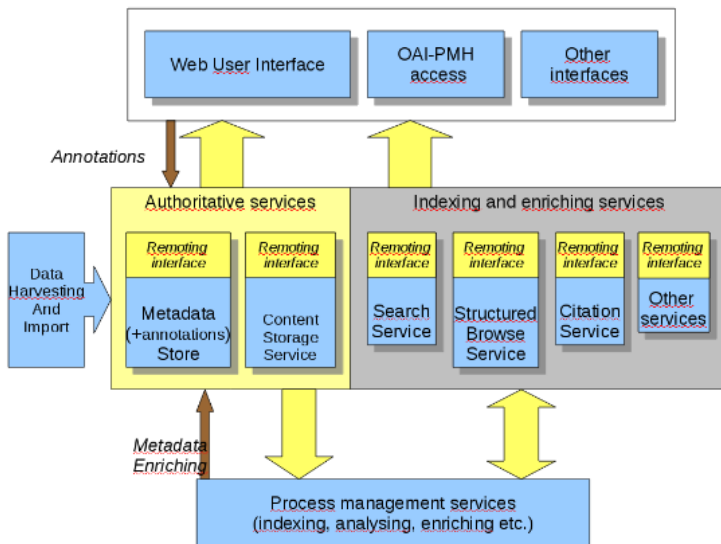


DML-CZ workflow

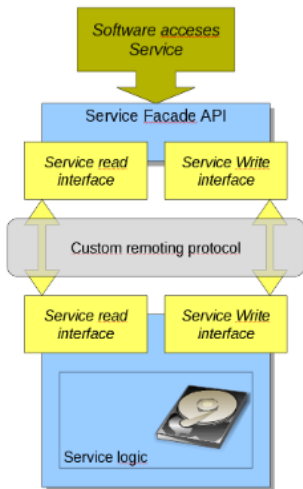


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EuDML service based architecture



EuDML service based architecture II

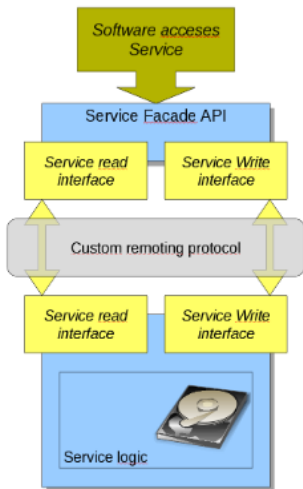


based on existing YADDA (used in Driver, Driver II) and REPOX (used in EuropeanaLocal, Telplus) projects – both are verified and mature platforms (implemented in Java)

math specifics needed to develop (T_EX to MathML converter, math OCR, math in metadata support,...

MU offers: Metadata editor and other tools and expertise, mainly to be used in *WP7 Metadata Enhancements*

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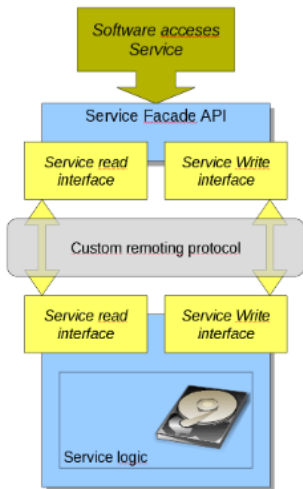


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Data heterogeneity, plethora of formats, validation and conversions:

retro-digital period: scanning, geometrical transformations (BookRestorer),
OCR (FineReader, InftyReader), two-layer PDF

retro-born-digital period: not complete .tex or .dvi data, bad formats, bitmap
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Current activities: 4+ papers at DML 2010 workshop, accepted paper at LREC 2010 (with Radim Řehůřek), DocEng 2010 in Manchester,...

Next activities: EuDML working meeting in Prague in October 13–16th, and general meeting in Madrid in February 2011.

In Prague: WP7 technical meeting, tool implementation.

Working meetings at MU (LEMMA) every Tuesdays, 3PM.

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Current activities: 4+ papers at DML 2010 workshop, accepted paper at LREC 2010 (with Radim Řehůřek), DocEng 2010 in Manchester,...

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In Prague: WP7 technical meeting, tool implementation.

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Comments, cooperation offers welcome!

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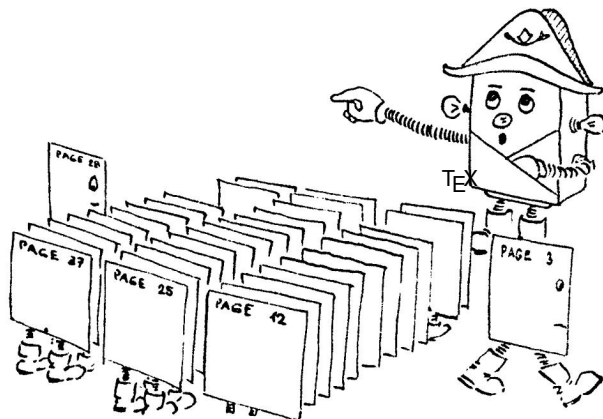
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Comments? Cooperation? Questions?



Questions? Otherwise other 5 talks to follow.

References, links



DML-CZ team.

Materials about DML-CZ, project publications [online, cit. 2010-04-28].

<<http://project.dml.cz/documents.html>>.



EuDML team.

EuDML project info [online, cit. 2010-04-28].

<http://ec.europa.eu/information_society/apps/projects/factsheet/index.cfm?project_ref=250503>



EuDML team.

EuDML preliminary webpage [online, cit. 2010-04-28].

<<http://eudml.devspace.net/>>.



EuDML at MU team.

EuDML at MU project info [online, cit. 2010-04-28].

<<http://nlp.fi.muni.cz/projekty/eudml/>> or <<http://www.muni.cz/research/projects/10067>>.