

# The Latest Condition in the WAP Forum

*In January 2002, the Wireless Application Protocol (WAP) Forum released the final version of WAP 2.0. Since 1998, NTT DoCoMo had been proposing a new activity "Next Generation WAP", based on its experience of i-mode, and the primary target of such activity is the harmonization with internet standard technologies. The WAP Forum began to create the specifications based on the proposal, and in July 2001, released the public-review version of WAP 2.0. Many comments were gathered during the public review period, and they were reflected in the final version of WAP 2.0.*

*This article is a report on the latest condition in the WAP Forum, elaborating on the content of the final version of WAP 2.0, focusing on the amendments made to the public-review version, and the future challenges and directions of the WAP Forum.*

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## 1. Introduction

The Wireless Application Protocol (WAP) Forum is an industry standardization body of the mobile Internet area, which provides the specification suite of protocols and application environments for Internet access services from mobile terminals. Since its establishment in January 1998, major operators, vendors and content providers have participated in the WAP Forum. As of December 2001, it boasted a membership of about 300 companies. NTT DoCoMo has been contributing to the WAP Forum as a board member since October 1998.

The WAP Forum originally provided specifications optimized for narrow-band, long-delay networks. However, it faced the urgent need to introduce standard technologies from the rapidly growing Internet world, to adopt the new high-speed wireless network services such as General Packet Radio Service (GPRS) and International Mobile Telecommunications-2000 (IMT-2000). NTT DoCoMo made proposals on "Next Generation WAP" with the cooperation of Ericsson [1]. The proposal was widely accepted in the WAP Forum, and the public-review version

of WAP 2.0, which harmonized with internet standard technologies, was released in July 2001. The new technologies of WAP 2.0 are described in detail in References [2] and [3].

According to the work process of the WAP Forum, a draft specification is disclosed to the public on the WAP Forum's website for one month after being approved by the Working Group (WG). Other standardization bodies' members and Internet players are able to review the registered draft specification during this period, and submit comments from their respective standpoints. This process is called "public review". The WG checks the comments that have been gathered, makes necessary amendments to the draft specification, and asks members of the WAP Forum to cast the final vote. If the majority upholds the draft specification, it wins approved status.

The specifications were released as a collection of approved specifications before WAP2.0. However, the July 2001 WAP 2.0 specifications consisted of approved specifications and draft specifications which had not yet finished their public review, in response to demands for its earliest possible disclosure. This is why it is referred to as



the “public-review version”.

This article describes the comments to the public-review version of WAP 2.0 and the amendments in the final version, and elaborates on the composition of the final version of WAP 2.0. In the end, it discusses the remaining issues and future directions of the WAP Forum.

## 2. WAP 2.0 Public-review and Reflections to Final Version

The specification is registered in the public domain of the WAP Forum’s website (<http://www.wapforum.org/>) during a public review period. This area is free for everyone to access and check specifications. A mailing list, called ‘technical-comments’, is prepared for gathering comments and inputs to the mailing list are distributed to all the WAP Forum members. When the WAP 2.0 public-review version was released in July 2001, eight (8) specifications in the application area were on the way of review period.

The biggest issue raised by the comments was the treatment of the Wireless Markup Language (WML) Extension part, which was designed to guarantee the backward compatibility of WML2 with WML1. WML2 is the newly defined content description language of WAP 2.0. In WAP1.X specifications, WML1 is defined as the content description language, which has unique functions such as Card & Deck and event processing. It is specialized in low-speed wireless networks, and useful particularly in circuit-switched networks. The problem was that content made by WML1 could only be viewed on a WML1 browser, because it is incompatible with internet standards.

To solve this problem, WAP 2.0 selects eXtensible HyperText Markup Language (XHTML) Basic, which is an internet standard language, for its core part of content description languages, and specifies WML2 by adding elements and attributes to XHTML Basic. The additions are: WML1 functions that are not included in XHTML Basic; and functions regarded necessary in consideration of the usage patterns in the market. The former was added to guarantee the backward compatibility; whereas the latter was adopted according to NTT DoCoMo’s additional proposal based on the past usage records of the i-mode service. Additional functions were tried to select from an internet standard markup language XHTML1.1. However, as WML1 has proprietary functions that are not

included in XHTML1.1, it is impossible to select every required element from XHTML1.1 and new functions should be defined in WML2 to maintain backward compatibility with WML1. WML Extension is a package of those missing functions. WML2 consists of XHTML Basic, additional XHTML1.1 modules, and WML Extension. As WML Extension is a specification unique to WAP, WML2 content including WML Extension element cannot be viewed on an internet standard browser.

The issue raised by the public review was whether to allow content creators to use WML Extension when creating new contents. Although there were strong voices initially to preserve these functions in WAP 2.0 due to their convenience, the majority opinion gradually became “contents created based on the WAP-proprietary language cannot be displayed on internet standard browsers, and the fragmentation of the wired Internet and the mobile Internet should be avoided by unifying the content description languages.” Ultimately, there was a unanimous decision to amend the WAP 2.0 specification as follows.

### (1) Creating New Specification, XHTML Mobile Profile (MP)

It is decided that XHTML compliant part (XHTML Basic and additional XHTML 1.1 modules) should be used to create WAP2.0 new contents, to share the created contents with the Internet users. For this purpose, the XHTML compliant part in the WML2 specification was separated and named XHTML Mobile Profile (XHTML MP) as a new specification. It is explicitly described that new contents must be created by XHTML MP. Profile means a subset of a specification in the terminology of World Wide Web Consortium (W3C). XHTML MP is a subset of XHTML1.1 specified by the WAP Forum targeting mobile terminals. Accordingly, an internet XHTML browser can display contents created by XHTML MP.

As a result, the content description language in WAP 2.0 becomes the combination of XHTML MP and WAP Cascading Style Sheet (W-CSS). W-CSS is a subset of the Cascading Style Sheet 2 (CSS2), which is an internet standard of style definition language. An increasing number of internet standard browsers support CSS2, as do XHTML.

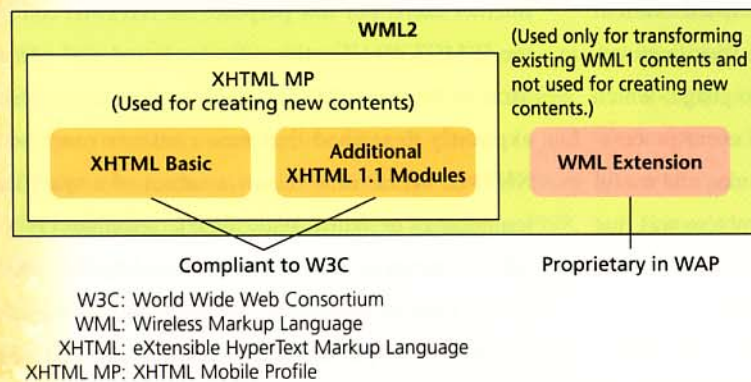
On the other hand, the decision was made to use WML2 only for guaranteeing backward compatibility but not for creating new contents. Therefore, WML Extension is not shown to content creators. **Table 1** shows the composition of XHTML MP, and **Figure 1** shows the relationship between XHTML MP and WML2.



**Table 1 Composition of XHTML Mobile Profile**

	Modules	Elements
XHTML Basic	Structure	body, head, html, title
	Text	abbr, acronym, address, blockquote, br, cite, code, dfn, div, em, h1, h2, h3, h4, h5, h6, kbd, p, pre, q, samp, span, strong, var
	Hypertext	a
	List	dl, dt, dd, ol, ul, li
	Basic Forms	form, input, label, select, option, textarea
	Basic Tables	caption, table, td, th, tr
	Image	img
	Object	object, param
	Metainformation	meta
	Link	link
	Base	base
Additional XHTML 1.1 Modules	Forms (partial)	fieldset, optgroup
	Legacy (partial)	start attribute on ol, value attribute on li
	Presentation (partial)	b, big, hr, i, small
	Style Sheet	style element
	Style Attribute	style attribute

XHTML: eXtensible HyperText Markup Language



**Figure 1 WML2 and XHTML Mobile Profile**

cation suite.

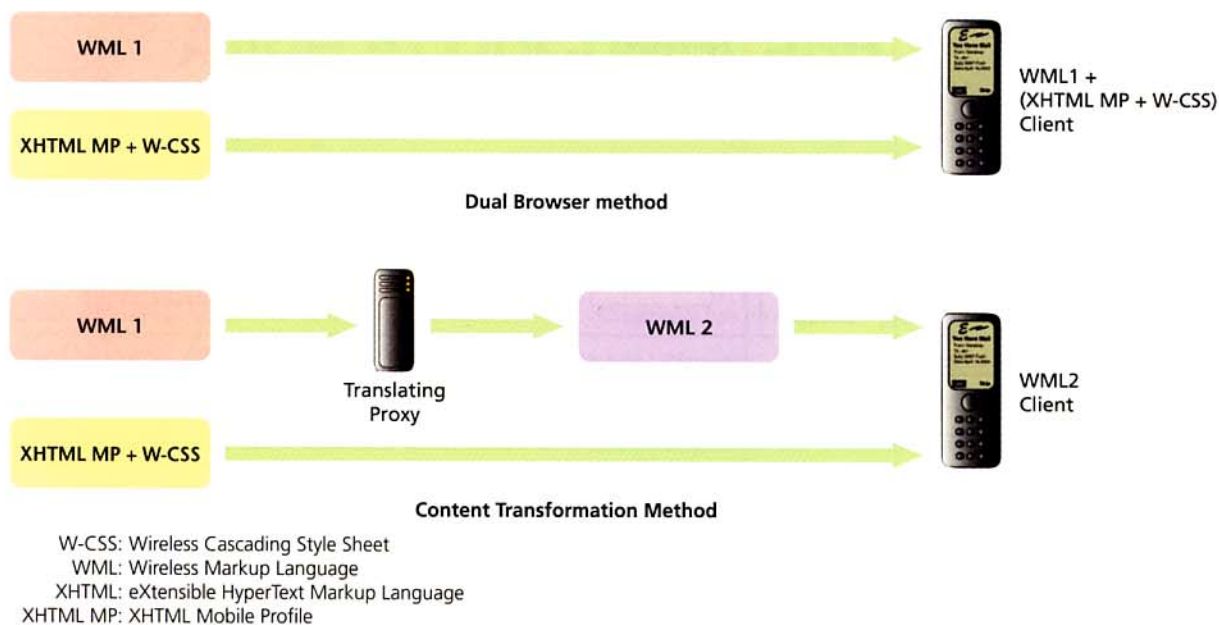
While either method may be chosen as far as the specifications are concerned, a problem has been pointed out with respect to the content transformation method. End-to-end security is widely used in e-commerce, but it cannot be realized in the transformation method, as a proxy is required for transformation in the middle.

## (2) Method of guaranteeing Backward Compatibility

Two methods have been approved for a WAP 2.0 terminal to display existing WML1 contents: the dual browser method (the browser directly supports WML1 as well as XHTML MP & W-CSS), and the content transformation method (the browser only supports WML2, while the proxy transforms WML1 contents into WML2 and passes them on to the client). **Figure 2** illustrates these two methods. In order to implement the dual browser method, the WML1.3 specification was added to the WAP 2.0 specifi-

## 3. The Final Version of WAP 2.0 Suite Composition

At the WAP Forum, a collection of specifications released as a set is referred to as a "suite." The WAP 2.0 specification suite (January 28, 2002 edition) consists of fifty-seven (57) specifications and twenty-five (25) Specification Information Notes (SIN). SIN is an amendment to a specification. **Figure 3** shows the composition of the final version of the WAP 2.0 specification suite. The



**Figure 2 Methods of guaranteeing Backward Compatibility**

latest version of the WAP 2.0 specification suite can be downloaded from the WAP Forum's website [4].

Compared to the public-review version, substantial changes have been made in the final version. One new specification was produced, one specification was copied from the WAP1.2.1 specification suite, nine (9) specifications were updated, and SINs were produced with respect to twenty-two (22) specifications.

In the WAP 2.0 specification suite, the traditional protocol stack (referred to as "1.X stack") is in parallel with a newly-defined internet standard protocol stack (referred to as "2.0 stack"). The same situation happened in the browser agents: a 1.X browser agent supporting WML1.X is in parallel with a 2.0 browser agent supporting XHTML MP and W-CSS. Supporting to the 2.0 browser agent is a mandatory. Generally, the 2.0 stack and the 2.0 browser agent are referred to as WAP 2.0 in the narrow sense.

In the WAP Forum, Working Groups create specifications concurrently with each other, and the task of creating protocols specifications and the task of creating applications that use those protocols are carried out independently. Accordingly, there is a time lag to reflect the former work in the latter. Multimedia Messaging Service (MMS) and the provisioning which is used for the initial setup of mobile stations, are components of the WAP2.0 specification suite, but only support WAP 1.X (protocol and browser agent). As a future challenge, efforts

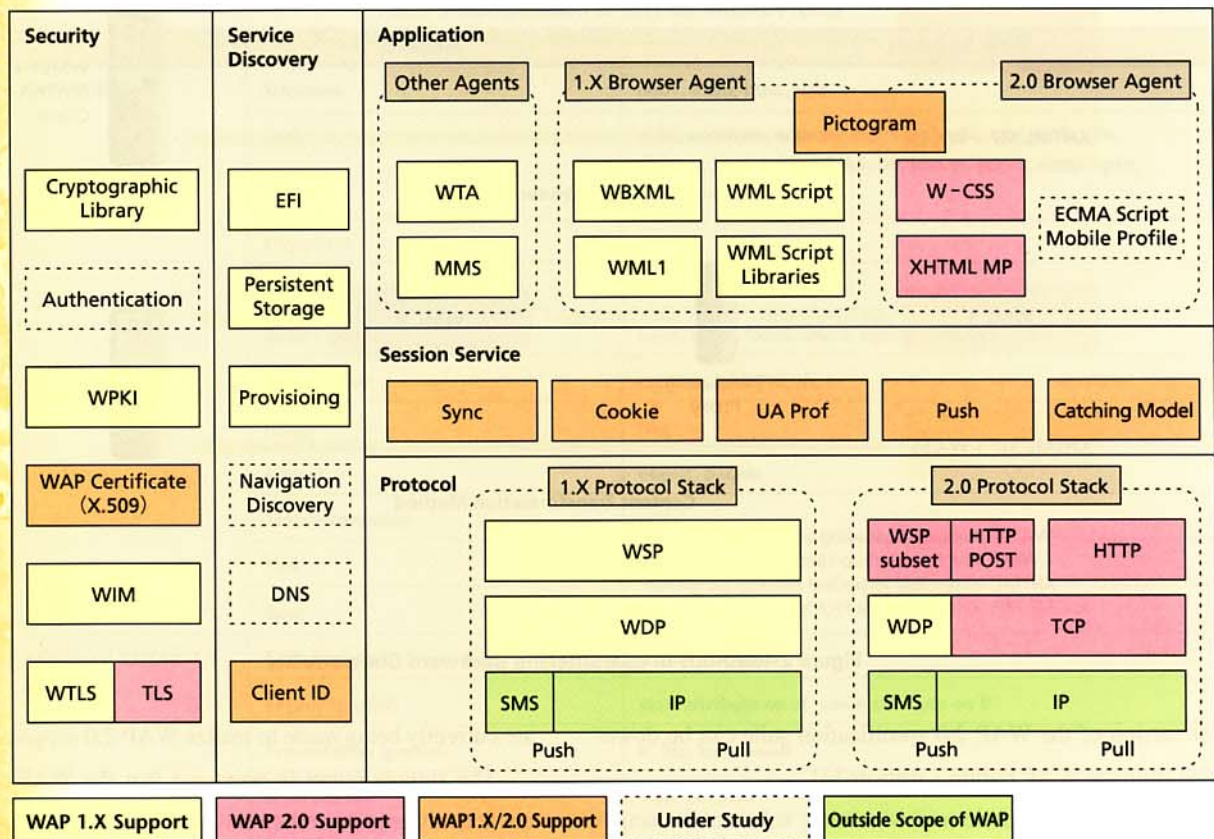
are currently being made to realize WAP 2.0 support.

The authors regret to point out that the WAP Forum does not actively engage in the version management of the specification suite. Although new specifications have been added and SINs have been produced in some times since the release of the public-review version, the WAP Forum has merely changed the content of the specification suite on each occasion, without engaging in version management. Therefore, the component of the WAP 2.0 specification suite may depend on the day on which it is downloaded. As the production of SIN is an important task for brushing up the specifications, it is strongly hoped that version management will be carried out with respect to the specification suite in order to avoid compatibility problems in the future.

## 4. Future Challenges

The activity of "Next Generation WAP" started with the primary target of harmonizing with the internet standard technologies, and it was achieved by adopting the internet protocols and content description languages in the final version of WAP 2.0. As the future direction, the WAP Forum is currently involved in two activities: the introduction of missing parts from internet standards that could not be adopted in the WAP 2.0 such as Domain Name System (DNS); and the updating of portions in the WAP 2.0 specification suite that do not support WAP 2.0





DNS: Domain Name System  
 EFI: External Functionality Interface  
 HTTP: HyperText Transfer Protocol  
 IP: Internet Protocol  
 MMS: Multimedia Message Service  
 SMS: Short Message Service  
 TCP: Transmission Control Protocol  
 WAP: Wireless Application Protocol

WBXML: Wireless Binary eXtensible Markup Language  
 WDP: Wireless Datagram Protocol  
 WIM: Wireless Identity Module  
 WML: Wireless Markup Language  
 WPKI: WAP Public Key Infrastructure  
 WSP: Wireless Session Protocol  
 WTA: Wireless Telephony Application  
 WTLS: Wireless Transport Layer Security

**Figure 3 Composition of Final Version of WAP 2.0 Specification Suite**

protocol and browser agent, such as MMS, provisioning and the European Computer Manufacturers Association (ECMA) Script.

## Amendment

WAP Forum modified the article of association, and changed the name to Open Mobile Alliance (OMA) in the annual meeting in June 2002. The new web site (<http://www.openmobilealliance.org/>) is available and the WAP 2.0 specification suite is downloadable from the new site.

## REFERENCES

- [1] Tsukada et. al: "Latest Condition in the WAP Forum," NTT DoCoMo Technical Journal, Vol.8, No.4, pp.88-91, Jan. 2001. [Japanese Version]
- [2] Ishikawa, et. al: "Special Articles on Next-generation WAP (WAP 2.0): Protocol Technologies", NTT DoCoMo Technical Journal, Vol.9, No.3, pp.71-78, Oct. 2001. [Japanese Version]
- [3] Tsukada et. al: "Special Articles on Next-generation WAP (WAP 2.0): Application Technologies", NTT DoCoMo Technical Journal, Vol.9, No.3, pp.79-85, Oct. 2001. [Japanese Version]
- [4] <http://www.wapforum.org/what/technical.htm>