User-tailored Inter-Widget Communication

Extending the Shared Data Interface for the Apache Wookie Engine

Bernhard Hoisl, Vienna University of Economics and Business
Hendrik Drachsler, Open University of the Netherlands
Christoph Waglechner, Vienna University of Economics and Business
Language Technologies for Lifelong Learning
CREATES A SET OF TOOLS

Addressing two areas of TEL:

• help people to learn

• help tutors/teachers support learners
THREE THEMES

- Positioning the learner
- Feedback Support
- Knowledge retrieval and sharing

Tutor/Learner support *not* fully automated system
Create next-generation support and advice services for individual and collaborative learning using language technologies (LSA, NLP, etc)
PERSONALISED SERVICES

Individual feedback and support
And how we do that ...
And how we do that ...
WHAT IS A ...

WIDGET
WHAT IS A ... 

**_WIDGET**

- Aka: gadgets, apps, minis, badges, flakes, desklets ...
- Use common technology HTML, CSS, JavaScript, AJAX
- Application stores (e.g. Apple, Google, ...)

Widgets are rich, interactive mini-applications that bring functionality to website and personal environments.
WHAT IS A ...

**_WIDGET**

- Aka: gadgets, apps, minis, badges, flakes, desklets ...
- Use common technology HTML, CSS, JavaScript, AJAX
- Application stores (e.g. Apple, Google, ...)

Widgets are rich, interactive mini-applications that bring functionality to website and personal environments.

- Open source widget engine
- Incubator phase at the Apache Foundation
- Created by EU project TENCompetence

Wookie manages widgets to embedded them into a wide range of web applications (e.g. Wordpress, Elgg, Moodle)
PERSONAL ENVIRONMENTS
PERSONAL ENVIRONMENTS
### PERSONAL ENVIRONMENTS

Most-popular Web 2.0 Tools and Applications

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reddit</td>
<td>Zyb</td>
<td>Yelp</td>
<td>AMIEST</td>
<td>Finetune</td>
<td>Pageflakes</td>
<td>FeedBurner</td>
</tr>
<tr>
<td>Netvibes</td>
<td>Zoomr</td>
<td>Facebook</td>
<td>YouTube</td>
<td>Alexa</td>
<td>Flickr</td>
<td>GMail</td>
</tr>
<tr>
<td>Box</td>
<td>eBay</td>
<td>Amazon.com</td>
<td>Orkut</td>
<td>Myspace</td>
<td>Skype</td>
<td>Meebo</td>
</tr>
<tr>
<td>Del.icio.us</td>
<td>Flock</td>
<td>StumbleUpon</td>
<td>Pandora</td>
<td>Last.fm</td>
<td>Smugmug</td>
<td>Doist</td>
</tr>
<tr>
<td>Mint</td>
<td>Docstoc</td>
<td>Animoto</td>
<td>FotoFlexer</td>
<td>Lijit</td>
<td>Google Docs &amp; Spreadsheets</td>
<td>Foxytunes Planet</td>
</tr>
<tr>
<td>Wufoo</td>
<td>Twitter</td>
<td>OpenID</td>
<td>Picasa</td>
<td>Piczo</td>
<td>Jost</td>
<td>Footnote</td>
</tr>
<tr>
<td>Digg</td>
<td>Viddler</td>
<td>Snap</td>
<td>Wesabe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
THE CONCEPT

PLE

Middleware

Service A

Service C

Service B

Data

Database

External Data Source

Widget
How A Moodle Can Be Like A Wave

This Moodle course is acting as a Wave Container (i.e. a context) for connecting to a Wookie Widget Engine.

A Moodle Block Plugin (a small php file used to configure bits of the course) tells Wookie to pass it a Widget, and sends it the current user (the Viewer).

Wookie renders the Wave Widget requested by the Moodle block; each Widget calls the Wave API (e.g. wave.getParticipants, wave.getState...) which is implemented as a JS wrapper that Wookie injects at runtime, and communicates with Wookie's own Comet and AJAX services to update the Widget's state in real time.

Unlike a regular Moodle course page, everything you see here updates live in real time - you never need to refresh the page.
RELATED WORK

• Gadget-to-Gadget communication framework

• Static specification of communication widgets in the widget manifest file

• Not dynamic extensible to new widgets that also need to receive updates
• Gadget-to-Gadget communication framework
• Static specification of communication widgets in the widget manifest file
• Not dynamic extensible to new widgets that also need to receive updates

• In the working draft an API for cross-document messaging is defined.
• More generally described and not tailored specifically to IWC
• HTML5 is still no web-browser standard and not reliable at the moment.
RELATED WORK

- EU FP6 project Palette created myWiWal widget portal.
- 1st IWC approach by drag-and-drop facilities to send information
- This approach lacking the possibility to tailor IWC to a user-defined audience (all widgets of one user or all users that have one particular widget)

- Gadget-to-Gadget communication framework
- Static specification of communication widgets in the widget manifest file
- Not dynamic extensible to new widgets that also need to receive updates

- In the working draft an API for cross-document messaging is defined.
- More generally described and not tailored specifically to IWC
- HTML5 is still no web-browser standard and not reliable at the moment.

- In the working draft an API for cross-document messaging is defined.
- More generally described and not tailored specifically to IWC
- HTML5 is still no web-browser standard and not reliable at the moment.

- Gadget-to-Gadget communication framework
- Static specification of communication widgets in the widget manifest file
- Not dynamic extensible to new widgets that also need to receive updates
DEMO
SINGLE USER SETUP
SINGLE USER SETUP

Search
Help
PHP
Search

Graph Visualization

Informal Resources

Definition
Help

Sends search term
SINGLE USER SETUP

Search

Help
PHP
Search

Graph Visualization

Informal Resources

Help
- 15 Wonderfully Creative Uses for PHP Netutil-
- Online PHP Editor PHPanywhere.net
- CodeIgniter Open source PHP web application framework
- 9 Extremely Useful and Free PHP Libraries Netutil-
- 50 Extremely Useful PHP Tools | Developer's Toolbox | Smashing Maga...
- 20 Useful PHP Components Tutorials for Everyday Project | Nousp
- Amazon Web Services Developer Community
  Introduction to AWS for P...

Definition

Help
PHP
Undefined
Read more...
MULTIPLE USER SETUP

Alice
initiates shared update

```javascript
function send(var) {
    Widget.setSharedDataForKey("msg", var);
}
```

Bob
both participants are notified

```javascript
function handleSharedUpdate(key)

function refreshPage(data)
    update page with data
```

1

2

3

4
IMPLEMENTATION

Shared Data Key

```javascript
var sharedData = Array("searchterm");
```
IMPLEMENTATION

**config.js**
```javascript
var sharedData = Array("searchterm");
```

**searchwidget.js**
```javascript
function init() {
  IWCinit();
}
function submitForm() {
  IWCsetVar("searchterm", document.form.searchterm.value);
}
// IWC functions
function searchterm(data) {
  document.form.searchterm.value = data;
}
```

**definition.js**
```javascript
function init() {
  IWCinit();
}
function submitForm() {
  IWCsetVar("searchterm", document.form.searchterm.value);
}
// IWC functions
function searchterm(data) {
  document.form.searchterm.value = data;
}
```

Shared Data Key

HTML

Search

Help

Search widget.js

config.js

Search

Help

Definition

Help

config.js
IMPLEMENTATION

Shared Data Key

Search

Help

HTML

Search

Definition

Help

config.js

```javascript
var sharedData = Array("searchterm");
```

searchwidget.js

```javascript
function init() {
    IWCinit();
}

function submitForm() {
    IWCsetVar("searchterm", document.form.searchterm.value);
}

// IWC functions
function searchterm(data) {
    document.form.searchterm.value = data;
}
```

IWC.js

```javascript
IWCInstanceID = null;
IWCHashKey = null;
IWCData = new Array();
IWCData[0] = new Object();

function IWCinit() {
    Widget.preferenceForKey("sharedDataKey", IWCHashKey);
    IWCInstanceID = Widget.instanceID;
    onSharedUpdate = IWCHandleSharedUpdate;
}

function IWCinitHashKey() {
    IWCHashKey = key;
}

function IWCsetVar(name, data) {
    Widget.setSharedDataForKey(name, escape(data));
}

function IWCGetVar(name) {
    // "No matching key found" == Wookie's message
    // for key not defined
    Widget.setSharedDataForKey(name, "No matching key found");
}

function IWCGetVar(name) {
    Widget.setSharedDataForKey(name, escape(data));
    if (IWCData[0][name] != data & data !=
```

definition.js

```javascript
function init() {
    IWCinit();
}

function submitForm() {
    IWCsetVar("searchterm", document.form.searchterm.value);
}

// IWC functions
function searchterm(data) {
    document.form.searchterm.value = data;
}
```
IMPLEMENTATION

Shared Data Key

config.js

```javascript
var sharedData = Array("searchterm");
```

searchwidget.js

```javascript
function init() {
  IWCinit();
}
function submitForm() {
  IWCsetVar("searchterm", document.form.searchterm.value);
}
// IWC functions
function searchterm(data) {
  document.form.searchterm.value = data;
}
```

IWC.js

```javascript
IWInstanceID = null;
IWSerializedKey = null;
IWDdata = new Array();
IWdata[@] = new Object();

function IWCinit() {
  Widget.preferenceForKey("sharedDataKey", IWCinitSharedKey);
  IWInstanceID = Widget.instanceId;
  IWShareKey = Widget.instanceId;
  IWHandleSharedUpdate = IWHandleSharedUpdate;
}

function IWCinitSharedKey(key) {
  IWShareKey = key;
}

function IWCsetVar(name, data) {
  Widget.setSharedDataForKey(name, escape(data));
}

function IWCgetVar(name) {
  // "No matching key found" == Wookie's message
  // for key not defined
  Widget.setSharedDataForKey(name, "No matching key found");
}

function IWCsetVar(name, data) {
  Widget.setSharedDataForKey(name, escape(data));
  if (IWData[@][name] != data && data !=
```
CONCLUSIONS

• With our work we try to bridge the gap between highly individual personal environments and the possibilities for orchestrating services through IWC.

• We believe that IWC will contribute to more personalised learning environments, that are tailored to the functionalities users require for their personal learning goals.
FUTURE R&D

• Optimizing the IWC methods between the Wookie server and the client widgets by providing a workflow modelling library to improve service orchestration.
  
  **Current:** One IWC policy for the whole server  
  **Target:** IWC policy per widget  

• Integration of the IWC into all LTfLL widgets and dissemination to other widget developers and providers.
THANKS FOR YOUR INTEREST!

This slide is available here: http://www.slideshare.com/Drachsler

Questions now or later:

Email: hendrik.drachsler@ou.nl

Skype: celstec-hendrik.drachsler

Blogging at: http://www.drachsler.de

Twittering at: http://twitter.com/HDrachsler