W3C Web Intents

Local Network Service Discovery
Input to W3C Shenzhen meeting March 2012

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Web Intents for both cloud and local Services

Web Services

Browser

Home Network Devices/Services

Web app

Interaction with home network devices

Movie  Music  Photo  Power  Training  Home theater

Web app
Use Case

Play video on remote device
Step 1: User invokes video play page

Mobile Movie Web Service page from Internet

1) User pushes “Output” button and selects “remote”
Step 2: User selects the Service in Web Intents Service picker

2) Select Service

Mobile

Pop up Web Intents Window

List Dynamic Services

Dynamic Service

Kitchen TV

Living room TV
Step 3: Two user experience alternatives

- Service page invoked and has UI that provides playback control buttons
- Control stays in Client page that provides playback control buttons
Step 3 – alt 1: Service control page is invoked

When “close” selected back to Client page.
Step 3 – alt 1
Implementation proposal with UPnP/DLNA
Invocation / Service Registration

Invocation

```javascript
var intent = new Intent(
    "http://webintents.org/view",
    "video/mp4v",
    "http://demo-video-service.sony.com/content?id=462287");
window.navigator.startActivity(intent,
    function(intentData) {});
```

Intent Registration

```xml
<intent
    action="http://webintents.org/view"
    type="video/mp4v"
    href="video-control.html"
    title = "Living room TV"
    disposition="window"
/>```
SSDP registration page

UPnP Web Intents Device Description page

```xml
<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <device>
    <UDN>uuid:ec0b57d7-f768-4f62-8843-dd7ab9487748</UDN>
    <friendlyName>Living room TV</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:WebIntents:1</deviceType>
    <Intents>
      <intent
        action="http://webintents.org/view"
        type="video/mp4v"
        href="video-control.html"
        title = "Living room TV"
        disposition="window"
      />
      .....  
    </Intents>
  </device>
</root>
```

New: Web intent device type

New: Web Intent Service registration
Local UPnP discovery

Invocation

```javascript
var intent = new Intent(
    "http://webintents.org/view",
    "video/mp4v",
    "http://demo-video-service.sony.com/content?id=462287");

window.navigator.startActivity(intent, function(intentData) {});
```

M-SEARCH * HTTP/1.1
Host: 239.255.255.250:1900
ST: urn:schemas-upnp-org:device:WebIntents:1
Man: "ssdp:discover"
MX: 3

SSDP M-SEARCH

SSDP response

HTTP / 1.1 200 OK
ST: urn:schemas-upnp-org:device:WebIntents:1
CACHE-CONTROL: max-age=900
HOST: 239.255.255.250:1900
USN: uuid:67a89239-6ce9-4c6f-8527-aa457a481798::urn:schemas-upnp-org:device::WebIntents:1
SERVER: Windows NT/5.0, UPnP/1.0, Intel CLR SDK/1.0
LOCATION: http://43.4.33.103:57735/
Content-Length: 0
Device Description page retrieved based on SSDP Location header

User selects Service

Get Device Description Page

Response Device Description Page

<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <device>
    <UDN>uuid:ec0b57d7-f768-4f62-8843-d7ab9487748</UDN>
    <friendlyName>Living Room TV</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:WebIntents:1</deviceType>
  </device>
  <Intents>
    <intent>
      action="http://webintents.org/view"
      type="video/mp4v"
      href="video-control.html"
      title = "Living room TV"
      disposition="window"
    </intent>
  </Intents>
</root>
Service handler page is invoked

When user presses “close” the original (Client) page is invoked
Step 3 – alt 2: Control stays in Client page that provides playback control buttons.

Mobile

User controls playback

Remote playback
Step 3 - alt 2
Implementation proposals with UPnP

2 options:

1. Client page communicates directly with remote UPnP device
2. Client communicates with "hidden" Service page that communicates with remote UPnP device
Implementation option 1

Client page communicates directly with remote UPnP device
Invocation / Service Registration

Invocation

```javascript
var intent = new Intent(
    "http://webintents.org/discover",
    "urn:upnp-org:deviceID:MediaRenderer");

window.navigator.startActivity(intent, function (data) {
    // Communicate with the HN device using UPnP
    // data is location of UPnP Description page
    descriptionUrl = data[0];
    // UPnP Description page is retrieved using XHR2
    // Subsequent transactions using XHR2 are invoked
    // based on the UPnP description.

})
```

Intent Registration

There is no registration page. Service is dynamically registered by the UA based on UPnP SSDP discovery and retrieved Device Description document.
Local UPnP discovery

Invocation

```javascript
var channel = new MessageChannel();
var intent = new Intent(
    "http://webintents.org/discover",
    "urn:upnp-org:deviceld:MediaRenderer");

window.navigator.startActivity(intent,
    function(intentData) {});
```

M-SEARCH * HTTP/1.1
Host: 239.255.255.250:1900
ST: urn:upnp-org:deviceld:MediaRenderer:1
Man: "ssdp:discover"
MX: 3

HTTP / 1.1 200 OK
ST: urn:schemas-upnp-org:device:WebIntents:1
CACHE-CONTROL: max-age=900
HOST: 239.255.255.250:1900
USN: uuid:67a89239-6ce9-4c6f-8527-aa457a481798::urn:upnp-org:deviceld:MediaRenderer1
SERVER: Windows NT/5.0, UPnP/1.0, Intel CLR SDK/1.0
LOCATION: http://43.4.33.103:57735/
Content-Length: 0
Device description page retrieved based on SSDP
Location header

Get Device Description Page

Response Device Description Page

<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <device>
    <UDN>uuid:ec0b57d7-f768-4f62-8843-d7ab9487748</UDN>
    <friendlyName>Living Room TV</friendlyName>
    <deviceType>urn:upnp-org:deviceId:MediaRenderer</deviceType>
    ......
</root>

Dynamic Services

Kitchen TV
Living room TV

User selects Service

Update webintents
Service picker
Client page controls TV through UPnP/DLNA commands

UA stays in Client page. When user presses “stop” the background Service is terminated.
Implementation option 2

Client page communicates with hidden/background Service page that communicates with remote UPnP device
Invocation / Service Registration

Invocation

```javascript
var channel = new MessageChannel();
var intent = new Intent(
    "http://webintents.org/discover",
    "application/octet-stream+mytvprotocol",
    [channel.port2]);
window.navigator.startActivity(intent,
    function(intentData) {});
```

Intent Registration

```html
<intent
    action="http://webintents.org/discover"
    type="application/octet-stream+mytvprotocol"
    href="video-control.html"
    title = "Living room TV"
    disposition="background"
/>
```

Note: Syntax currently under discussion on WITF mail list
SSDP registration page

UPnP Web Intents device description page

```xml
<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <device>
    <UDN>uuid:ec0b57d7-f768-4f62-8843-dd7ab9487748</UDN>
    <friendlyName>Living room TV</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:WebIntents:1</deviceType>
    <Intents>
      <intent
        action="http://webintents.org/discover"
        type="application/octet-stream+mytvprotocol"
        href="video-control.html"
        title="Living room TV"
        disposition="background"
      />
    </Intents>
  </device>
</root>
```

New: Web intent device type

New: Web Intent Service registration
Local UPnP discovery

Invocation

```javascript
var channel = new MessageChannel();
var intent = new Intent('http://webintents.org/discover', 'application/octet-stream+mytvprotocol', [channel.port2]);
window.navigator.startActivity(intent, function(intentData) {});
```

SSDP M-SEARCH

HTTP / 1.1 200 OK
ST: urn:schemas-upnp-org:device:WebIntents:1
CACHE-CONTROL: max-age=900
HOST: 239.255.255.250:1900
USN: uuid:67a89239-6ce9-4c6f-8527-aa457a481798::urn:schemas-upnp-org:device::WebIntents:1
SERVER: Windows NT/5.0, UPnP/1.0, Intel CLR SDK/1.0
LOCATION: http://43.4.33.103:57735/
Content-Length: 0
Device Description page retrieved based on SSDP
Location header

Get Device Description Page

Response Device Description Page

User selects Service

Dynamic Services

Kitchen TV

Living room TV

Update webintents
Service picker

<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <specVersion>
    <major>1</major>
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  </specVersion>
  <device>
    <UDN>uuid:ec0b57d7-f768-4f62-8843-d7ab9487748</UDN>
    <friendlyName>Living Room TV</friendlyName>
    <deviceType>urn:schemas-upnp-org:device:WebIntents:1</deviceType>
    <Intents>
      <intent action="http://webintents.org/discover"
               type="application/octet-stream+mytvprotocol"
               href="video-control.html"
               title="Living room TV"
               disposition="background"/>
      .....  
    </Intents>
  </device>
</root>
Background Service page is invoked

UA stays in Client page. When user presses “stop” the background Service is terminated.
TV control communication

Client page

UA

Background Service page

e.g.:
- Web Worker
- Hidden iframe

UPnP Web Intents device

HTML5 Web Messaging using high level device independent TV control protocol
("Play", "Pause", "Stop", etc commands)

User terminates TV control.

navigator.startActivity()
Callback().

intent.postResult();
window.close();

Low level control communication over XHR or Web Sockets

"Play", "Pause", "Stop", etc commands according to TV capabilities
Conclusions

• Sony proposes:
  • WebIntent should support local discovery on the IP sub-network (UPnP and mDNS)
  • Web Intents Service as background/hidden web content must be supported. Proposes "disposition"=background

• To be considered and discussed
  • If Web Intents Service page is used registration could be done by including registration markup in SSDP Device Description document
  • For low level protocol agnostic Client applications high level Service specific protocols have to be specified.
Conclusions

• To be considered and discussed
  • UA must be able to manage Service availability as dynamic Services may come and go. Implementation specific or subject for standardization
  • It has to be considered if search for dynamic Services should explicitly be initiated by the user or in the intent invocation
  • For control communication same origin policy is an issue if a Service page is not retrieved from the UPnP device
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