Expanding the horizontal of Web
– Mash up Web and home networked devices –

The Third W3C Web and TV Workshop
19–20 September, 2011
Hollywood, California, USA

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At the first Workshop in Tokyo, 2010

- Sony suggested to standardize the API which enables Web applications to interact with home networked devices (Networked Device Connection API)
Expanding the horizontal of Web

Sony thinks that the “Networked Device Connection API” is one of the approaches to expand the horizontal of Web

A) Let various types of device connect to web services
   • E.g. Multi-Modal Interaction Working Group of W3C, M2M

B) Let various types of device support the web browser
   • E.g. Device APIs Working Group of W3C

C) Let web applications communicate device locally
   • This approach is missing in W3C

● What is the approach C)
● How the “Network Device Connection API” should be:
   ● high level v.s. low level API
   ● security and privacy concerns
(A) Let various types of device connect to web services

- HTML5 Browser
  - Web Application

- Networked device Type A

- Networked device Type B

Web Service

GW

Application-specific format over HTTP

Light-weight I/f

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(B) Let various types of device support the web browser

Networked device
Type A

HTML5 Browser

Web Application

Device Function & Resource

HTML + HTTP

Device specific API

Web Service

Networked device
Type B

HTML5 Browser

Web Application

Device Function & Resource

HTML + HTTP

Device specific API
Let web applications communicate device locally

Networked Device Connection API

HTML5 Browser

Web Application

Discovery & Messaging

Web Service

Home Networked Device

e.g. DLNA

Standard Home Network protocol

Application-specific format over HTTP

*Web application comes via Internet/Terrestrial / Satellite / Cable, etc.

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High Level API v.s. Low Level API

• Two idea on the API
  • High Level API
    • Enable only to discover and communicate a specific service, e.g. DLNA media renderer.
  • Low level API
    • Enable to discover and communicate an arbitrary service which is based on a common protocol, e.g. HTTP

• Sony suggests the low level API
  • It has a potential to realize a new type of service/application which mashes up Web and (home) network devices
    • 2nd screen scenario, home automation/energy, healthcare, etc.
  • It can also enable the discovery and control of pervasive DLNA devices if the underlying protocols are compatible with the UPnP standard.
## Security & Privacy

<table>
<thead>
<tr>
<th>Risk</th>
<th>Risk Level</th>
<th>Risk per type of APIs</th>
<th>Effectiveness of Solutions (To Reduce Risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High Level API</td>
<td>IP Address Filtering by UA</td>
</tr>
<tr>
<td>1. Disclose information about discovered devices</td>
<td>Low</td>
<td>Yes</td>
<td>N.A.</td>
</tr>
<tr>
<td>2. Unexpected control of discovered service</td>
<td>Mid</td>
<td>Yes</td>
<td>N.A.</td>
</tr>
<tr>
<td>3. Malicious Attack on discovered device</td>
<td>High</td>
<td>No</td>
<td>N.A.</td>
</tr>
<tr>
<td>4. Malicious Attack on any devices on home network</td>
<td>High</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

NA: Not Applicable

* Please see demo

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Please see how the warnings of security and privacy look like

| Waning of Device Discovery by UA | Waning of Device Access by UA | Tablet device Browser (proto-type) |

Discovery & Control
TV
Home Network Device

Media Renderer

Online Video Shop

Web App

Web Service

Home Network Device

video

TV

Waning of Device Discovery by UA
Waning of Device Access by UA
Conclusion

- The API should be generic, i.e. application agnostic, to enable new types of application/service
  - Protocols should be compatible with the industrial standards, UPnP and DLNA.
  - Protocols should be friendly to web browsers.

- Security and privacy are crucial for consumers, however it should not be a “Show-stopper” to move the discussion forward

- Sony suggests to create a new Working Group of W3C to discuss a generic API for Discovery and Message Exchange on local IP network
Appendix
Example of Discovery Warning by UA

www.sony-demo-video.com wants to access your local area network devices.

O.K.  Not allow
Example of Access Warning by UA

Network Device Access Warning

www.sony-demo-video.com wants to access Bravia KDL-40LX900

O.K.  Not allow
Example of UA Setting

Browser Setting

Local Area Network Devices

Discovery and Access
Enable  Disable

Allow to access a new device
Always  Query  Never

Domain List

www.sony-demo-video.com

www.sony-demo-service.com

www.sony-test-video.com

Device List for www.sony-demo-video.com

Sony Bravia TV-1
192.168.1.13
access: yes

Sony Bravia TV-2
192.168.1.14
access: no

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