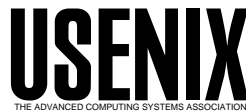USENIX Association

Proceedings of the
4th Annual Linux Showcase & Conference, Atlanta

Atlanta, Georgia, USA
October 10–14, 2000

USENIX
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Programming for the People

Mozilla as a cross-platform application development framework

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Outline

- Overview of Mozilla as an application development framework
- Building portable user interfaces with XUL, XBL and JavaScript
- XPCOM: Mozilla's component strategy
- Architecture of the Komodo IDE, a large non-browser Mozilla application
- Lessons learned in working with Mozilla
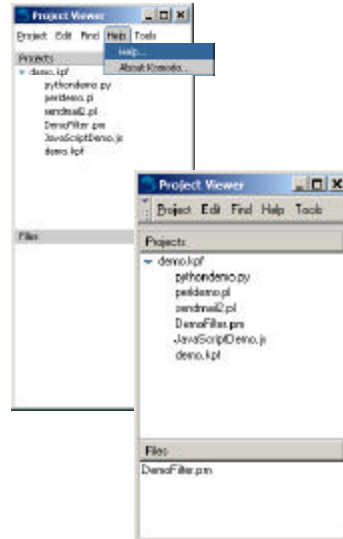
Mozilla Overview

- XML & JS define the UI
- Components (think of them as classes) define the implementation/backend
- NSPR is a portable runtime library
- Necko is network library
- Oh yeah, there's a layout engine too… (Gecko)
- Emphasis on standards compliance

UI TLAs

- XUL: XML dialect for layout of widgets
- XBL: XML dialect for association of behaviors with widgets
- JavaScript: What to do on events
- Skins: switchable themes

XUL Example

```
<?xml version="1.0"?>
<?xml-stylesheet href="chrome://mypackage/skin/" type="text/css"?>
<?xul-overlay href="chrome://mypackage/content/myOverlay.xul"?>
<window id="main-window"
 xmlns:html="http://www.w3.org/TR/REC-html40"
 xmlns="http://www.mozilla.org/keymaster/gatekeeper/there.is.only.xul"
 onload="EditorOnLoad()" >
 <script language="JavaScript"
  src="chrome://mypackage/content/demo.js"/>
 <box orient="vertical">
   <button id="Spam" flex="2" oncommand = "DoIt()" />
   <button id="Foo" flex="1"/>
   <button id="Eggs" flex="1"/>
 </box>
</window>
```

XPCOM

- Cross-platform component model
- Much like COM, without IDispatch
- C++, JavaScript supported by Netscape
- Python and Perl support by ActiveState
- Define an IDL file, an implementation, and can call from any language (e.g. JS in a XUL file)

IDL Example:

```
[scriptable,
 uuid(D1899240-F9D2-11D2-BDD6-000064657374)]
interface nsISimpleEnumerator : nsISupports {
     boolean hasMoreElements();
     nsISupports getNext();
};
```

Python Implementation

```
from xpcom import components
class SimpleEnumerator:
    _com_interfaces_ = [components.interfaces.nsISimpleEnumerator]
    _reg_desc_ = "Python SimpleEnumerator Implementation"
    _reg_progid_ = "Python.SimpleEnumerator"
    _reg_clsid_ = "{E4EE2533-F5BD-4c2c-BEDF-5EC4A35BC609}"
    def __init__(self):
        self._data = []
        self._index = 0
    def hasMoreElements(self):
        return self._index < len(self._data)
    def getNext(self):
        self._index = self._index + 1
        return self._data[self._index-1]
```

JS Usage Pattern
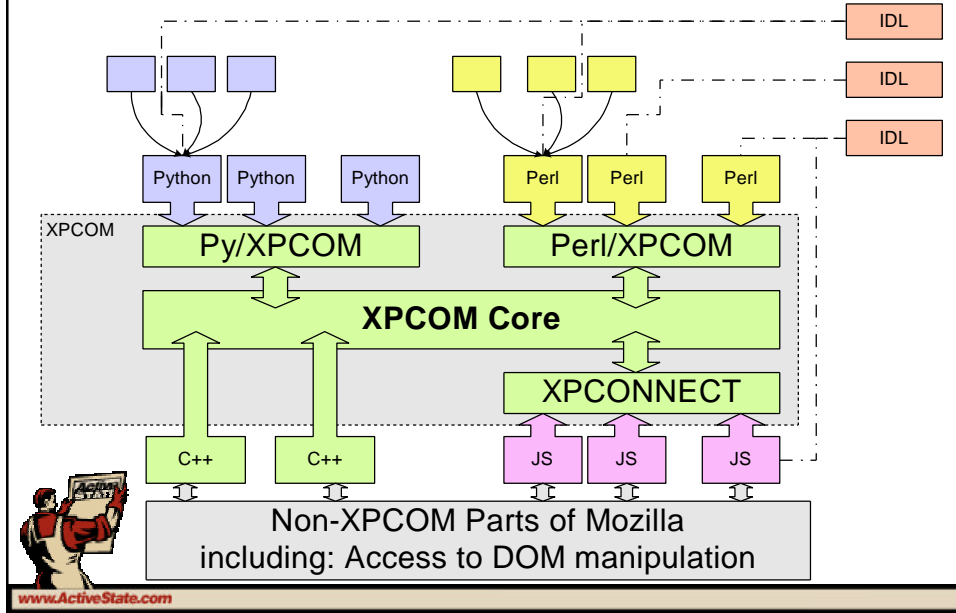
```
var winEnumerator = foo.getEnumerator();
while ( winEnumerator.hasMoreElements()) {
    var myWindow = winEnumerator.getNext();
    … do something with myWindow …
}
```

The enumerator could be written in C++, Perl, Python, JavaScript, …

Architecture of Komodo

Other Key Tech

- Gecko (Layout)
- DOM / XML
- Network APIs
- RDF
- NSPR
- Java
- Crypto
- Mail/News/Composer/Chatzilla/…
- SVG? XSLT?

Lessons learned

- XPCOM is a great foundation to build on
- Mozilla is huge, but worth investigating
- Get involved!
  - www.mozilla.org
  - Newsgroups, Bugzilla, IRC
- Netscape is a great partner
- Unique opportunity for Linux community

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