Wireless Markup Language

WML Script

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Wireless Markup Language

Wireless Markup Language

The wireless markup language (WML) (WAP Forum) is based on the standard

HTML known from the www and on HDML

- Ericsson, Motorola, Nokia, Unwired Planet (phone.com)
- bring Internet to cellular phone users
- re-use fundamental Internet concepts (TCP/IP, http, html, JavaScript)

  but adapted to lower bandwidth

  smaller screen

  limited input facilities

  limited computational resources

Wireless Markup Language

WML follows a deck and card metaphor.

A WML document is made up of multiple cards.

Cards can be grouped together into a deck.

A WML deck is similar to an HTML page.

in that it is identified by a URL is the unit of content transmission.

A user navigates with the WML browser through a series of WML cards,etc

Wireless Markup Language

The user agent on a handheld device has to decide how to best present all elements of a card.

This presentation depends much on the capabilities of the device.

Wireless Markup Language

WML basic features

Text and images:

- Text and images can be presented to a user.
- The exact presentation of data to a user is up to the user agent running on the handheld device.
- WML only provides a set of mark-up elements, such as emphasis elements (bold, italic, etc.) for text, or tab columns for tabbing alignment.

Wireless Markup Language

WML basic features

User interaction

WML supports different elements for user input.

Examples are: text entry controls for text or password entry, option selections or controls for task invocation.

Again, the user agent is free to choose how these inputs are implemented. They could be bound to, e.g., physical keys, soft keys, or voice input.

Wireless Markup Language

WML basic features

Navigation

WML offers a history mechanism with navigation through the browsing history, hyperlinks and other intercard navigation elements.

Context management

WML allows for saving the state between different decks without server interaction, i.e., state can be shared across different decks. Cards can have parameters defined by using this state without access to the server over the narrow-band wireless channel.

Wireless Markup Language

Other Features

Actions (OK, navigation, help) can be performed
Hyperlinks (like in HTML)
String variables
Timers
wbmp images (B&W)
Select boxes, forms (for input)
wmlscript (like javascript)

WML structure

```
< ? xml version="1.0" ? >
<!DOCTYPE wml …>
<wml>
    <card>
        <p>
            text
        </p>
        <p>
            text
        </p>
    </card>
    <card>
    …
    </card>
</wml>
```

WML Elements

	text
 	hyperlink (anchor)
<do> </do>	action
<go href=.../>	goto wml page
<timer>	trigger event (units = tenths of a second)
<input/>	input user text
<prev/>	return to previous page
$(...)	value of variable
	display image
<postfield name=... value=.../>	set variable
<select > <option> <option> </select>	select box

WML Elements

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.1//EN“ "http://www.wapforum.org/DTD/wml_1.1.xml">
<wml>
        <card id="card_one" title="Simple example">
                <do type="accept">
                        <go href="#card_two"/>
                </do>
        <p>  This is a simple first card!  <br/>  On the next one you can choose ...  </p>
</card>
```

WML Elements

```
<card id="card_two" title="Pizza selection">
        <do type="accept" label="cont">
                <go href="#card_three"/>
        </do>
        <p>  ... your favourite pizza!
        <select value="Mar" name="PIZZA">
                <option value="Mar">Margherita</option>
                <option value="Fun">Funghi</option>
                <option value="Vul">Vulcano</option>
        </select>
         </p>
 </card>
```

WML Elements

```
<card id="card_three" title="Your Pizza!">
<p>
Your personal pizza parameter is <b>$(PIZZA)</b>!
</p>
</card>
</wml>
```

WML encoding

WML may be encoded using a compact binary representation to save bandwidth on the wireless link.

The compact format allows for transmission without loss of functionality or of semantic information.

Example:

URL prefix href=_http://, which is very common in URLs, will be coded as 4B.

The code for the select keyword is 37 and option is 35.

These single byte codes are much more efficient than the plain ASCII text used in HTML and today's www.

WML Script

WML Script

WMLScript complements to WML and provides a general scripting capability in the WAP architecture.

WMLScript offers several capabilities not supported by WML:

Validity check of user input:

before user input is sent to a server, WMLScript can check the validity and save bandwidth and latency in case of an error.

WML Script

Access to device facilities:

WMLScript offers functions to access hardware components and software functions of the device.

On a phone a user could,

e.g., make a phone call, access the address book, or send a message via the message service of the mobile phone.

WML Script

Local user interaction:

WMLScript can directly and locally interact with a user, show messages or prompt for input. Only, for example the result of several interactions could be transmitted to a server.

Extensions to the device software:

With the help of WMLScript a device can be configured and new functionality can be added even after deployment. Users can download new software from vendors and, thus, upgrade their device easily.

WML Script

Local user interaction:

Without introducing round-trip delays, WMLScript can directly and locally interact with a user, show messages or prompt for input. Only, for example the result of several interactions could be transmitted to a server.

Extensions to the device software: With the help of WMLScript a device

can be configured and new functionality can be added even after deployment.

Users can download new software from vendors and, thus, upgrade

their device easily.

WML Script

WML Script bytecode interpreter and an efficient over-the-air transport via a space efficient bytecode.

A WMLScript compiler is used to generate this bytecode.

WMLScript is event-based.

WMLScript also has full access to the state model of WML, i.e., WMLScript can set and read WML variables.

WML Script Example

```
function pizza_test(pizza_type)
{
        var taste = "unknown";
        if (pizza_type = "Mar")
         {
                taste = "well... ";
        }
        else
         {
        if (pizza_type = "Vul")
         {
                taste = "quite hot";
        };
        };
        return taste;
};
```

WML Script

The WMLScript compiler can compile one or more such scripts into a **WMLScript compilation unit.**

A handheld wireless device can now fetch such a compilation unit using standard protocols with HTTP

http://www.xyz.int/myscr, a user could call the script and pass the parameter "Vul" via

http://www.xyz.int/myscr#pizza_test("Vul").

WML standard libraries

Lang:

Examples are **isInt** to check if a value could be converted into an integer or

float to check if floating-point operations are supported.

Float:

Many typical arithmetic floating-point operations are in this library

Example functions are **round of & sqrt**

String

Many string manipulation functions are in this library.

Examples length of a string, substring to return a substring of a given string. find a substring within

a string or squeeze to replace several consecutive whitespaces with only one.

WML standard libraries

URL:

syntax

<scheme>://<host>:<port>/<path>;<parameters>?<query>#<fragment>

for example: http://www.xyz.int:8080/mypages;5;2?j=2&p=1#crd.

WMLBrowser:

prev to go back one card or refresh to update the context of the user interface.

WML standard libraries

Dialogs:

For interaction with a user, this library has been defined.

An example function is prompt which displays a given message and prompts for user input.

An additional library is the **WMLScript Crypto Library**

Provides security functions provided by **WTLS**. The required keys can be stored on the **wireless identity module (WIM)** which could be part of the mobile phone's SIM

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