Developing Offline Web Application

Kanda Runapongsa Saikaew
(krunapon@kku.ac.th)
Art Nanakorn
Thana Pitisuwannarat

Computer Engineering
Khon Kaen University, Thailand
Agenda

• Motivation
• Offline web application samples and tools
• Web application implementation
• Experimental result
• Conclusion
Motivation

● Software is increasingly available in the form of web application
● Sometimes web application users are seriously affected by disconnected Internet connection
● Developing web application that can be accessed both online and offline is thus necessary
The Web Will Be Everywhere

- Mobile devices (iPhone, PDA, Palm)
- Desktop and laptop
- Widgets
- TV
- The browser will be fast
  - Google Chrome, Firefox, Internet Explorer
Why Offline?

- Reliability: sometimes we really need to get data at that moment
- Performance: local acceleration
- Convenience: Not having to remember where we store data (just search)
- Usually human beings are offline more than online!
Sample Web Applications with Gears

- YouTube: upload large size videos
- Wordpress: speed up every page load and enable users to blog faster
- Google Reader: allow users to access the RSS feeds when they are offline
- Gmail: enable users to read, reply, and search emails when they are offline
YouTube Uploader Powered by Gears

Upload each video up to 1 GB without installing a dedicated software
Speed up WordPress with Gears

- With Gears enabled, most of WordPress's images, scripts and CSS files will be stored locally on a user's computer.
Read Feeds When You Aren’t Online

• Click the green icon to download the most recent articles.
Gmail with Offline Enabled Setting

• Install offline access

• Synchronizing

![Install offline access for Gmail](image1)

![Synchronizing](image2)
Offline Web Application Tools

- Microsoft silverlight
  - Need to know .NET programming
- Adobe Integrated Runtime (AIR)
  - Must know Flash and AIR platform
- Gears
  - Need to know only javascript
Gears

• Open source browser extension: enables more powerful web applications
  – Let web applications interact naturally with your desktop
  – Store data locally in a fully-searchable database
  – Run JavaScript in the background to improve performance
The Web with AJAX and Gears

- AJAX and Gears in the web environment and native environment
AJAX Architecture
Offline Architecture

- Read and write using local store
- Changes are queued for later synchronization
- Server communication is completely decoupled from UI actions, happens periodically whenever there is a connection
Main Modules in Gears API

• LocalServer
  – Cache and serve application resources (HTML, JavaScript, Images, etc.) locally

• Database
  – Store data locally in a fully-searchable relational database

• WorkerPool
  – Make your web applications more responsive by performing resource-intensive operations asynchronously
Agenda

- Motivation
- Offline web application samples and tools
- Web application implementation
- Experimental result
- Conclusion
Web Application Architecture
Web Application Interface

• Registration form and registered users

Enter your information:

Firstname: 
Lastname: 
Year: 
Phone: 
Email: 

Registered users are:

(1) Art Nanakorn 5 08451011
(2) Thana Pitisuwannarat 4 089-4174

Register
Main Web Development Procedure

- Check whether Gears has been installed
- Store data in a local database
- Store data in a server database
- Synchronize data between server and local databases
Check whether Gears installed

- Download and use file gears_init.js
  
  `<script src="gears_init.js"></script>
  
  <script>
  if (!window.google || !google.gears) {
    location.href= "http://gears.google.com/?action=install&message=<your welcome message>" +
    "&return=<your website url>;"
  }
  
  </script>`
Store Data in a Local Database (SQLite)

• try {
    
    db = google.gears.factory.create('beta.database');
    if (db) {
        db.open('db');
        db.execute('create table if not exists users' +
                    ' (firstname varchar(255), ...'
        }
    }
    catch (ex) {
        alert(ex.message);
    }
}
Store Data in a Server Database (MySQL)

```php
<?php
// connect and select database
mysql_select_db("registerdb")
or die(mysql_error());
if ($method == "access") {
    // use SQL statements to retrieve data
} else if ($method == "update") {
    // use SQL statements to insert data
}
?>
```
Copy Data from Server DB to Local DB

```javascript
var sync_script = 'http://host/directory/sync_data.php';
var request = google.gears.factory.create('beta.httprequest');
request.open('POST', sync_script);
request.setRequestHeader("Content-type","application/x-www-form-urlencoded");
request.onreadystatechange = function() {
  if (request.readyState == 4) {
    // insert data received from server db to local db
  }
  request.send(params);
```

JCSSE 2009
var request =
googles.gears.factory.create('beta.httprequest');
var params="method=update&f="+firstnames[index];
...
request.open('POST', sync_script);
request.setRequestHeader("Content-type","application/x-www-form-urlencoded");
request.send(params);
Experimental Result

- Check whether the web application can work offline
  - User can access and fill out the form
- Check whether the application can synchronize data
  - Multiple users view the same result
Check Offline Web App Ability (1/3)

- Select Work Offline at Browser Menu
Check Offline Web App Ability (2/3)

- Use the Web from the browser with offline mode

Note: Please register only if you can attend. If you want to attend, you should register 2008

Enter your information:
- Firstname: Chanapat
- Lastname: Saikaew
- Year: 1
- Phone: 089-111-2222
- Email: chanapat@gmail.com

Register
Check Offline Web App Ability (3/3)

- Content: Please see the [outline](http://coeservice.en.kku.ac.th/~kanda/ms_training.html)

- Note: Please register only if you can attend. If you want to attend, you should register to 2008

**Enter your information:**

- **Firstname:**
- **Lastname:**
- **Year:**
- **Phone:**
- **Email:**

**Registered users are:**

1. Chanapat Saikaew 1 089-111-2222 chanapat@gmail.com
2. Art Nanakorn 5 [_masked_@gmail.com](mailto:[_masked_@gmail.com])
3. Thana Pitusuwannarat 4 [masked_@gmail.com](mailto:[masked_@gmail.com])
4. Suchart jumpeeklang 4 083-1513574 en42chart@gmail.com
Check Synchronization: User 1

MS Technology Training at KKU

This page uses Google Gears to record your entries on the local disk and sync data with the database at coeservice server. If your internet is disconnected or you choose to work offline, you still can revisit this page and all your data will still be here. Try it!

The training information

- Instructors: Mr. Pongsakorn Poosankom (COE 11) and Mr. Art Nanakorn (COE 14)
- Audience: COE KKU students
- Dates: Sat Feb 28 - Sun Mar 1 and Sat Mar 14 - Sun Mar 15
- Place: EN 4210
- Content: Please see the outline
- Note: Please register only if you can attend. If you want to attend, you should register to reserve your seat. Please register by Feb 20, 2008

Enter your information:

Firstname: 
Lastname: 
Year: 
Phone: 
Email: 

Registered users are:

1) Art Nanakorn 5 0845101109 nanakorn.a@gmail.com
2) Korkeat Wannapat 3 085-7401471 khasaihan@gmail.com
3) Pongsak Sripanya 3 0862211188 to_pongsak@hotmail.com
4) Sorntchai Tonggam 3 089-4171974 banate_s@hotmail.com
5) Suchart jumpeeklang 4 083-1513574 en42chart@gmail.com
6) Thana Pitsuwannarat 4 089-4174341 t.pitsuwannarat@gmail.com

Register
Check Synchronization: User 2

MS Technology Training at KKU

This page uses Google Gears to record your entries on the local disk and sync data with the database at coeservice server. If your internet is disconnected or you choose to work offline, you still can revisit this page and all your data will still be here. Try it!

The training information:

- Instructors: Mr. Pongsakorn Poonsakom (COE 11) and Mr. Art Nanakom (COE 14)
- Audience: COE KKU students
- Dates: Sat Feb 28 - Sun Mar 1 and Sat Mar 14 - Sun Mar 15
- Place: EN 4210
- Content: Please see the outline

- Note: Please register only if you can attend. If you want to attend, you should register to reserve your seat. Please register by Feb 20, 2008

Enter your information:

- Firstname:
- Lastname:
- Year:
- Phone:
- Email:

Registered users are:

1. Thana Pitsuwannarot 0 089-4174341 t.pitsuwannarot@gmail.com
2. Kerkwat Wannapat 3 066-7401471 khasathan@gmail.com
3. Pongpak Snpanya 3 0862211188 pongpak@hotmail.com
4. Somchai Tongtiam 3 089-4171974 banate_s@hotmail.com
5. Suchart Jumpeeeklang 4 083-4513674 en42chart@gmail.com
6. Art Nanakom 5 0845101110 nanakom.a@gmail.com

Register
Conclusion

- Web applications have been integrated into our daily life
- Need to make web application offline
  - To access our data at any time
  - To speed up the web application
- We have developed offline web application using Gears
References

[1] Dion Almaer, “How to take your Web Application Offline with Google Gears”,
http://www.slideshare.net/dion/future-of-web-apps-google-gears


http://wpsecurity.org/10/how-to-enable-google-gears-in-wordpress-27

http://www.google.com/help/reader/offline.html