Trends in Web-based Signage Standardization

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Abstract

Web-based signage is expected to be the next generation of digital signage for presenting information and advertisements on displays. Its key feature is the ability to provide rich and compelling services at low cost using web technology. This article introduces trends in the standardization of web-based signage both in Japan and in international standardization bodies such as the W3C (World Wide Web Consortium) and ITU-T (International Telecommunication Union - Telecommunication Standardization Sector).

Keywords: web-based signage, digital signage, standardization, W3C, ITU-T, DSC

1. Introduction

Digital signage shows great promise as an information service for foreign visitors to Japan including at international sports events and as a social infrastructure for delivering information at the time of a natural disaster. The market for digital signage is expected to expand rapidly as the price of displays drops.

The Ministry of Internal Affairs and Communications (MIC) recently held the Conference on the Promotion of Introduction of ICT in the Entire Society in View of 2020. The Digital Signage Working Group was organized at the conference and is now studying the functions needed for implementing information and communication technology (ICT) throughout society via digital signage with a view to successfully staging the events in 2020 and achieving sustainable growth in Japan beyond 2020. It seeks to implement methods to achieve dissemination of disaster-related information, provide information via smartphones based on individual user attributes, and provide multilingual information via signage all with the aim of expanding digital signage functions and ensuring their interoperability [1].

Web-based signage is attracting attention as a means of achieving such a digital signage system. It is a form of digital signage using web technology. As long as an HTML5[*1]-compatible web browser is installed on the signage terminal, signage functions can be provided via a web application called a signage player. In other words, web-based signage can be configured with a general-purpose terminal without regard to the type of terminal or operating system being used, thereby lowering the cost of providing services (**Fig. 1**). It also enables content creation through web application programming interfaces (APIs) and abundant cloud assets such as open data. To achieve interoperability among digital signage systems with different specifications, it must be possible to deliver general content through a standard connection interface. An effective solution to this problem is a system configuration centered on web-based signage that applies widely used web technology.

NTT Service Evolution Laboratories has been researching and developing web-based signage. It aims to turn the results of its research and development (R&D) efforts into useful products and contribute to both domestic and international standardization activities to propagate web-based signage throughout society.

*1 HTML5: Hypertext Markup Language, fifth revision.

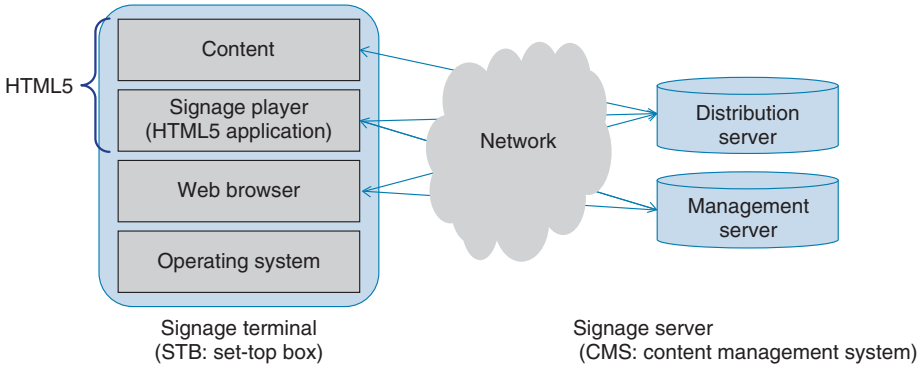


Fig. 1. Web-based signage.

2. Standardization in Japan

The motivating force behind the standardization of digital signage in Japan is the Digital Signage Consortium (DSC), whose core members include NTT Group companies. The DSC serves as a forum for all stakeholders in Japan's digital signage industry. It consists of 112 corporate members (as of April 4, 2017) including manufacturers, content providers, location owners, system integrators, and carriers. Its activities include conducting surveys and doing research in addition to carrying out its standardization efforts. The DSC has so far released "Digital Signage Standard System Guidelines" in 2008 and "Digital Signage Operation Guidelines at Times of Disasters and Emergencies" (Version 1: 2013; Version 2: 2014), which have contributed to international standards through an upstream[*2] process, becoming the basis for ITU-T Recommendations H.780 [2] and H.785.0 [3] published by the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) [4].

As part of this flow, DSC released "Digital Signage Standard System Interoperability Guidelines" in April 2016 with the aim of providing advanced digital signage functions such as dissemination of disaster information and information provision based on individual user attributes. The goal here is to promote the spread of digital signage with a view to 2020, and envisioning use by the increasing number of foreign visitors to Japan and by people with disabilities.

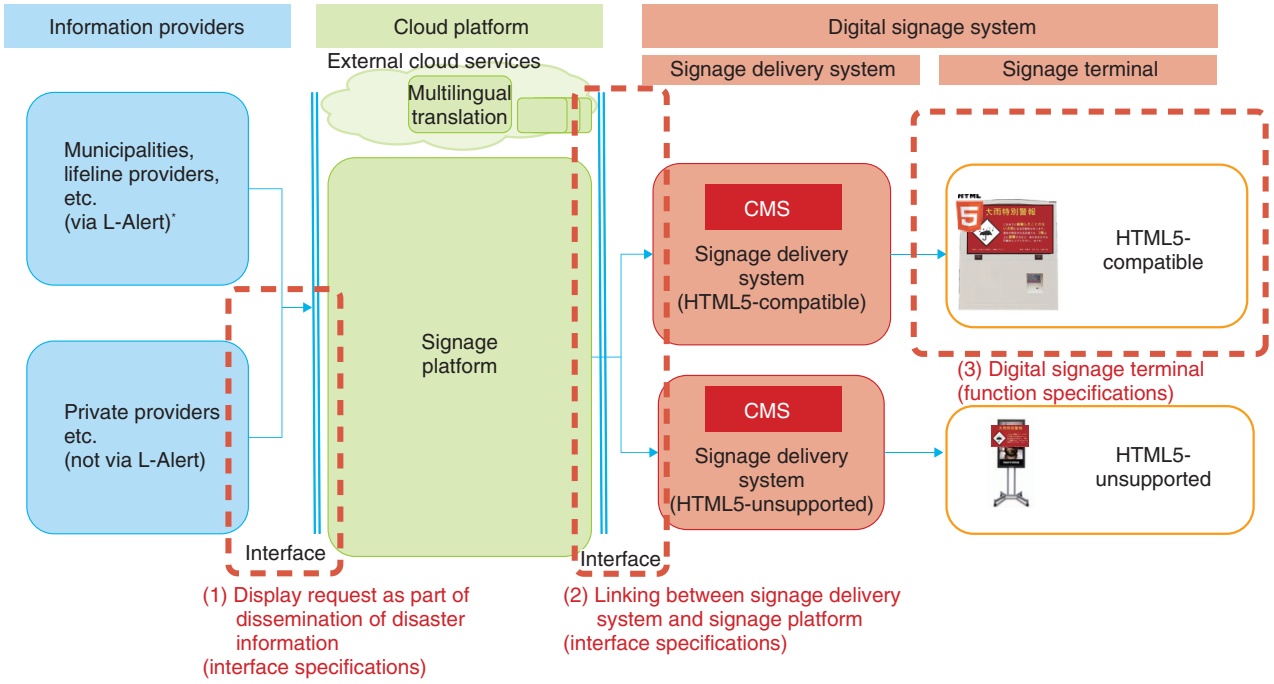
These guidelines present a system configuration that enables the provision of diverse services such as dissemination of urgent information including disaster information on signage, the linking of signage and smartphones to display signage information on smartphones, and the optimal delivery of information through multilingual support that switches the display based on personal attributes (preferred language) (**Fig. 2**). In short, a system configuration that includes a signage platform as a linking infrastructure plus the interface specifications for that platform are being turned into guidelines to achieve interoperability between digital signage systems having different specifications. These guidelines include terminal specifications for achieving functions using HTML5-compatible web-based signage.

3. Standardization at W3C

The World Wide Web Consortium (W3C) is an international, membership-based industry-academia consortium that aims to standardize and promote web technologies [5]. Standardization activities related to web-based signage began with studies on use cases and requirements in the Web-based Signage Business Group (BG) established in response to a proposal from Japan in 2012. The results of these studies were released as a BG report on use cases and requirements [6]. A web-based signage terminal features content presentation and terminal control through a web application called a signage player that runs on a web browser. The basic functions of this signage player can be achieved using existing HTML5 technology. Methods for implementing these functions have been released in the form of profiles (core profile [7], basic media profile [8], and storage profile [9]).

However, from the viewpoint of digital signage operation, APIs for controlling terminal hardware

*2 Upstream: In standardization activities, a proposal for making a domestic standard into an international standard.



* L-Alert: A disaster information sharing system in Japan.
Source: DSC "Digital Signage Standard System Interoperability Guidelines"

Fig. 2. System configuration for achieving envisioned services.

from the browser had been insufficient, and it was proposed that a Working Group (WG) for promoting the standardization of these APIs be established. A basic consensus on establishing this WG was reached in a BG meeting held at the W3C Technical Plenary/Advisory Committee Meetings Week 2015 (W3C TPAC 2015). A charter outlining the activities and mission of this WG was then prepared, and discussions commenced. Then, in 2016, these API discussions continued as face-to-face meetings at the September TPAC and became even more intense at face-to-face BG meetings held in Seoul in November, where the WG charter was enhanced and the preparation of documents related to web-based signage architecture began. At present, APIs targeted for standardization are those related to control of terminal power from the browser and to the acquisition of information necessary for terminal and content control (**Table 1**). The plan is to pursue standardization in earnest once the establishment of this WG is approved in W3C.

4. Standardization at ITU-T

As an agency of the United Nations, ITU-T produces ITU Recommendations that become international standards centered on telecommunications. The area of digital signage is addressed in Question 14 (Q14) by Study Group 16 (SG16), the group in charge of multimedia matters. Japan has been active in making contributions and proposals pertaining to Q14.

Recent activities include contributing an upstream standard from the Digital Signage Standard System Interoperability Guidelines produced by DSC and in addition, making proposals for establishing new work items relating to the topics. In this regard, the "Requirements of interoperable information services in public places" (H.DS-PISR) and "Framework for interactive service" (H.DS-FIS) were established as work items in June 2015 and September 2016, respectively, based on proposals from Japan. In addition, the draft technical paper "Technical Paper on Digital signage: Web-based digital signage" (HSTP.DS-WDS) for clarifying the framework and architecture of web-based signage is being studied as guidelines for configuring digital signage using web technology. The preparation of this paper is progressing based on a collaborative relationship with W3C.

Table 1. API proposals targeted by WG for recommendations.

API		Function	
Power status management		Automatic power saving of the terminal device	
	Power status control	Changing the power status mode	• Switching to stand-by mode • Display on/off
	Power status scheduling	Scheduled resume	• Resuming from stand-by
Contextual information		Information retrieval for player enrichment	
	Signage operational information	Acquiring unique information about the device	• Unique terminal information (serial number) • Manufacturer information (manufacturer name, brand name) • Terminal type
	Signage functional information	Retrieving functional information on the device	• Logical resolution • Display size

5. Verification trial

In line with the standardization trends described above, a verification trial using digital signage conforming to the Digital Signage Standard System Interoperability Guidelines was conducted from January to March 2017 in the Takeshiba redevelopment district in Minato ward, Tokyo [10]. This trial was conducted by the Contents innovation Program (CiP) together with Albero Grande (a joint venture of Tokyu Land Corporation and Kajima Corporation for developing Takeshiba district), NTT Communications, NTT IT (now NTT TechnoCross), and NTT as part of the MIC fiscal year 2016 project "Survey Contracts in Relation to Regional Trials toward IoT Hospitable Environments."

In the trial, research achievements of NTT Service Evolution Laboratories were used in the signage platform and web-based signage delivery system. The trial involved the construction of a signage platform capable of disseminating content to multiple signage systems, automatic acquisition of disaster-related municipal information and web-based information, conversion of that information to signage-compatible content, dissemination of that content to the signage delivery systems of various providers, and provision of a multilingual information service during a disaster. In addition, the web-based signage delivery system made it possible to display priority information rather than other information and to automatically display information on a smartphone in the user's default language.

6. Future outlook

In the near future, standards for web-based signage will become recommendations. The Digital Signage Standard System Interoperability Guidelines already include web-based signage and dissemination, which are also promoted by NTT. These guidelines were upgraded to Version 2 (2017) and reflect the results of the verification trial to further the standardization of web-based signage in Japan. In addition, the contents of these guidelines are expected to become an international standard in 2018, which means a standard that can be used both in Japan and throughout the world and that can contribute to the expansion of web-based signage business.

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