



EXPath

A packaging system for XML libraries and a portable web application framework

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EXPath

- **Introduction**
- Simple examples
- The packaging system
- Web applications
- A comprehensive example
- Conclusion





Introduction - History

- EXSLT for XSLT 1.0
- XSLT 2.0 and needs for new extensions
- EXSLT 2.0, EXQuery & EXProc
- XML Prague 2009 – EXPath
- First modules – HTTP Client & ZIP Facility
- Balisage 2009 – the Packaging System
- XML Prague 2010 – the Webapp module



Introduction - Scope

- Quite vague (*that is a feature, not a bug*)
- Extensions for XPath of course
- But also: XSLT, XQuery, XProc (and XForms, XML Schema, DSDL, etc.; that is, XML technologies)
- Mainly extension functions
- But also: servlet container, packaging system...



Introduction - Goals

- *Collaboratively defining open standards for portable XPath extensions*
- The main means is extension functions
- The main goal is defining portable specifications...
- ...and convincing vendors to endorse them
- But also providing support to open-source implementations



Introduction - Processes

- More or less formal, more or less informal (*that is a feature, not a bug*)
- The definitive goal is writing specifications
- The main tool is the mailing list
- Each module has one main maintainer, responsible of editing & achieving consensus
- Other tools include Subversion repositories, public Wiki, etc.
- More infos about processes on the wiki



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Examples – HTTP Client

- A single function to send HTTP requests and handle corresponding responses
- Get the description of the request as an XML element (with verb, headers, content...)
- Return a description of the response as an XML element (with code, headers, content...)
- Actually the content is handled differently (as separate items, either text, XML, HTML or binary) to avoid the SOAP envelope syndrome



Examples – HTTP Client

`http:send-request($request as element(http:request)) as item()+`

```
<http:request href="http://www.example.com/..." method="post">
  <http:header name="X-Header" value="some value"/>
  <http:body content-type="application/xml">
    <hello>World!</hello>
  </http:body>
</http:request>
```

```
<http:response status="200" message="Ok">
  <http:header name="..." value="..." />
  ...
  <http:body content-type="application/xml"/>
</http:response>
```

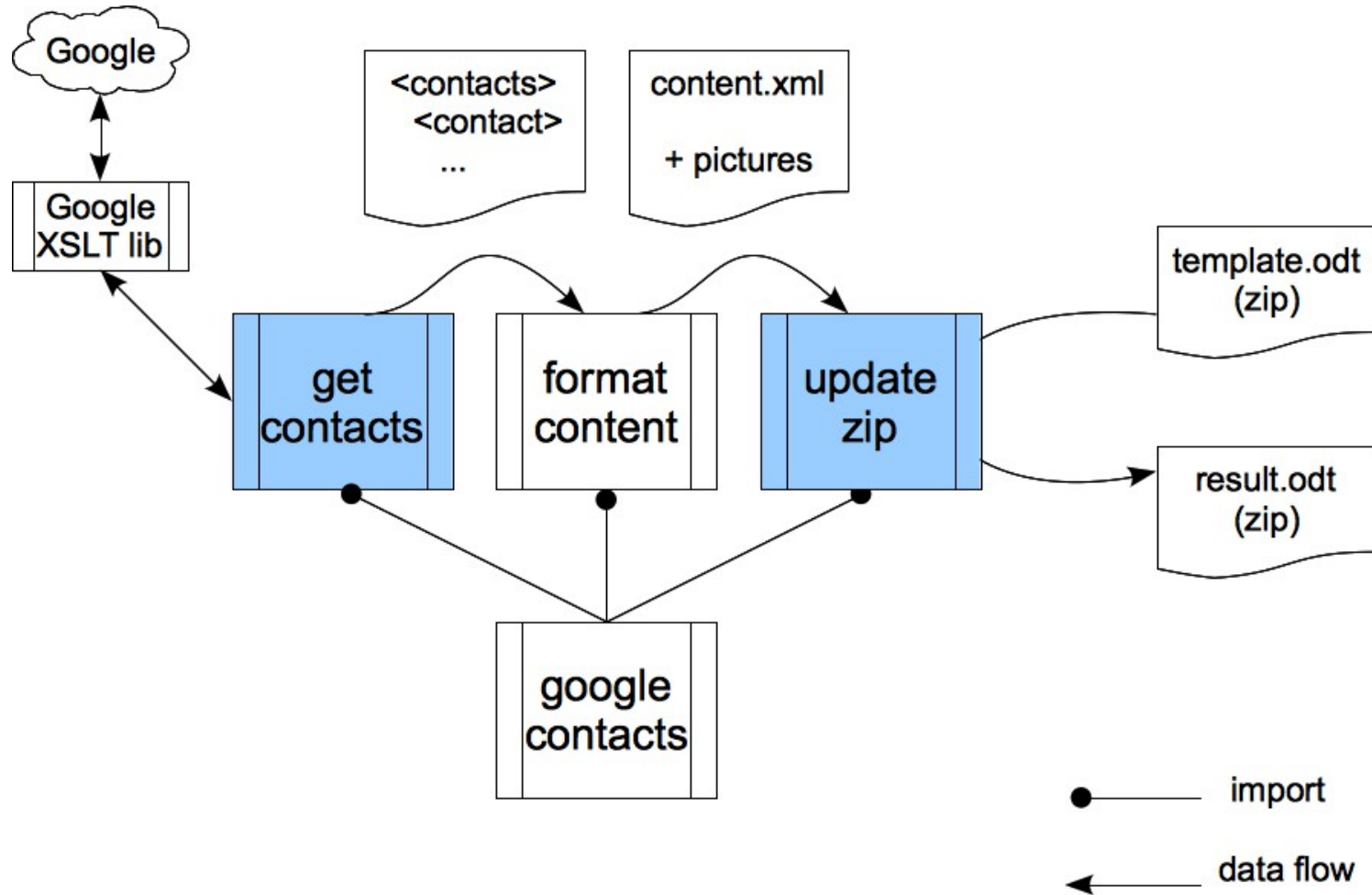


Examples – ZIP Facility

- List entries:
 - `zip:entries($href)` as `element(zip:file)`
- Extract entries:
 - `zip:xml-entry($href, $path)` as `document-node()`
 - `zip:html-entry($href, $path)` as `document-node()`
 - `zip:text-entry($href, $path)` as `xs:string`
 - `zip:binary-entry($href, $path)` as `xs:base64Binary`
- Create new ZIP files:
 - `zip:zip-file($zip)` as `empty()`
 - `zip:update-entries($zip, $output)` as `empty()`





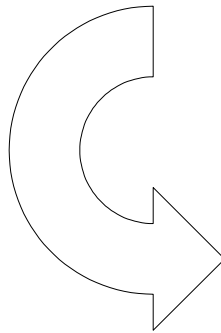
Examples – Google Contacts

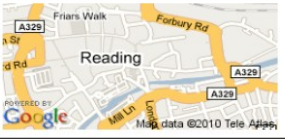







Examples – Google Contacts

Contacts		
Photo	Name	Map
	Chloe Francois rue de Qwerty	



Contacts		
Photo	Name	Map
	Michael Kay Saxonica mike@saxonica.com Reading, UK Group: XSL List	
	Florent Georges fgeorges.test@gmail.com rue de Savoie 73 1060 Brussels	
	Jirka Kosek jirka@kosek.cz Groups: XML Prague, XSL List	
	Jim Fuller FlameDigital Ltd. iim.fuller@xmlprague.cz	



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Packaging – The problem

- How to install a library of UBL format helpers?
- Depends on the processor
- Easy: just copy the files *somewhere*
- To use them, adapt the XSLT import URI or the XQuery import *at hint* in your using stylesheets or queries
 - `<xsl:import href="file:///c:/xquery/ubl-helpers/mod-1.xsl"/>`
 - `import module namespace
ubl = "http://fgeorges.org/ubl/mod-1"
at "dadb://modules/ubl-helpers/mod-1.xql";`



Packaging – Houston, we've...

- But UBL Helpers actually use FunctX
- So you have to change the import statements throughout this third-party library
- Wait a minute, no problem, really, UBL Helpers have to include FunctX
- But your application uses another library, which in turn also uses FunctX
- ...



Packaging – Intermezzo

- OASIS XML Catalogs provide a bit of fresh air
- They help avoiding the requirement of changing import statements...
- ...as long as everyone agree on URIs to use in import statements
- They must then be supported by all products
- One has to install configure catalogs for its system by hand, again and again



Packaging – Standard format

- The solution lays in a standard format to describe X^* components
 - Must describe what is needed but is not in the X^* specifications (*well-defined import URIs*)
 - Must be understood by most processors (*suitable for standard libraries*)
 - Must package the components and additional informations in a single file (*suitable as a delivery format*)
 - Must be eXtensible (*that's XML, isn't it?*)
- Installation process can then be automated



Packaging – Overview

The screenshot displays the Saxon-EE software interface. The main window shows the XML package definition for 'functx' in 'expath-pkg.xml'. The package is defined with the namespace 'http://expath.org/ns/pkg' and contains two modules: 'functx' (version 1.0) and 'functx.xq'.

```
1 <package xmlns="http://expath.org/ns/pkg">
2
3   <module name="functx" version="1.0">
4     <title>Functx library</title>
5     <xslt>
6       <import-uri>http://www.functx.com/functx.xsl</import-uri>
7       <file>functx.xsl</file>
8     </xslt>
9     <xquery>
10      <namespace>http://www.functx.com</namespace>
11      <file>functx.xq</file>
12    </xquery>
13  </module>
14
15 </package>
16
```

The interface also shows a Project Explorer on the left with the following structure:

- Archive Browser
 - functx-1.0.xar
 - functx
 - functx.xq
 - functx.xsl
 - expath-pkg.xml



Packaging – Tools

- Standard on-disk repository layout
- Command-line repository manager
- Implementation for Saxon (XQuery, XSLT)
- Implementation for Calabash (RELAX NG RNG + RNC, Schematron, XProc, XQuery, XML Schema and XSLT)
- Implementations provide a Java API as well as command-line scripts



Packaging – Further

- Repository manager can install directly from the web
 - `xrepo install http://cxan.org/xxx.xar`
- That leads to the idea of CXAN (like CPAN for Perl or CTAN for TeX/LaTeX): a global, online repository of existing package
 - `cxan install functx`
- A key point is user and vendor adoption, and support in existing tools like IDEs



Packaging – Projects

- The package format is low-level and strict
 - e.g. require the target namespace for an XQuery module in the package descriptor
- Using simple conventions, it is possible to create consistent project structure
- Other info can be added in the component source files
- Structure and annotations captures some packaging information, used by a packager



Packaging – Projects

- Low-level specifications are technical and strict
- They are as less as possible
- Conventions are flexible
- They can be used to ease developer's day-to-day life, by automating repetitive tasks
- They can be used to define different kinds of projects
 - Standard X* library, extension, webapp, tests...



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Webapps – Intro

- Using X* technologies end-to-end for web applications
- Most existing XML databases provide proprietary framework for that (eXist, MarkLogic, Sausalito, etc.)
- Then again, we are stuck with processor-locked applications
- A standard would allow to write portable web applications, libraries and frameworks



Webapps – Principles

- Not define all aspects of web applications
- A component can be an XQuery function or module, an XSLT function, template or stylesheet, or an XProc pipeline
- The only technical missing piece is a way to map HTTP requests to components
- That means dispatching and providing infos



Webapps – Mapping

- URLs are matched by regular expressions, and associated to a component
- A component is identified by its name (if applicable) and the import URI of its module
- This is configured in a simple descriptor
- ...and packaged using the Packaging System
- The Packaging System already provides setting of the component's public URIs
- The web descriptor simply builds on top of that



Webapps – Requests

```
<web:request servlet="name" path="/path" method="get">  
  <web:uri>http://example.org/my-app/path</web:uri>  
  <web:authority>http://example.org</web:authority>  
  <web:context-root>/my-app</web:context-root>  
  <web:path>  
    <web:part>path</web:part>  
  </web:path>  
  <web:header name="connection" value="keep-alive"/>  
  ...  
</web:request>
```

```
<web:response status="200" message="Ok">  
  <web:header name="..." value="..." />  
  ...  
  <web:body content-type="text/html" method="xhtml"/>  
</http:response>
```



Webapps – Servlex

- Servlex is an early implementation
- Server technology is Java Servlet
- XSLT and XQuery are provided by Saxon
- XProc is (going to be) provided by Calabash
- Webapp manager to (un)deploy applications



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Freedom

- A web application to download a backup of your data in some Google services
- Use EXPath ZIP Facility
- Use EXPath HTTP Client
- Use Google API XSLT libraries
- Use OAuth-like authentication



That's all Folks!

- Join the mailing list and browse the website:

<http://expath.org/>

