A Unique Application to Reserve Doctor Appointment by Using Wireless Application Protocol (WAP)

Adnan Affandi[1], Othman Abdullah saleh Al-Rusaini[2], Mubashshir Husain[3]

[1]*Professor, Dept.,of Elect.& Comp. Eng., Faculty of Eng. King Abdul Aziz University Jeddah, KSA*
[2]*MS (Student), Dept.,of Elect.& Comp. Eng., Faculty of Eng. King Abdul Aziz University Jeddah, KSA*
[3]*Lecturer, Dept., of Elect. & Comp. Eng., Faculty of Eng. King Abdul Aziz University Jeddah, KSA*

Abstract: *WAP is a standardized technology for cross-platform, distributed computing, very similar to the Internet's combination of Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP). WAP could be described as a set of protocols that has inherited its characteristics and functionality from Internet standards and from standards developed for wireless services by some of the world's leading companies in the business of wireless telecommunications. This application will help patients, the normal doctor and the medical director. The patient can reserve an appointment. The normal doctor can view and print the lists of patient appointment under his responsibility. The medical director can add new departments, add new doctors, and also can change the password to access the database. He can also modify data and working schedules of doctors assigned. He can add new patients and can have privilege access to transfer any patient appointment to another doctor. This Application which has been developed by using WAP was the first of its kind here, where software has been developed.*

Keywords: *WAP, WML etc.*

I.   Introduction

Wireless Application Protocol (WAP) is a result of continuous work to define an industry-wide specification for developing applications that operate over wireless communication networks. The scope for the WAP Forum is to define a set of specifications to be used by service applications. WAP was developed by the WAP Forum as a standardized specification for technologies that operate over wireless networks. It is seen as an attempt to define the standard for how content from the Internet is filtered for wireless communications, thus bridging the gap between the mobile world and the Internet. The basic aim of WAP is to provide users with a web-like experience but over a handheld device rather than a PC, whilst accessing the content is readily available on the Internet. Most of the successful interactive services available on the Internet can be envisaged in a WAP environment too.

WAP is more than just a protocol specification, it also incorporates its own language called WML or Wireless Markup Language. WML is designed for low-power, resource-constrained devices. Developers starting to use WAP and WML to extend their Internet services quickly discover that wireless handheld devices differ significantly from the ordinary computer and must learn new ways of presenting information where the target medium is mobile devices. WAP is the set of rules governing the transmission and reception of data by computer applications on, or via, wireless devices like mobile phones. WAP is a standardized technology for cross-platform, distributed computing, very similar to the Internet's combination of Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP).[1]

A. The Architecture and Workings of WAP

When people think of networks, they always think of the World-Wide-Web and the Internet. Generally people have a basic understanding of it, i.e. a two-tier architecture comprising clients (browsers) and servers which host the pages that are viewed (or the applications that produce pages on-the-fly). Well, WAP is essentially the same. The clients are now the wireless handheld devices and the servers are still hosting the pages (and applications). The main difference between a WAP network and the Internet is the interconnecting of the wireless network to the wired network, the basic view of the WAP network is shown in Figure 1.
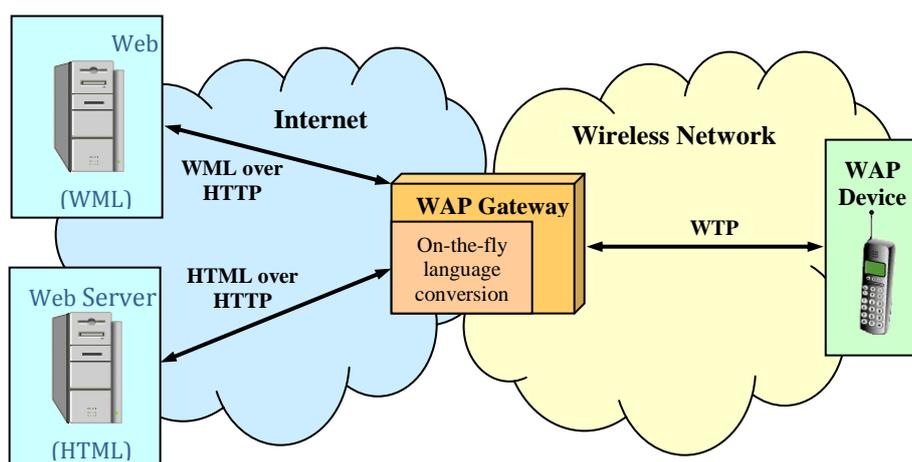
Figure 1: Basic View of the WAP Network

B. WAP standard

As much as possible, WAP uses existing Internet standards for the basis of its own architecture and is designed to allow standard Internet servers to provide services to wireless devices. However, Internet standards such as HTML, HTTP, TLS, and TCP, which require large amounts of mainly text-based data to be sent, are inefficient over wireless networks. So Internet standards such as HTML, HTTP, TCP, and TLS are not appropriate for the restrictions associated with wireless networks.

WAP does, however, use many other Internet standards such as eXtensible Markup Language (XML), User Datagram Protocol (UDP), and Internet Protocol (IP) to communicate with wireless devices. So WAP is based on familiar standards such as HTTP and TLS, but has been optimized for the constraints of the wireless environment. For example, a WAP gateway is required to communicate with other Internet nodes using HTTP, and the WAP specification requires devices to use standard URL addressing to request services.

So WAP has been optimized with the restrictions of the wireless environment in mind. It is designed for low bandwidth and long latency, and uses binary transmission for greater compression of data. WAP sessions deal with intermittent coverage and operate using IP over a large variety of wireless transports whenever possible.

It is important that WAP standards complement existing standards. For example, instead of the WAP specification designating how data is transmitted over the air interface, it is designed to sit on top of existing standards so that the bearer's standard is used with the WAP protocol.

The WAP Forum works closely with the World Wide Web Consortium and other bodies such as the European Telecommunications Standards Institute (ETSI), the Cellular Telecommunications Industry Association (CTIA), and the Internet Engineering Task Force (IETF) to ensure that the future versions of HTML, HTTP, and TCP take the special needs of wireless devices into account and can be supported in the WAP framework. The WAP Forum also works closely with these bodies and others as they become members of the Forum.

When the WAP Forum identifies a new area of technology with no existing standards specification, it works to submit its specification to related standards groups, believing that active participation leads to the best standards. With this approach, the WAP Forum hopes to produce open, not proprietary, standards through industry consensus and with no one vendor receiving favorable treatment.[2][3]

C. WAP Architecture

WAP architecture was designed to provide a scalable and extensible environment for application and content development. This is achieved through layered design of the entire protocol stack with many of the protocols used analogous to those used in existing Internet technology, but optimised for the constraints imposed by narrowband handheld devices and wireless networks, as shown in Figure 2. Each of these protocols for WAP 1.X and WAP 2.0 (WAP versions presented in section 3.8) will be discussed in turn.
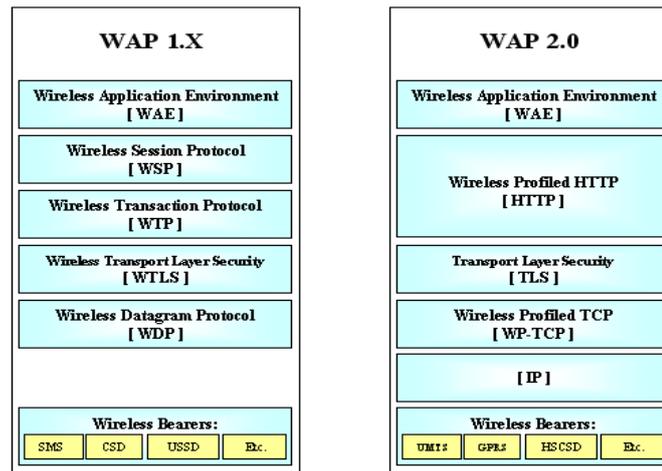
Figure 2: The WAP Protocol Stack for WAP 1.X and WAP 2.0

II.   Developing a WAP Application

A. Defining a template

```
<wml>
  <template>
    <do type="goBack" name="goBack" label="Back">
      <prev/>
    </do>
  </template>
  <card id="init" newcontext="true">
  </card>
</wml>
```

The snippet of WML results in the Back option being displayed on each card in the deck. It uses the <do> element to associate the label Back with the <prev> task.Whenever the user selects the Back option as shown in Figure 3, the microbrowser will navigate to the previous card:

Figure 3: Back option

B. Defining a Card

```
<wml>
  <card id="init" newcontext="true">
    <p align="center">
      <b>Portfolio Service</b><br/>
    </p>
  </card>
</wml>
```

This code snippet just shows a simple WML card. It includes some formatting elements to influence how the text is laid out by the microbrowser. The card is shown in Figure 4:

Figure 4: Defining a card

C. Using anchors

```
<wml>
<card id="MainMenu" title="Main Menu">
   <p>
      <anchor>1. Market Indices
         <go href="#MarketIndices"/>
      </anchor><br/>
      <anchor>2. Portfolio Valuation
         <go href="#PortfolioValuation"/>
      </anchor><br/>
      <anchor>3. Current Fund Prices
         <go href="#CurrentFundPrices"/>
      </anchor><br/>
      <anchor>4. Buy/Sell
         <go href="#BuySell"/>
      </anchor><br/>
   </p>
</card>
</wml>
```

Anchors are used to link to other cards, as shown in the code snippet above and the screen shot here. Each anchor element is bound to a <go> task that references another card in the deck as shown in Figure 5

Figure 5: Using anchors

D. Using input fields

```
<wml>
<card id="Login" title="Client Login">
   <p>
      Please enter:<br/>
      Account No
      <input type="text" name="txtAccountNo"/><br/>
      Security Code
      <input type="password" name="txtSecurityCode"/><br/>
   </p>
   <do type="goMainMenu" label="Main Menu">
      <go href="#MainMenu"/>
   </do>
</card>
</wml>
```

Input fields are used to allow the user to enter data. The code snippet above creates two input fields, one of which takes some text, the other of which takes a password. The password will be obscured by asterisks as it is rendered on the screen as shown in Figure 4.5. The card is also bound to a <go> task, which links it to the main menu, by a <do> element.

Figure 6: Using input fields

E. Using tables and graphics

```
<wml>
<card id="init" newcontext="true">
   <p align="center">
     <table columns="1">
       <tr><td>
         <img src="abcbank.gif" alt="ABC Bank"/><br/>
       </td></tr>
     </table>
     <b>Portfolio Service</b><br/>
   </p>
   <do type="goLogin" label="Login">
     <go href="#Login"/>
   </do>
</card>
</wml>
```

A table containing one column is created using the <table> element. The <p> element is used to align the table in the center of the screen.Within the table a <tr> element creates a single row that contains a single cell, created by the <td> element. Inside the cell the <img> element creates a link to an image, with some alternate text associated with it for use in the event that the image cannot be displayed. A <do> element binds the card to a <go> task that links to the login card within the deck, that shown in Figure 7.

Figure 7: Using tables and graphics

This application is designed to help the patients, the normal doctor and the medical director .The patient can reserve an appointment date with the doctor. The doctor can view and print the lists of patient appointment under his responsibility. The medical director can add new departments, add new doctors, and also can change the password to access the database. He can also add/modify data and working schedules of doctors assigned. He can add new patients and can have privilege access to transfer any patient appointment to another doctor.

III.   Results & Discussion

A. APPLICATION PAGES

The application home page can be seen in fig.8. The home page contains several links like new request, Inquiries about request, doctors, etc. Doctor can enter into login page by clicking on link "Doctors". On login page they have to enter user name and password. After clicking on enter button , doctor can enter into another page named "Doctors Menu", where he can see his name , patients name report link and option for changing password. He can anytime reach to home page by clicking on home page link. By clicking on "Patients Names Report" , he can come to new page containing information about patients. That page containing patients names , date & time of appointment.
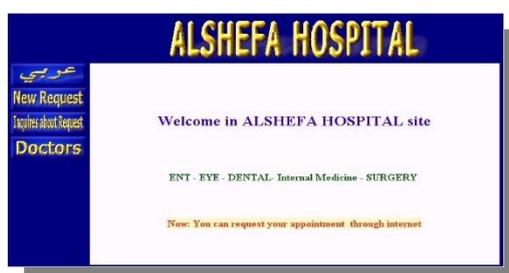

Figure 8 : The application home page

By clicking on "New Request" link, patient enters into another page . On this page patient can select clinic , Doctor , date,etc. "New Request" page cab be seen in fig 9.

Figure 9: "New appointment request" page

After filling all the information in " New Request " page and pressing enter , the patient will move into new page containing booking informations like patient name , clinic , appointment date , appointment time, appointment day,etc. Patient can print this page and can be used as appointment slip.Confrmed appointment page can be seen in fig.10

Figure 10: "Confirmed appointment" page

Through this application medical director has authority to access Doctors data, clinic data , doctors unavailable dates , doctors's patient transfer, patient data ,etc. By clicking on link "Doctors and clinic data" , medical director can modify clinics data and also modify doctors data like shifts working time,etc. By clicking on link " Doctor's patients transfer" , director can transfer patient to another doctor of same speciality.Medical director menu page can be seen in fig.11.
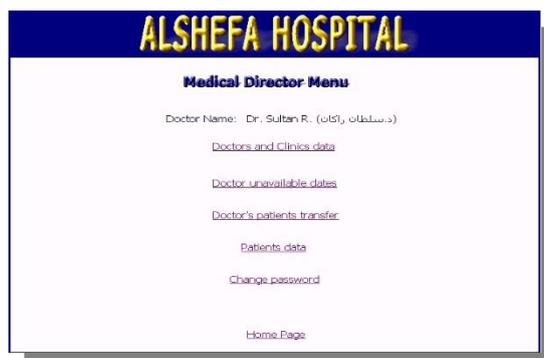
Figure 11: "Medical director menu" page

IV. Conclusion

In this paper, a Reserve Doctor Appointment Application using WAP has been developed. The WAP successfully protocol is designed using the best of the existing protocol and then was optimized to suite the wireless end-client. It was also found that WAP uses less than half the number of packets that the standard HTTP/TCP/IP stack uses to deliver the same content. This improvement is essential for the end-user to experience an acceptable transfer rate of data. To further enhance the browsing experience of HTML web pages through a thin mobile client a network element was added – the WAP gateway. Through the gateway infrastructure deployed in mobile operator's network it enables low capacity wireless devices to access web servers of the Internet. Indeed, the use of the gateway and compression in the network interface reduces the processing load at the handheld device so that an inexpensive CPU can be used and helps reducing power consumption and extends battery life. Hence, the gateway has increased the functionality in the communication subsystem, making the wireless clients much less flexible but making it possible to pleasantly view html content of the web on the run.

Acknowledgment

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