

Developing publishing process support system with Fedora and Orbeon Forms - A case study

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Table of Contents

- 1 Introduction
- 2 Autogeneration of XForms editor from XML metadata
- 3 Autocompletion of metadata blocks

Introduction

Searching for good platform

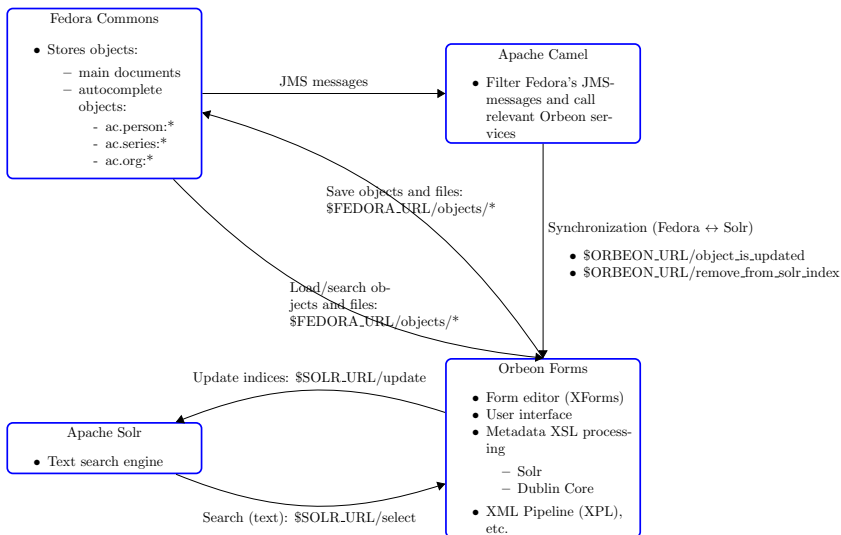
During development, following requirements arose:

- support for hierarchical metadata,
- support for multiple languages,
- versioning of the metadata and files,
- ability to link multiple documents to each other,
- support for author, series, and organization identifiers.

→ Fedora.

Convergence towards Fedora & Orbeon Forms

Used architecture is almost XRX (XForms - Rest - XQuery/XSLT):



Lines represents REST-calls between components

About XForms

In this presentation, we focus on the metadata input process.

We are using heavily XForms with Orbeon Forms.

XForms:

- XForms 1.1 W3C Recommendation (October 2009),
- allows to create complex input forms and other interfaces in XHTML,
- almost a programming language,
- metadata can be stored and processed in XML (no conversions!).

Pros & cons of used software

Pro:

- rapid creation of UI and metadata editors with Orbeon Forms,
- interoperability between components is easy with REST-style data transfers,
- XML is used thoroughly in whole system,
- modularisation and expandability.

Con:

- steep learning curve,
- XForms documentation is not yet complete,
- XML is used thoroughly in whole system,
- some unanswered questions:
 - edit locking,
 - authorization,
 - heavier processing,
 - different roles.

Autogeneration of XForms editor from (almost arbitrary) XML metadata

Editor for complex metadata?

The amount of metadata for doctoral thesis is quite large:

- information about dissertants, custos, reviewers, other people,
- dissertation event, series information,
- publication info.

The used metadata format is hierarchical and fine grained to avoid comma-separated values.

Complexity of metadata

→ Form editor is complex

→ Autogenerate editor from given XML metadata.

Generating XForms editor

We created an XSL transformation to generate XForms editor from given metadata:

Metadata XML

```
<metadata>
  <person>
    <first_name/>
    <last_name/>
  </person>
</metadata>
```

XSL
→

XForms code

```
<xhtml:head> ... <xforms:model>
  <xforms:instance id="metadata">
    <metadata xmlns="">
      <person>
        <first_name/>
        <last_name/>
      </person>
    </metadata>
  </xforms:instance>
</xforms:model> ...
</xhtml:head><xhtml:body>
...
  <xforms:input ref="instance('metadata')/first_name">
    <xforms:label>first_name</xforms:label>
  </xforms:input>

  <xforms:input ref="instance('metadata')/last_name">
    <xforms:label>last_name</xforms:label>
  </xforms:input>
...
</xhtml:body>
```

Metadata editor

Choose Form Language English

person

person:

first_name:

last_name:

Orbeon
Forms
←

Example: Dublin core editor

Metadata

```
<rdf:RDF xmlns:rdf=...>
  <rdf:Description rdf:about="...">
    <dc:creator/>
    <dc:creator/>
    <dc:title ouf:type="textarea"/>
    <dc:description
      ouf:type="textarea"
      ouf:html_editor="true"/>
    <dc:date ouf:type="xs:date"/>
  </rdf:Description>
</rdf:RDF>
```

Metadata editor

Choose Form Language

rdf:Description

rdf:Description: rdf:about

 dc:creator: dc:creator: dc:title: dc:description: dc:date:

Example: Dublin core editor

Metadata

```
<rdf:RDF xmlns:rdf=...>
  <rdf:Description rdf:about="...">
    <dc:creator/>
    <dc:creator/>
    <dc:title ouf:type="textarea"/>
    <dc:description
      ouf:type="textarea"
      ouf:html_editor="true"/>
    <dc:date ouf:type="xs:date"/>
  </rdf:Description>
</rdf:RDF>
```

Features:

- 1 Multilanguage
- 2 Repeating fields
- 3 Different input fields
- 4 HTML editor

Metadata editor

Choose Form Language English 1

rdf:Description

rdf:Description: rdf:about Choose one... Add

2 { **dc:creator:** Add Remove

dc:creator: Add Remove

dc:title: Add

dc:description: HTML Edit Add

3 { **dc:date:** Add

January 2001

Su	Mo	Tu	We	Th	Fr	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Edit metadata field in HTML

HTML Editor, now included!

Describes process for planting and nurturing different kinds of rose bushes.

4

Features, cont.

Metadata

```
<metadata xmlns=...>
  <person>
    <first_name/>
    <ouf:label elementname="first_name">
      First name
    </ouf:label>
    <last_name/>
    <ouf:hint elementname="last_name"
      lang="eng">Display name is generated
      automatically
    </ouf:hint>
    <xforms:bind ref="//display_name"
      calculate="concat( //last_name, ', ', ', ',
      //first_name)"/>
    <display_name calculate="true"/>
    <organization show="false">
      <org_name/>
    </organization>
  </person>
  <publication>
    <pub_title/>
  </publication>
</metadata>
```

More features:

- 1 tabs,
- 2 translations,
- 3 calculate values,
- 4 helps & hints,
- 5 hide/show blocks.

Metadata editor

Choose Form Language English

person publication

person:

2 First name:

last_name:

display_name: 3 4

Show Additional

organization: Information 5

How about more complex metadata?

The created XSL can take (almost) arbitrary XML and create a somewhat usable metadata editor. For example, XMetadiss:

Metadata editor

Choose Form Language English ▾

dc.title	dcterms.alternative	dc.creator	dc.subject	dcterms.abstract	dc.publisher	dc.contributor	dcterms.dateAccepted	dcterms.issued	dc.type	dc.identifier
dcterms.medium	dc.language	dc.rights	dcterms.accessRights	thesis.degree	dcb.contact	dcb.fileNumber	dcb.fileProperties	dcb.rights	dcb.dateDelivered	

dc:creator: xsi:type Choose one... ▾ Add

pc:person: gender Choose one... ▾ Add

pc:name: type Choose one... ▾ Add

pc:foreName: Add

pc:surName: Add

pc:dateOfBirth: **xsi:type** Choose one... ▾ Add

pc:profession: **Scheme** Choose one... ▾ Add

pc:countryPubl: **countryCode** Choose one... ▾ **type** Choose one... ▾ Add

pc:publications: Add

dc:title: **Wernig** **xsi:type** Choose one... ▾ **Choose Form Language** Choose one... ▾ Add

dcterms:issued: **xsi:type** Choose one... ▾ Add

Autocompletion of metadata blocks

Autocompletion

Some of the inputted data repeats itself in many cases:

- organizations,
- series,
- personnel.

Because our metadata is fine-grained, each entity contains many fields

- data input is tedious
- why not automate this?

Autocomplete example

- 1 Blocks (ie. organization) can be autocompleted from drop-down list,
- 2 List is created from Fedora objects (ac.org:*),
- 3 Whole block is replaced,
- 4 Updated data can be submitted back into the Fedora object.

Person Name Suffix:

Nie:

Person Cited as:

Person Organisation Information: Autocomplete (ac.org)

Fedora Identifier:

Organisation Identifier: Choose Identifier Type: Choose one...

University Name: [eng] Choose Language: English

Faculty: [eng] Choose Language: English

Department: [eng] Choose Language: English

Subject: [eng] Choose Language: English

Choose Organization Type

Other organisation: [eng] Choose Language: English Choose one...

Organisation Display Name: [eng] Choose Language: English

Show Additional Address: Information

Autocomplete example

- 1 Blocks (ie. organization) can be auto completed from drop-down list,
- 2 List is created from Fedora objects (`ac.org:*`),
- 3 Whole block is replaced,
- 4 Updated data can be submitted back into the Fedora object.

Person Name Suffix: Add

Nic: Add

Person Cited as: Add

Person Organisation Information: Autocomplete (ac.org) Update autocomplete object Add

Fedora Identifier:	<input type="text"/>	University of Oulu - Faculty of Medicine - Institute of Health Sciences - General Practice - (ac.org.59)
Organisation Identifier:	<input type="text"/>	University of Oulu - Faculty of Medicine - Institute of Health Sciences - Health Administration - (ac.org.57)
University Name:	<input type="text"/>	University of Oulu - Faculty of Medicine - Institute of Health Sciences - Nursing Science - (ac.org.55)
Faculty:	<input type="text"/>	University of Oulu - Faculty of Medicine - Institute of Health Sciences - Public Health - (ac.org.56)
Department:	<input type="text"/>	University of Oulu - Faculty of Science - Department of Biochemistry - (ac.org.21)
Subject:	<input type="text"/>	University of Oulu - Faculty of Science - Department of Biology - (ac.org.22)
Other organisations:	<input type="text"/>	University of Oulu - Faculty of Science - Department of Chemistry - (ac.org.24)
Organisation Display Name:	<input type="text"/>	University of Oulu - Faculty of Science - Department of Geography - (ac.org.27)
		University of Oulu - Faculty of Science - Department of Information Processing Science - (ac.org.29)
		University of Oulu - Faculty of Science - Department of Mathematical Sciences - (ac.org.28)
		University of Oulu - Faculty of Science - Department of Physics - (ac.org.23)
		University of Oulu - Faculty of Science - Division of Biophysics - (ac.org.20)
		University of Oulu - Faculty of Science - Faculty of Science - (ac.org.26)
		University of Oulu - Faculty of Technology - Chemical Process Engineering Laboratory - (ac.org.64)
		University of Oulu - Faculty of Technology - Department of Architecture - (ac.org.63)
		University of Oulu - Faculty of Technology - Department of Electrical and Information Engineering - (ac.org.71)
		University of Oulu - Faculty of Technology - Department of Electrical Engineering - (ac.org.72)
		University of Oulu - Faculty of Technology - Department of Industrial Engineering and Management - (ac.org.74)
		University of Oulu - Faculty of Technology - Department of Mechanical Engineering - (ac.org.65)
		University of Oulu - Faculty of Technology - Department of Process and Environmental Engineering - (ac.org.68)

Show Additional Address: Information Add

Autocomplete example

- 1 Blocks (ie. organization) can be autocompleted from drop-down list,
- 2 List is created from Fedora objects (ac.org:*),
- 3 Whole block is replaced,
- 4 Updated data can be submitted back into the Fedora object.

Person Name Suffix: Add

Nic: Add

Person Cited as: Add

Person Organisation Information: University of Oulu - Faculty of Science - Department of Physical Sciences - - (ac.org:23) Update autocomplete object Add

Fedora Identifier: ac.org:23 Add

Organisation Identifier: Choose Identifier Type: Choose one... Add

University Name: University of Oulu [eng] Choose Language: English Add Remove

University Name: Oulun yliopisto [fin] Choose Language: Finnish Add Remove

Faculty: Faculty of Science [eng] Choose Language: English Add Remove

Faculty: Luonnontieteellinen tiedekunta [fin] Choose Language: Finnish Add Remove

Department: Department of Physical Sciences [eng] Choose Language: English Add Remove

Department: Fysikaalisten tieteiden laitos [fin] Choose Language: Finnish Add Remove

Subject: [eng] Choose Language: English Add Remove

Subject: [fin] Choose Language: Finnish Add Remove

Other organisation: [eng] Choose Language: English Choose Organization Type: Choose one... Add Remove

Other organisation: [fin] Choose Language: Finnish Choose Organization Type: Choose one... Add Remove

Organisation Display Name: [eng] Choose Language: English Add

Show Additional Address: Information Add

Autocomplete example

- 1 Blocks (ie. organization) can be autocompleted from drop-down list,
- 2 List is created from Fedora objects (ac.org:*),
- 3 Whole block is replaced,
- 4 Updated data can be submitted back into the Fedora object.

Person Name Suffix: Add

Nic: Add

Person Cited as: Add

Person Organisation Information: University of Oulu - Faculty of Science - Department of Physical Sciences -- (ac.org 23) Update autocomplete object Add

Fedora Identifier: Add

Organisation Identifier: Choose Identifier Type: Choose one... Add

University Name: [eng] Choose Language: English Add Remove

University Name: [fin] Choose Language: Finnish Add Remove

Faculty: [eng] Choose Language: English Add Remove

Faculty: [fin] Choose Language: Finnish Add Remove

Department: [eng] Choose Language: English Add Remove

Department: [fin] Choose Language: Finnish Add Remove

Subject: [eng] Choose Language: English Add Remove

Subject: [fin] Choose Language: Finnish Add Remove

Other organisation: [eng] Choose Language: English Type Choose one... Add Remove

Other organisation: [fin] Choose Language: Finnish Type Choose one... Add Remove

Organisation Display Name: [eng] Choose Language: English Add

Show Additional Address: Information Add

Implementation of autocomplete

Metadata (Fedora object, e.g. thesis:2)

```
<publication_metadata>
<pub_info>
...
  <pub_title>Test publication</pub_title>
...
</pub_info>
<creator_info>
...
  <person_org_info ac_choice="ac.org:23">
    <fedora_id>ac.org:23</fedora_id>
    <org_id org_id_schema=""/>
    <org_univ_name lang="eng">University of Oulu</org_univ_name>
    <org_univ_name lang="fin">Oulun yliopisto</org_univ_name>
    <org_faculty_name lang="eng">Faculty of Science</org_faculty_name>
    <org_faculty_name lang="fin">Luonnontieteellinen
    tiedekunta</org_faculty_name>
    ...
    <org_address show="false">
      ...
      <street_name lang="eng">P.O.Box 3000</street_name>
      <post_number lang="eng">FI-90014</post_number>
      ...
    </org_address>
  </person_org_info>
  ...
</creator_info>
<thesis_info>...</thesis_info>
</publication_metadata>
```

Fedora object ac.org:23

- 1 Metadata contains all information about publication,
- 2 Each autocomplete block is also stored as a separate object in Fedora by using xforms:submit-method.

Autocompletion

Benefits of block-level autocomplete:

- reduces typing,
- reduces errors,
- publication contains the publication-time information,
- object database contains the newest information,
- e.g. organization lists are easy to generate.

Conclusion

- Currently, the input framework and the basic functionality is implemented.
- Rapid development with Orbeon Forms & Fedora
 - steep learning curve,
 - small amount of code,
 - XML-based,
 - good interoperability.
- Generation of XForms editor
 - fast prototyping,
 - allows to use fine-grained and complex metadata,
 - editor can have sophisticated features,
 - block-level autocomplete,
 - hopefully the source code for this autogeneration will be released on some day on our wiki:
<https://wiki.oulu.fi/display/UusiJultika/Home>.

That's all, folks!

Thank you!

Questions?