



OMWeb

Open Media Web

Deliverable N° D3.5

Standardisation Roadmap 2, M24

PROJECT PERIODIC REPORT

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Project	
Grant Agreement number	248687
Project acronym:	OMWeb
Project title:	Open Media Web
Funding Scheme:	Coordination & Support Action
Date of latest version of Annex I against which the assessment will be made:	August 15, 2009
Period covered:	From 01/01/2011 to 31/12/2011
Deliverable number:	D3.4
Deliverable title	Standardisation Roadmap 2
Contractual Date of Delivery:	M24
Actual Date of Delivery:	6/2/2012
Editor (s):	Dr. Philipp Hoschka
Author (s):	Dr. Philipp Hoschka
Reviewer (s):	
Participant(s):	ERCIM/W3C
Work package no.:	3
Work package title:	Standardisation
Work package leader:	Dr. Philipp Hoschka
Work package participants:	ERCIM/W3C
Distribution:	PP
Version/Revision (Draft/Final):	Final
Total N° of pages (including cover):	21
Keywords:	Web and TV, Points of Interest, Standards, Video on the Web, HTML5, Media APIs, WebRTC

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² The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm ; logo of the 7th FP: http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos). The area of activity of the project should also be mentioned.

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OMWeb is a project partly funded by the European Union.

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1 INTRODUCTION

With HTML5 and related technologies of W3C's Open Web Platform, open, royalty-free Web technologies are seen by many as the future way to create, distribute and access audiovisual media in the broadest sense. The Open Web Platform will not only allow access to music and videos, but also support more advanced applications such as integration with TV content and services, augmented reality and audio/video conferencing.

While W3C is currently working on standardizing many media-related aspects of the Open Web Platform, information about these standardization projects is spread over many parts of the W3C website, and the work itself is spread over various W3C working groups.

The aim of this roadmap is to make this information more accessible to ICT projects within the "[Networked Media and 3D Internet](#)" topic of the EU commission's ICT program, facilitating their involvement in W3C standardization.

We give a comprehensive and structured view of the ongoing work, facilitating access to the information, increasing its usability and visibility.

To achieve this, this document maps ongoing W3C standardization activities onto target outcomes outlined in the ICT funding program for "Networked Media", namely

- Technologies for converged delivery of multimedia content and services
- Networked Search

Using this roadmap, an ICT project can easily determine which W3C standardization activities are relevant to the project's target outcome and contribute to those or even suggest new standardization activities should there be important omissions in W3C's current standardization work.

This document is structured as follows: Section 2 explains the different ways in which ICT projects can contribute to W3C standardization. It also explains the positioning of W3C with respect to other European standardization organizations such as ETSI (HbbTV) and DVB.

In Section 3, for each W3C standardization activity relevant to one of the target outcomes, we identify its most important characteristics, including

- the relevant W3C specification or section of a specification, including a direct link, enabling an interested ICT project to directly find the relevant information
- the relevant W3C WG with a direct link, enabling an ICT project to find out more about who participates in the effort, ongoing WG discussions and other related standardization work items handled by the WG.

2 W3C STANDARDS CONTRIBUTION AND POSITIONING

2.1 How can ICT Projects contribute to W3C Standards?³

2.1.1 Introduction

W3C is the natural home for Web-related standardization aspects of EU-funded projects and an ideal partner for those interested in creating new open standards for the Web. W3C has extensive experience with EU projects both as coordinator and as partner; see a summary of [current funding through EU projects and other non-Member sources](#).

W3C has several mechanisms to make it easier for research projects to participate in the design of future Web technologies. All funded projects focussing on Web technology should understand the details of how to bring their research outcomes to a standardization process.

Fig. 1 gives a general overview of the different ways that ICT projects can contribute to standardization for web-based applications and services within the W3C.

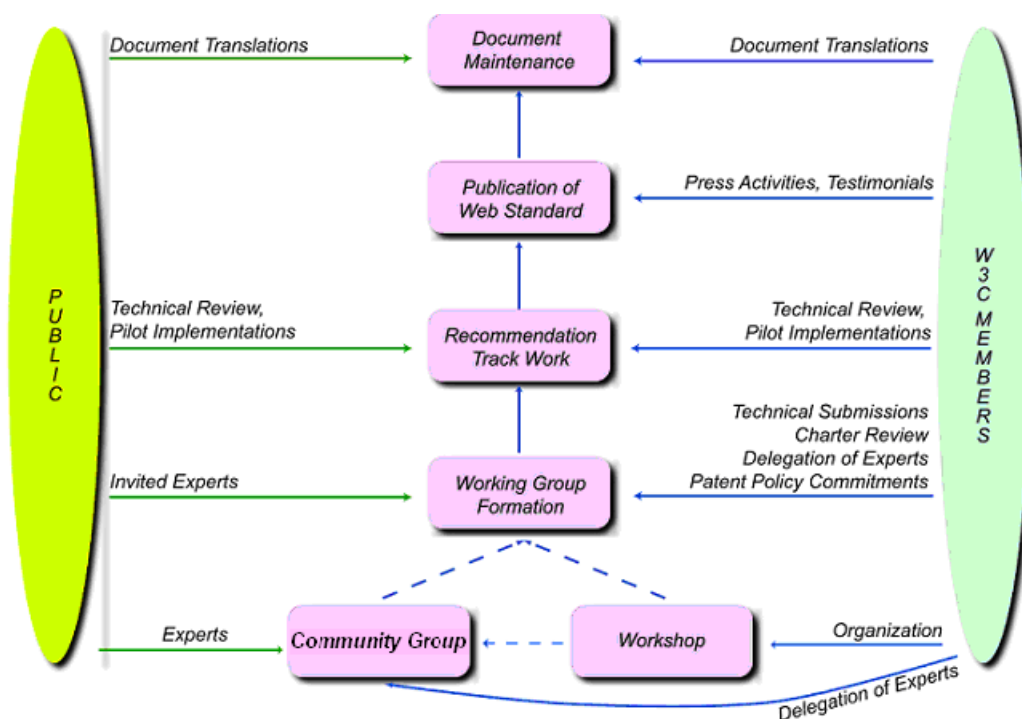


Fig. 1: Opportunities for Contributions to W3C Standardization for ICT projects along Standards lifecycle

³ This Section contains original material as well as updated and edited material of the document "Participation in W3C by EU-funded Projects" developed within the within the MobiWebApp project (Grant Agreement Number: 257800).

From bottom to top, the figure shows the lifecycle of the W3C standardization process, often starting with a workshop or a community group and leading towards a final Web standards document.

There are many ways for ICT projects to contribute to W3C standardization. In particular, contribution is not necessarily limited to taking technical project results and bringing those for standardization to W3C.

Other contribution opportunities for ICT projects include

- reviewing working drafts, providing feedback on the functionality, possible "bugs" etc.
- using and implementing a W3C standard in the project, thereby helping with adoption of the standard
- participating in the development of the standard by joining a working group, workshop etc.

Time spent by ICT project engineers within W3C can be charged on EU projects (e.g. as part of the standardization work packages often present in the project's work plan). Travel expenses to attend W3C face-to-face meetings, where specifications are developed and refined, can also be charged as project expenses.

2.1.2 Contributions by Projects that are W3C members

On the right hand side, Fig. 1 shows how projects that are W3C members can contribute to W3C's work.

W3C provides [special "Project" Membership](#) tailored for EC project/consortia. This can be included as part of the funding request when drafting a EU proposal.

W3C membership not only allows direct participation in the W3C working groups standardising technology, but is a requirement for submitting a specification for the rest of the W3C to review.

This type of membership is only open for multi-partner, government-funded, time-limited, project, and it gives up to four (or more in special cases) individuals the right to represent the Project in W3C groups. The commitment is for a minimum of one year.

2.1.3 Contribution by ICT Project Participants that are W3C members

Participants in an ICT project that work for an organization that is a W3C member can contribute project results to the W3C as shown on the right hand side of Fig. 1. W3C currently has more than 320 members (see [full list](#)), many of them from Europe and many from the research community (e.g. CWI, DFKI, INRIA, Fraunhofer, University of Oxford, University of Manchester, Universidad Politécnica de Madrid, Universitat Politècnica de Catalunya...).

2.1.4 Contribution by ICT Project Participants that are not W3C members

However, an organization participating in an ICT project does not have to be a W3C member to be able to contribute to W3C's work. On the left hand side, Fig. 1 shows how organizations that are not currently W3C members can contribute to W3C's work.

2.1.5 Community and Business Groups

In August 2011, W3C created [Community and Business Groups](#) with a lighter-weight process to promote innovation.

Both type of groups an excellent way to do early standardization work in W3C for EU-funded project, independently of the official standard track dynamics, and without having to get the endorsement of the rest of the W3C membership and community, but still while using the W3C tools and pool of experts know-how.

Community Groups are an open forum, without fees, where Web developers and other stakeholders develop specifications, hold discussions, develop test suites, and connect with W3C's international community of Web experts.

A W3C Business Group gives innovators that want to have an impact on the development of the Web in the near-term a vendor-neutral forum for collaborating with like-minded stakeholders, including W3C Members and non-Members.

2.2 Positioning of W3C with Respect to other European Standardisation Organisations

Numerous “networked media” ICT projects focus on television-related services, and many members of the ICT networked media community have strong interest in the television area.

With the advent of HTML5, W3C’s role in the area of television standardization has significantly increased. Many of today’s HTML5 features as well as additions planned for the future directly or indirectly enable innovative TV-related services. These include multi-screen scenarios or HTTP streaming of TV-content.

While the “networked media” community is often familiar with standardization efforts in bodies such as ITU, DVB Forum or ETSI (see [FutureNEM updated inventory of relevant standards for the networked media field](#)⁴ for an overview). The community is less familiar today with standardization television-related services within W3C.

The standardization landscape in the area of television is relatively complex. There is some level of fragmentation at an international level, but also at the pan-European level.

In order to select the right standardization body to get involved in, it is important that ICT projects planning to standardise their Web and Television research results know how the different ongoing standardization activities this area relate to each other.

2.2.1 The Past: CE-HTML

Before the advent of HTML5, much of the recent work on TV and Web integration was based on CE-HTML⁵. This specification includes a number of W3C specifications (XHTML, CSS TV profile, ...) and adds TV-specific functionality. CE-HTML is part of a specification known as CEA-2014 or “*Web-based Protocol and Framework for Remote User Interface on UPnP Networks and the Internet (Web4CE)*”⁶ developed by the CEA (Consumer Electronics Association).

⁴ <http://nem-summit.eu/files/2011/09/D3-3-1-Updated-inventory-of-relevant-standards-for-the-networked-media-field-v2.pdf>

⁵ <http://en.wikipedia.org/wiki/CE-HTML>

⁶ http://www.ce.org/Standards/browseByCommittee_2757.asp

CE-HTML has been adopted by various other bodies, e.g. by the DLNA⁷ (Digital Living Network Alliance) in what is known as DLNA RUI⁸ as well as by the OIPF (Open IPTV Forum) in its DAE (Declarative Application Environment) specification⁹.

The OIPF specifications have in turn been adopted by the HbbTV consortium¹⁰. HbbTV provides interactive TV content in a “hybrid” manner, using a combination of a DVB-based broadcast and a broadband Internet connection. HbbTV has been approved as ETSI standard TS 102 796.

HbbTV adoption currently seems centred on Germany and France, although the specification has also recently been approved by the DTG (Digital Television Group) in the UK¹¹.

2.2.2 The Future: HTML5

In contrast to XHTML, HTML5 integrates video and other multimedia functionality is much more tightly. This makes HTML5 an attractive candidate for direct integration of other TV-relevant functionalities.

Within the W3C Web and TV Interest Group¹², W3C members are currently working on extending HTML5 and related W3C specifications to incorporate more TV-related functionality, thereby replacing today’s XHTML-based CE-HTML. The plan is for this “TV-enabled” HTML5 version to then be adopted by bodies like the DLNA and OIPTV, and to “flow upwards” into specifications such as HbbTV and others.

⁷ <http://www.dlna.org/>

⁸ Included in “DLNA Networked Device Interoperability Guidelines, August 2009” <https://members.dlna.org/industry/certification/guidelines/>

⁹ http://www.oipf.tv/docs/Release2/V2.1/OIPF-T1-R2-Specification-Volume-5-Declarative-Application-Environment-v2_1-2011-06-21.pdf

¹⁰ http://www.hbbtv.org/pages/about_hbbtv/specification.php

¹¹ <http://www.broadbandtvnews.com/2011/09/30/dtg-approves-uk-hbbtv-spec/>

¹² <http://www.w3.org/2011/webtv/>

3 W3C STANDARDIZATION ACTIVITY RELEVANT TO NETWORKED MEDIA OBJECTIVE

Section 2 clarifies the various ways in which ICT projects can contribute to W3C work on the organizational level and how W3C work relates to work in other standardisation organisations.

To be able to make concrete contributions, ICT projects in the “networked media” area also need orientation on a technical level to answer questions such as:

- What are ongoing standardization activities relevant for my project?
- When is an appropriate time to contribute?
- Is the standard mature enough so I can use it in my project?

The aim of this Section is to help answer these technical questions for ICT projects within the [“Networked Media and 3D Internet”](#) objective of the EU commission's ICT program. This is particularly important given the rapidly increasing role of the Web and W3C standardization for Networked Media.

Ongoing W3C standardization activities are particularly relevant for two of the target outcomes in the "Networked Media" objective, namely

- Technologies for converged delivery of multimedia content and services
- Networked Search

For each target outcome, we describe the features relevant for the target outcome that are currently under standardization at W3C, point to relevant standardization documents and identify the relevant W3C working group.

The correlation of the planned outcomes of the OMWeb project in the areas "Points of Interest", "Web and TV" and "Real time communications" with the standardisation roadmap is noted explicitly where applicable.

Moreover, we provide tables that lists for each feature

- the relevant specification or section of a specification, including a direct link, enabling an interested ICT project to directly find the relevant information
- the relevant WG with a direct link, enabling an ICT project to find out more about
 - who participates in the effort
 - ongoing WG discussions
 - other related standardization work items handled by the WG
- the maturity of the specification in the terms of the W3C process.

The maturity levels of documents in the W3C process are the following (ordered from least to highest maturity level):

- “W3C Recommendations” are stable and completed Web standards; these documents only get updated rarely, through the “Edited Recommendation” process, as a result from errata collected by Working Groups.
- “Proposed Recommendations” manifest that the group has gathered sufficient implementation experience, and triggers the final review by W3C Members.

- “Candidate Recommendations” trigger a call for implementations where implementers are invited to implement the specification and send feedback; Working Groups are expected to show the specification gets implemented by running test suites they have developed.
- “Last Call Working Drafts” signal that the Working Group has determined that the specification fulfils its requirements and all the known issues have been resolved, and thus requests feedback from the larger community.
- “Working Drafts” are early milestones of the Working Group progress.
- “Editors drafts” represent the current view of the editors of the specification but have no standing in terms of standardization.

3.1 W3C Standards Efforts Relevant to “Content aware networks and network aware applications” Target Outcome¹³

3.1.1 Audio and Video

Playback

HTML5 adds two tags that dramatically improve the integration of multimedia content on the Web: the [<video>](#) and [<audio>](#) tags. These tags allow embedding video and audio content, and make it possible for Web developers to interact much more freely with that content than they can through plug-ins. They make multimedia content first-class citizens of the Web, the same way images have been for the past 15 years.

Editing

The [media fragments URI](#) specification provides a means to edit audio and video resources via URIs. For example, it enables to retrieve only seconds 10 to 30 of a one minute video. The specification also allows cropping out a certain part of a video (e.g. the upper left corner) using a “spatial” media fragment. Moreover, media fragment URIs can address only certain tracks of a multi-track multimedia object (e.g. the audio track of a video). Named temporal segments are also supported.

Capture

The [HTML Media Capture](#) function defines a markup-based mechanism to access captured multimedia content using camera and microphones attached to a device, a very common feature on mobile devices, but also on desktop computers.

The recently chartered [Web Real-Time Communications Working Group](#) is building an [API \(getUserMedia\)](#) to directly manipulate streams from camera and microphones, on which it will collaborate with the Device APIs Working Group to provide capture and recording capabilities.

¹³ This Section contains original material as well as updated and edited versions of material provided within D4.1 “Standardization Roadmap 1” within the MobiWebApp project (Grant Agreement Number: 257800), published in August 2011.

Processing

Two additional APIs add multimedia processing capabilities to the Web platform. The [Canvas 2D Context](#) API enables modifying images, which in turn opens up the possibility of video editing.

The [Audio Working Group](#) works on the [Web Audio API](#) and the [MediaStream Processing API](#) which make it possible to modify, analyze and synthesize audio content.

Metadata

The [API for Media Resources 1.0](#) defines an API to access metadata information related to media resources on the Web. The overall purpose is to provide developers with a convenient access to metadata information stored in different metadata formats. The API provides means to access the set of metadata properties defined in the [Ontology for Media Resources 1.0](#) specification. These properties are used as a pivot vocabulary in this API. The API allows retrieving metadata information in synchronous and asynchronous way and provides interfaces for structured return. The API has been designed for both client and server side implementations.

Content Protection

(supported by OMWeb project)

Support for protected content in HTML5 is an active work item in the [Web and TV Interest Group](#). There are many and varied existing “content protection” and “digital rights management” systems with many and varied capabilities, and implementing these capabilities in open source projects is difficult. Therefore, the group follows an approach where an HTML5 browser communicates with an external content protection server, rather than implementing content protection itself.

Table 1 summarizes ongoing W3C standardization activities in the area audio and video.









Feature	Specification	Working Group	Maturity
Video playback	HTML5 video element	HTML Working Group	
Audio playback	HTML5 audio element		Last Call Working Draft
Editing	Media Fragments URI 1.0	Media Fragments Working Group	 Candidate Recommendation
Capturing	HTML Media Capture	Device APIs Working Group	 Working Draft
	getUserMedia() WebRTC 1.0: Real-time Communication Between Browsers	Web Real-Time Communications Working Group	 Working Draft
Video processing	HTML Canvas 2D Context	HTML Working Group	 Last Call Working Draft
Audio processing	Web Audio API MediaStream Processing API	Audio Working Group	 Working Draft
Metadata	API for Media Resources 1.0	Media Annotations Working Group	 Candidate Recommendation
	Ontology for Media Resources 1.0		 Proposed Recommendation
Content Protection	N/A	Web and TV Interest Group	N/A

Table 1: W3C standardization activities relevant to Audio and Video

3.1.2 Subtitles and Captioning

The [Timed Text Markup Language](#) allows representing timed text media such as subtitles and captions. TTML has been adopted by SMPTE (the Society of Motion Picture and Television Engineers) as the basis for [SMPTE-TT](#), which in turn has been [chosen by the FCC as “safe harbor” closed caption technology](#) for “IP-delivered video programming”. TTML is also the basis of the ongoing [EBU-TT](#) effort at the EBU (European Broadcasting Union).

[WebVTT](#) (Web Video Text Tracks) is another format intended for captioning video content currently being discussed in the [Web Media Text Tracks Community Group](#). In contrast to TTML, it is not based on XML and has support by Web browser providers such as Google.

Table 2 summarizes ongoing W3C standardization activities in the area of subtitles and captioning.


Feature	Specification	Working Group	Maturity
Subtitles	Timed Text Markup Language	Timed Text Working Group	 Recommendation
	WebVTT	Web Media Text Tracks Community Group	CG Work Item

Table 2: W3C standardization activities relevant to subtitles and captioning

3.1.3 Networked Media

HTTP Adaptive Streaming

(supported by OMWeb project)

The document [Adaptive Bit Rate Parameters, Error Codes and Feedback](#) developed within the [Web and TV Interest Group](#) describes approaches for integrating HTTP adaptive streaming into HTML5, including ways for applications to control the adaptive play-out, e.g. by setting parameters or by direct manipulation of the manifest file in Javascript.

Second Screen Support

(supported by OMWeb project)

The [Device API Working Group](#) is planning to work on a device discovery specification that will enable implementing second screen support within a web client. In a typical “second screen” scenario, a user uses a TV set and a mobile device simultaneously, and the mobile device can alternatively serve as “remote-control-on-steroids”, enabling sophisticated control of the TV, or as device for displaying interactive content that goes together with the content displayed on the TV set (e.g. voting applications, additional information what is shown on the TV etc.).

Home Networking

(supported by OMWeb project)

The device discovery specification developed within the [Device API Working Group](#) will also enable typical home networking scenarios within web clients, e.g. displaying photos stored on a home media server or PC on a TV set.

Real-Time Audio/Video Conferencing

(supported by OMWeb project)

The [WebRTC 1.0: Real-time Communication Between Browsers](#) specification defines a set of APIs that will enable implementation of real-time audio/video conferencing directly within a Web client. The APIs enable representing streaming media, including audio and video, in JavaScript, to allow media to be sent over the network to another browser or device, and media received from another browser or device to be processed and displayed locally. This specification is being developed in conjunction with a protocol specification developed by the [IETF RTCWEB](#) group.

P2P

(supported by OMWeb project)

The [WebRTC 1.0: Real-time Communication Between Browsers](#) specification provides an API that allows two users to exchange data directly, browser-to-browser and peer-to-peer. This enables not only audio/video conferencing, but also supports file sharing, e.g. for video distribution.

Table 3 summarizes ongoing W3C standardization activities in the area of networked media.


Feature	Specification	Working Group	Maturity
HTTP Adaptive Streaming	Adaptive Bit Rate Parameters, Error Codes and Feedback	Web and TV Interest Group	Draft
Second Screen	N/A (Device Discovery)	Device API Working Group	N/A
Home Networking			
Real-Time Audio/Video Conferencing	WebRTC 1.0: Real-time Communication Between Browsers	Web Real-Time Communications Working Group	 Working Draft
Peer-to-Peer			

Table 3: W3C standardization activities relevant to networked media

3.1.4 Graphics

Vector Graphics

[SVG](#), Scalable Vector Graphics, provides an XML-based markup language to describe two-dimensional vector graphics. Since these graphics are described as a set of geometric shapes, they can be zoomed at the user request, which makes them well-suited to create graphics on mobile devices where screen space is limited. They can also be easily animated, enabling the creation of very advanced user interfaces.

The integration of SVG in HTML5 opens up new possibilities, for instance applying advanced graphic filters (through SVG filters) to multimedia content, including videos. SVG 2.0 is set to facilitate that integration and complete the set of features in SVG.

Graphics API

In complement to the declarative approach provided by SVG, the <canvas> element added in HTML5 enables a [2D programmatic API](#) that is well-suited for processing graphics in a less memory intensive way. This API not only allows to render graphics, but can also be used to do image processing and analysis.

Effects

Both SVG and HTML can be styled using [CSS](#) (Cascading Style Sheets); in particular, CSS3 (the third level of the specification) is built as a collection of specifications set to offer a large number of new features that make it simple to create graphical effects, such as rounded corners, complex background images, shadow effects ([CSS Backgrounds and Borders](#)), rotated content ([CSS 2D Transforms](#)), animations ([CSS Animations](#), [CSS Transitions](#)), and even 3D effects ([CSS 3D Transforms](#)).

Animations can be resource intensive. The [Timing control for script-based animations API](#) allows managing animation resource use by controlling the rate of updates to animations.

Fonts

Fonts play an important role in building appealing graphical interfaces. [WOFF](#) (Web Open Font Format) make it easy to use fonts that are automatically downloaded through style sheets, while keeping the size of the downloaded fonts limited to what is actually needed to render the interface.

Table 4 summarizes ongoing W3C standardization activities in the graphics area.










Feature	Specification	Working Group	Maturity	
2D Graphics Vector	SVG Tiny 1.2	SVG Working Group	 Recommendation	
	SVG 2.0		N/A	
2D Programmatic API	HTML Canvas 2D Context	HTML Working Group	 Last Call Working Draft	
Rounded Corners			 Candidate Recommendation	
Complex background images				CSS Backgrounds and Borders
Box effects shadow				
CSS 2D Transforms	CSS 2D Transforms Module Level 3	CSS Working Group	 Working Draft	
3D Effects	CSS 3D Transforms Module Level 3		 Working Draft	
Animations	CSS Animations Module Level 3		 Working Draft	
	CSS Transitions Module Level 3		 Working Draft	
	Timing control for script-based animations API	Web Performance Working Group	 Working Draft	
Downloadable fonts	WOFF File Format 1.0	WebFonts Working Group	 Candidate Recommendation	

Table 4: W3C standardization activities relevant in the graphics area

3.1.5 User Interfaces for Games¹⁴

Pointer Lock

In current web clients, it is not possible to direct all mouse events to a single component (e.g. a sprite representing a “weapon”). Rather, events are sent to whatever page element the mouse cursor is currently “hovering over”. This makes it impossible to implement certain classes of applications, especially first person perspective 3D applications and 3D modeling software.

The [Pointer Lock](#) specification developed in the [Web Applications Working Group](#) provides a way to lock the target of mouse events to a single page element (or more precisely: Document Object Model (DOM) element) and to remove the cursor from view.

Gamepad API

All game consoles ship with a game controller that features buttons, one or more digital sticks and/or one or more analog sticks. The [Gamepad](#) API specification developed in the [Web Applications Working Group](#) allows users to interact with games implemented in a web client using buttons and joysticks of a gamepad as well as other similar devices common to current gaming systems including joysticks, driving wheels, pedals, and accelerometers.

Full screen API

Most games run full screen to take advantage of the space available and to ensure players are not distracted by other elements on the screen that would not match the game's colour scheme and ambiance.

The [Fullscreen](#) specification enables a web application to automatically switch to fullscreen by itself.

Accurate sound triggering

In a “shoot 'em up” video game, enemies “explode” when they are hit by a weapon. The explosion sound needs to be synchronized with the animation on the screen. Multiple explosions may occur at once.

The [Audio Working Group](#) is working on the [Web Audio API](#) specification which extends the HTML5 <audio> element to provide multi-channel low-latency and high-accuracy audio required for gaming applications.

Table 5 summarizes ongoing W3C standardization activities relevant for game user interfaces.

¹⁴ For a full analysis and mapping of gaming requirements onto web platform features, see [OMWeb Deliverable D3.3 “Workshop Report on HTML.next for Games”](#).

Feature	Specification	Working Group	Maturity
Pointer Lock	<i>Pointer Lock</i>	Web Applications Working Group	Editor's Draft
Gamepad API	<i>Gamepad</i>	Web Applications Working Group	Editor's Draft
Fullscreen API	<i>Fullscreen</i>	CSS Working Group	Draft
Accurate sound triggering	<i>Web Audio API</i>	Audio Working Group	 Working Draft

Table 5: W3C standardization activities relevant for user interfaces for games

3.1.6 Accessibility

The [Web Content Accessibility Guidelines \(WCAG\) 2.0](#) covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these.

WCAG 2.0 includes recommendations on making multimedia content more accessible, in particular [Guideline 1.1 Text Alternatives](#) and [Guideline 1.2 Time-based Media](#).

Table 6 summarizes ongoing W3C standardization activities in the accessibility area.


Feature	Specification	Working Group	Maturity
Accessibility	<i>Web Content Accessibility Guidelines (WCAG) 2.0</i>	Web Content Accessibility Guidelines Working Group (WCAG WG)	 Recommendation

Table 6: W3C standardization activities relevant in the accessibility area

3.2 W3C Standards Efforts Relevant to “Networked Search” Target Outcome

3.2.1 Metadata

The [API for Media Resources 1.0](#) defines an API to access metadata information related to media resources on the Web. The overall purpose is to provide developers with a convenient access to metadata information stored in different metadata formats. The API

provides means to access the set of metadata properties defined in the [Ontology for Media Resources 1.0](#) specification. These properties are used as a pivot vocabulary in this API. The API allows retrieving metadata information in synchronous and asynchronous way and provides interfaces for structured return. The API has been designed for both client and server side implementations.

Table 7 summarizes ongoing W3C standardization activities in the metadata area.



Feature	Specification	Working Group	Maturity
Metadata	API for Media Resources 1.0	Media Annotations Working Group	 Candidate Recommendation
	Ontology for Media Resources 1.0		 Proposed Recommendation

Table 7: W3C standardization activities relevant for metadata

3.2.2 Location Information

Geolocation

The [Geolocation API Specification](#) allows determining the location of the device that a web client is running on (e.g. a mobile device running a mobile browser). This enables the implementation of location-based applications such as “where is the nearest restaurant” within Web clients. The API itself is agnostic of the underlying location information sources. Common sources of location information include Global Positioning System (GPS) and location inferred from network signals such as IP address, RFID, WiFi and Bluetooth MAC addresses, and GSM/CDMA cell IDs, as well as user input. [Geolocation API Specification Level 2](#) is adding the ability to get location represented as a civil address.

Points of Interest

(supported by OMWeb project)

The [Points of Interest](#) (POI) specification allows to specify a location about which information is available (e.g. a restaurant, a landmark, ...). POI data has many uses including navigation systems, mapping, geocaching, location-based social networking games, and augmented reality browsers. A POI can be as simple as a set of coordinates and an identifier, or more complex such as a three dimensional model of a building with names in various languages, information about open and closed hours, and a civic address.

Table 8 summarizes ongoing W3C standardization activities in the area of location information.




Feature	Specification	Working Group	Maturity
Geolocation	<i>Geolocation API Specification</i>	<i>Geolocation Working Group</i>	 Candidate Recommendation
	<i>Geolocation API Specification Level 2</i>		 Last Call Working Draft
Points of Interest	<i>Points of Interest</i>	<i>Points of Interest Working Group</i>	 Working Draft

Table 8: W3C standardization activities in the area of location information