W3C THING API PROPOSAL

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AGENDA

- Idea and Requirements
- W3C Presentation API
- Proposal for W3C Thing API
- Implementation as cordova plugin

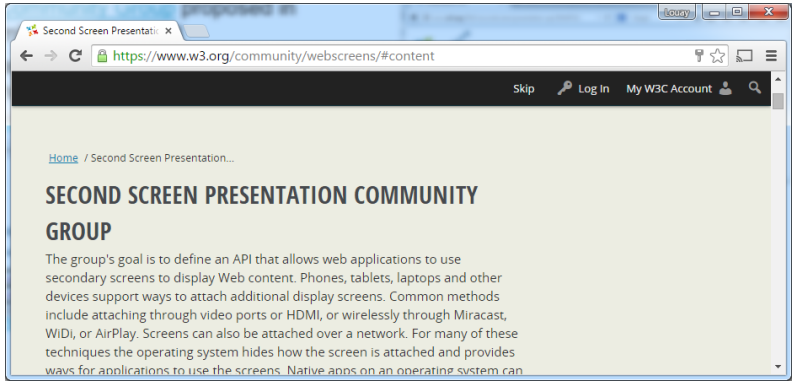
IDEA AND REQUIREMENTS

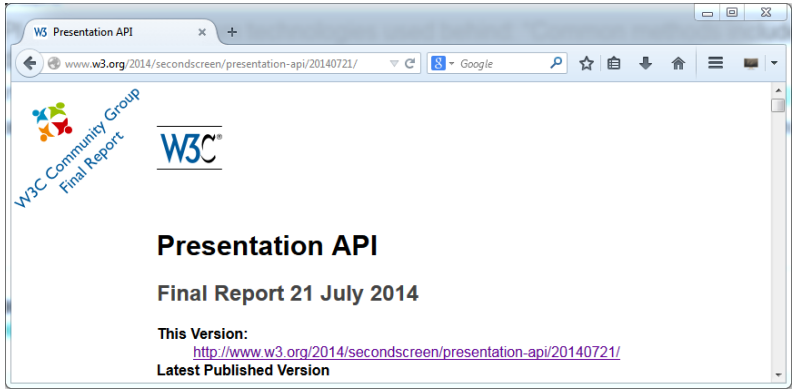
- W3C Thing API
- JavaScript API that allows Web pages to discover and interact with things
- The API should consider security and privacy by design
- The API should abstract from underlying protocols for discovery and communication
- The API should consider the concept of Thing Description
- Some concepts are taken from W3C Presentation API
  - Presentation API considers displays (or presentation devices like TVs, projectors, …)
  - Thing API considers Things as Tag
- The API could be implemented on top of existing Frameworks like:
  - Apple HomeKit
  - Google Brillo??

W3C Presentation API

W3C SECOND SCREEN PRESENTATION CG

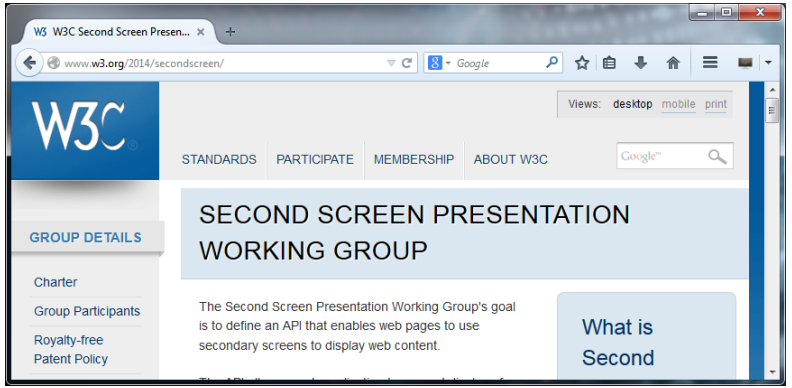
- W3C Community Group proposed in September 2013 by Intel
- Key partners: Intel, Google, Mozilla, Fraunhofer FOKUS, Netflix, LGE, etc.
- Goal: “Is to define an API that allows web applications to use secondary screens to display Web content”
- Final Report of the CG published in July 2014.

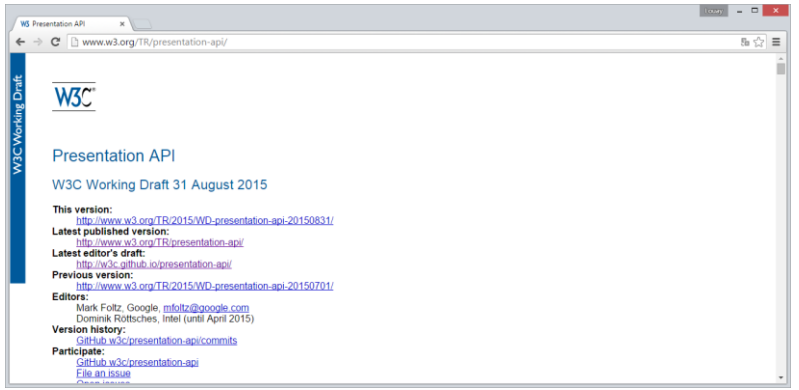




W3C SECOND SCREEN PRESENTATION WG

- The work of the Second Screen Presentation API is continued in a Working Group
- The Working Group was created in October 2014 → End date: 31 October 2016
- The WG took the final report of the CG as initial working draft for the Presentation API
- Working Draft 31 August 2015: http://www.w3.org/TR/presentation-api/





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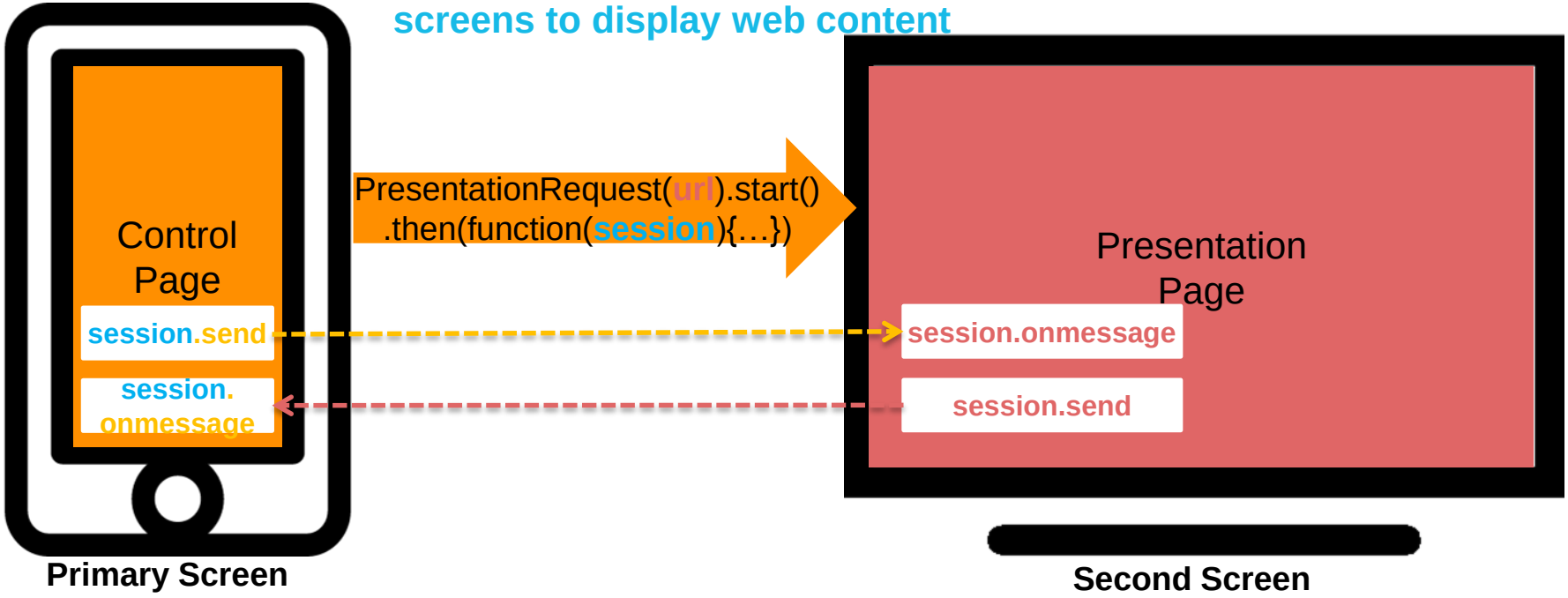
W3C SECOND SCREEN PRESENTATION API

Goal is to define an API that enables web pages to use secondary screens to display web content

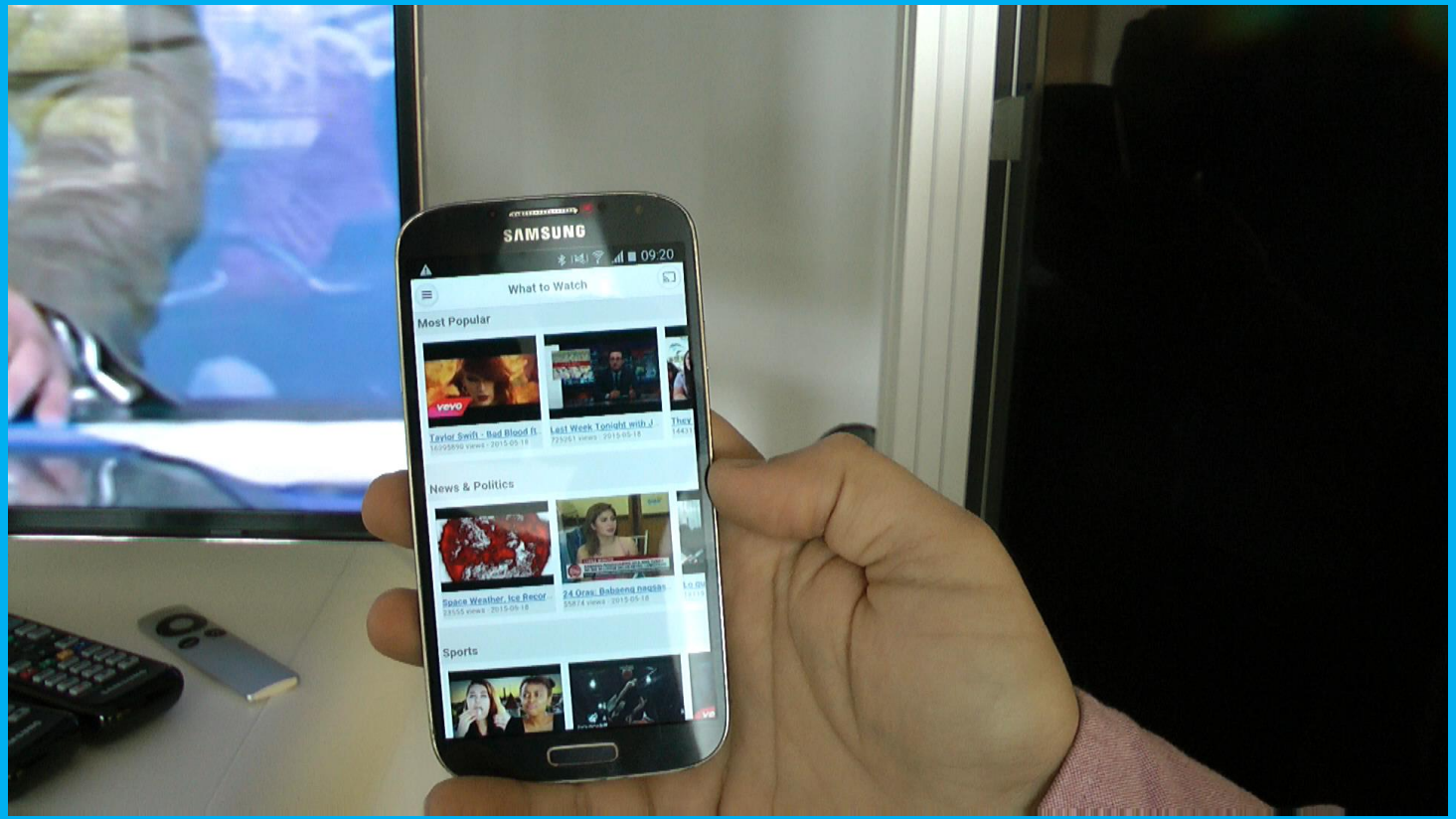


W3C SECOND SCREEN PRESENTATION API

Scope

- Define an API that allows a web application to:
  - ... request display of web content on a connected display
  - ... communicate with and control the web content
  - ... identify whether at least one secondary screen is available for display
- The web content may comprise HTML documents, web media types such as images, audio, video, or application-specific media
- The specification includes security and privacy considerations

Fraunhofer FOKUS implementation of Presentation API as Cordova Plugin



FIRST PRESENTATION API WG F2F MEETING IN BERLIN – MAY 2015

13:30 - 14:30

- **Presentation API – Intro and Recent Improvements**
  - François Daoust – Web and TV specialist at W3C
- **Presentation API in Chromium**
  - Mark Foltz – Google, Senior Staff Software Engineer
- **Presentation API / DIAL integration**
  - Mark Watson – Netflix, Director Streaming Standards
- **Companion Screens and HbbTV 2.0**
  - Matt Hammond – BBC, Senior R&D Engineer

- **14:30 - 15:00**
  - Coffee Break, Demos & Exhibition

15:00 - 16:00

- **Presentation API on Firefox OS**
  - Shih-Chiang Chien – Mozilla Foundation, Senior Software Engineer
- **Presentation API on Smart Watches**
  - Soonbo Han – LG Electronics, Senior Research Engineer
- **Multiscreen on Cloud Browsers**
  - Oliver Friedrich – Deutsche Telekom, Senior Expert New Media
- **Digital Signage Provides Information of Games and Disasters**
  - Masayuki Ihara – NTT Japan, Senior Research Engineer
- **Extending Video for Multiscreen**
  - Jean-Claude Dufourd – Télécom ParisTech, Research Director

Thing API proposal

THING API PROPOSAL

- W3C Thing API
  - Potential namespace: *navigator.thing* or *navigator.things*
- JavaScript API that allows Web pages to discover and interact with things
  - ThingRequest(filter).start().then(function(thing){…}).catch(function(err){…});
  - filter is a JSON that contains filter properties like type, proximity, etc.
- The API should consider security and privacy by design
  - In order to obtain access to a Thing, the browser may show (after ThingRequest.start() is called) a dialog (like <input type="file"> dialog) that displays a list of available Things. Once the user selects a thing, then it will be available for the Web page after the promise is resolved. Otherwise the promise will be rejected. This step may be not needed for non-browser JavaScript environments like Node.js
  - After the user approved access to a thing, the web page can access it (e.g. when the page is reloaded or opened again at a later time) by using:
    - navigator.things.getById(thingId).then(function(thing){…}).catch(function(err){…});

THING API PROPOSAL

- The API should abstract from underlying protocols for discovery and communication
  - Once the web page get access to a thing, the following API can be used to ready/write properties, call actions or subscribe to events by using the information (name of properties, actions, events, etc.) form the corresponding Thing Description:
  - thing.property.set("colorTemperature", 123456).then(success).catch(error);
  - thing.property.get("colorTemperature").then(success).catch(error);
  - thing.action.call("ledOnOff", true).then(success).catch(error);
  - thing.event.on("colorTemperatureChanged", callback).then(success).catch(error);
- Check and Watch reachability of a thing:
  - thing.getReachability().then(function(reachability) {
    handleReachabilityChange(reachability.value);
    reachability.onchange = function() { handleReachabilityChange(this.value);}
    });

EXAMPLE (1/2)

```
// filter of things to discover. Additional parameters can be added.
// in this example we want to discover LEDs nearby (Discovery and Communication technologies is not important)
// The value of the type element is just an example here for LEDs. Ontology for Thing types needs to be defined (or reused from somewhere else).
var filter = {
        type: "http://www.w3c.org/wot/thing/led"
        proximity: "nearby"
};
var req = new ThingRequest(filter);
// onSuccess will be called only when the user selects a Thing from the Thing Selection Dialog.
// The Thing Selection Dialog is a native UI provided by the User Agent and not accessible to the Web App.
// The Thing Selection Dialog will be displayed after the Web App calls "req.start()". The user may select
// a Thing from the Dialog or may cancel the Dialog.
var onSuccess = function(thing){
        // onSetPropertySuccess is called when the property is set successfully.
        // onSetPropertyError is called for example when a thing is not reachable, the property is not writable or when the property doesn't exist.
        thing.property.set("colorTemperature", 123456).then(onSetPropertySuccess).catch(onSetPropertyError);
        // onGetPropertySuccess is called when the property is retrived successfully.
        // onGetPropertyError is called for example when a thing is not reachable or when the property doesn't exist.
        thing.property.get("colorTemperature").then(onGetPropertySuccess).catch(onGetPropertyError);
        // onActionCallSuccess is called when the action is successfully executed. Results are passed as input.
        // onActionCallError is called for example when a thing is not reachable, when the action doesn't exist or when an error is raised during execution
        thing.action.call("ledOnOff", true).then(onActionCallSuccess).catch(onActionCallError);
        // colorTemperatureChangedCallback is executed each time the LED reports a new value.
        // onSubscribeSuccess is called when subscribtion was successfull.
        // onSubscribeError is called when the thing is not reachable or when the event doesn't exist
        thing.event.on("colorTemperatureChanged", colorTemperatureChangedCallback).then(onSubscribeSuccess).catch(onSubscribeError);
        // Get reachability of the Thing. Reachability may change during runtime.
        thing.getReachability().then(function(reachability) {
                // reachability.value may be kept up-to-date by the UA as long as the reachability
                // object is alive. It is advised for the web developers to discard the object
                // as soon as it's not needed.
                handleReachabilityChange(reachability.value);
                // reachability.onchange is executed each time the reachability is changed.
                // For example when the device in not the range of the LED or the LED is not available anymore.
                reachability.onchange = function() { handleReachabilityChange(this.value);}
        });
```

EXAMPLE (2/2)

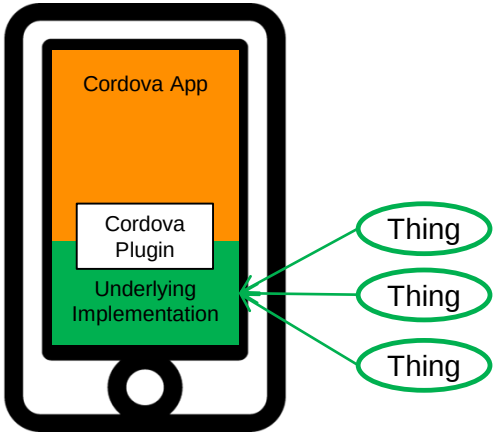
```
        // the Web App may store the thing.id in localStorage or somewhere else
        // and requests access to the Thing after reload the Web App using
        var thingId = thing.id;
        localStorage.setItem("thingId", thingId);
        var thingType = thing.type;
        var thingName = thing.name;
};
// onError will be called when the user cancels the selection dialog.
var onError = function(err){
        console.error("Unexpected Error", err);
};
// start the request will display the Thing Selection Dialog.
req.start().then(onSuccess).catch(onError);

// This call is relevant when the page is reloaded, but the app already accessed the thing before and stored its Id in the Storage.
var thingId = localStorage.getItem("thingId");
thingId && navigator.things.getById(thingId).then(function(thing){
        thing.getReachability().then(function(reachability) {
                if(reachability.value){
                        // access thing in the same way as described above
                }
        });
}).catch(function(err){
        console.error("Error on get thing by Id", err);
});
```

Implementation as cordova plugin

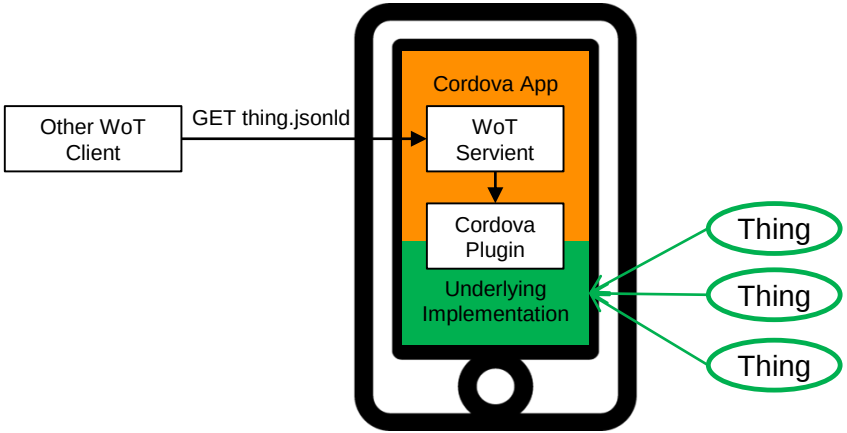
IMPLEMENTATION AS CORDOVA PLUGIN

- The Implementation is work in progress
- It is a cordova plugin for android and iOS
- The iOS implementation supports HomeKit
  - HomeKit Accessory ←→ W3C Thing
- Implementation will be showcased during TPAC



PLUGFEST IMPLEMENTATION: CORDOVA APP AS WOT SERVIENT

- Cordova App implements a WoT servient over WebSockets and HTTP
- A TD is available for each available Thing



FEEDBACK

- Feedback on the API proposal is welcome
- Feedback from Francois:
  - *“Would supporting the ability to select more than one Thing at a time be useful?”*
  - *“There may be more Things to choose from, which might mean that the list could grow out of control”*
  - *“Requiring the user to select a light in a list just to be able to switch it on or off may not lead to the best user experience”*

CONTACT

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