Extending XForms with Server-Side Functionality

Markku Laine, Denis Shestakov, Petri Vuorimaa
Aalto University
Finland
Presentation is about...

Web application architectures
XML technologies
End-user programming
Presentation Outline

Introduction
Proposed approach
Proposed XForms server-side extensions
The XFormsDB framework
Conclusions
Introduction
Three-Tier Web Application Architecture
Conventional Web Application Architecture

**Presentation**

- **(X)HTML**
- **JavaScript**

**Logic**

- **Java / Ruby / Python**

**Data**

- **SQL**
Conventional Web Application Architecture

Presentation

Logic

Data

(X)HTML
JavaScript
Object-JSON Mapper
Java / Ruby / Python
Object-Relational Mapper
SQL

XML
JSON
Object
Relational
Problems with the Architecture

- Multiple programming languages
- Multiple data models
- Multi-paradigm approach

→ Makes the development of entire Web applications extremely complex
How could we simplify the architecture?

...and as a result...

turn more people into Web developers.
Proposed Approach
Proposed Approach

One programming language
One data model
One paradigm approach

→ Unified Web application architecture
Proposed Approach

"Everyone" knows (X)HTML, right?

→ Let's use it as the base language
What about interaction?
Proposed Approach

Prefer XForms over JavaScript

→ XForms is even part of XHTML 2.0!
XForms Web Application Architecture
Proposed Web Application Architecture

Presentation

Logic

Data

XHTML

XForms

XForms

XForms (XPath)

XML

XML

XML
Proposed Web Application Architecture

- **Presentation**
  - XHTML
  - XForms
  - XForms

- **Logic**
  - XPath

- **Data**
  - XML
  - XML
  - XML

Diagram showing the architecture with layers for presentation, logic, and data, and technologies such as XHTML, XForms, XPath, and XML.
Proposed XForms Server-Side Extensions
Proposed XForms Server-Side Extensions

- Definition of Server-Side Requests
- Submission of Server-Side Requests
- Notification about Server-Side Errors
- Permission Management
- Reuse of Code Fragments

→ Seamless integration with XForms
<?xml version="1.0" encoding="UTF-8"?>
<html xmlns="http://www.w3.org/1999/xhtml" ...>
<head>
<title>Notes</title>
<xformsdb:include resource="xinc/meta.xinc" />
<xforms:model>
  <xforms:instance id="notes">
    <dummy xmlns="" />
  </xforms:instance>
  <xformsdb:instance id="select-notes">
    <xformsdb:query datasrc="notes">
      <xformsdb:expression>/root/notes</xformsdb:expression>
    </xformsdb:query>
  </xformsdb:instance>
  <xformsdb:submission id="sub-select-notes" replace="instance"
    instance="notes" requestinstance="select-notes" />
    <xforms:send submission="sub-select-notes" ev:event="xforms-ready" />
  </xforms:model>
</head>
<body>
...
</body>
</html>
The XFormsDB Framework
The XFormsDB Framework

- Implements the proposed extensions
- Supports all major Web browsers
- Supports various data sources
- Supports extensibility on all three tiers
- Open source!
Evaluation: Web Applications and Widgets
Conclusions
Conclusions

• Entire Web applications can be developed using only one programming paradigm, language, and data model
  – Simplifies the architecture
• Presentation tier technologies provide a good basis for the architecture
  – Especially markup languages (e.g., (X)HTML) due to their wide adoption and ease of use
• Our proposed approach is based on XForms
  – Only a few new elements, good XML knowledge is needed
• The implementing framework, XFormsDB, suits well for developing small- and medium-sized Web applications and widgets
Related Work


Thank you for your attention!

Markku Laine
M.Sc. (Tech.), Ph.D. student

+358 50 565 8179
markku.laine@aalto.fi

http://media.tkk.fi/webservices/personnel/markku_laine.html