HyWAI for Web of Things

ETRI

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Introduction

- **HyWAI** is an HTML5 based Hybrid Web Application platform that allows you to author native applications with web technologies and get access to APIs and app stores.

- **HyWAI** leverages web technologies developers already know best... HTML and JavaScript.

HyWAI : Hybrid Web Application Interface
History

- **Version 0.5 (Dec 2009)**
  - Support iOS 2.x, Android 1.x
  - Considering interoperable with W3C Device APIs

- **Version 1.0 (Dec 2010)**
  - Support iOS 3.x, Android 2.x

- **Version 2.0 (Dec 2011)**
  - Support iOS 5.x, Android 4.x
  - Implement NFC API (partially)

- **Version 2.1 (Dec 2012)**
  - Support iOS 6.x, Android 4.x
  - Implement NFC API (partially), File API (partially)

- **Version 3.0 (for Web of Things) + Server feature**
  - Support iOS 7.x, Android 4.x
  - Implement Sensor APIs (Ambient Temperature, Humidity, …)
  - Considering interoperable with W3C Device APIs, Sysapps APIs
Introduction - How HyWAI Works

- **Build your app once with **web-standards**
  - Based on HTML5, HyWAI leverages web technologies developers already know best... HTML and JavaScript.

- **Wrap it with **HyWAI**
  - Using HyWAI build you can get access to native APIs.

- **Deploy to **multiple** platforms!**
  - HyWAI uses standards-based web technologies to bridge web applications and mobile devices.
HyWAI Technology

Native Application
Created using the Android SDK or Xcode. Automated using HyWAI

Web Browser
Webkit on iPhone or Android

Open API Mashup
External Open APIs (e.g: Google Maps, Twitter, Facebook...)

HyWAI Native App

Javascript & CSS
Sencha, jQuery Mobile, jQTouch

HyWAI provide system APIs for access to native features. Also it can be use to external UI frameworks to provide better UX.

App Store

Smart Phone

HyWAI APIs
HyWAI API Architecture

Web Application

HyWAI API (Java Script)

Sync Process

Ajax (Sync)

Notification

Ajax (Async)

Async Process

WebServer

HyWAI Broker

Native API
HyWAI APIs

- applauncher
- calendar
- contact
- file
- gallery
- mediacapture
- messaging
- nfc
- sensor
- sysinfo
- task
- telephony
- ui
- util

http://www.w3c.or.kr/hywai/api/
Scenario

- I’d like to show you how we can use the Web APIs (Device APIs, sysapps APIs) for Web of Things.

Scenario 1 (by iPhone):
- Hybrid Web Application
- Device APIs and remote control

Scenario 2 (by Android):
- Hybrid Web Application
- Device APIs for Sensors
- Crowd Sensing with smartphone
Scenario 1 (by iPhone)
Scenario 2 (by Android):
**Smartphone & Sensors**

### Smartphone Sensors - Present & Future

<table>
<thead>
<tr>
<th>Type</th>
<th>Measurand</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-axis Gyroscope</td>
<td>Rotation in space - Roll, Pitch, Yaw</td>
</tr>
<tr>
<td>3-axis Magnetometer</td>
<td>Location direction (compass)</td>
</tr>
<tr>
<td>Accelerometer</td>
<td>Acceleration in the X, Y, &amp; Z axes; Vibration</td>
</tr>
<tr>
<td>Ambient Light</td>
<td>Illuminance (brightness of light)</td>
</tr>
<tr>
<td>Camera</td>
<td>Images, Video</td>
</tr>
<tr>
<td>GPS</td>
<td>Location</td>
</tr>
<tr>
<td>Humidity</td>
<td>Humidity</td>
</tr>
<tr>
<td>Microphone</td>
<td>Audio</td>
</tr>
<tr>
<td>Pressure</td>
<td>Pressure (used to determine altitude)</td>
</tr>
<tr>
<td>Proximity</td>
<td>Nearby objects, without any physical contact</td>
</tr>
<tr>
<td>Temperature</td>
<td>Temperature</td>
</tr>
</tbody>
</table>

### Near Future

<table>
<thead>
<tr>
<th>Type</th>
<th>Measurand</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-dimensional Microscale Motion</td>
<td>Combination of accelerometer and gyroscope</td>
</tr>
<tr>
<td>Accelerometer</td>
<td>Combination of accelerometer, compass, and gyroscope</td>
</tr>
<tr>
<td>9-axis motion sensor</td>
<td>Biochemical agents</td>
</tr>
<tr>
<td>Biochemical</td>
<td>Biochemical agents</td>
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</tbody>
</table>
Conclusions

- Web of Things?
  - The story how to access/control/management the Things by web technologies

- Device APIs, System level APIs
  - RESTful access of Device capabilities

- Remote Access of Web Resources
  - How can we access through the firewalls, NATs..

- Other big issues
  - Philosophical/Conceptual problem
    - What is a Thing in the web of things (Physical ? Virtual ? Everything ?)
  - Identification & Discovery (Services, Resources, Things, Capability..)
  - Management, Caching, Processing, Protocols, Collaboration, ....
  - Web technologies for small devices (accessory, sensors...)

- Web of Things CG could be a starting point to solve these issues
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