

Accessing Electronic Mails Without Internet Using Kannel and PHP

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Abstract— One of the most widespread computer applications used for person-to-person or organization-to-organization communication is the electronic mail (email or e-mail). The main objective for this study is to develop an emailing solution that is accessible without internet. Kannel works as an SMS gateway for GSM (Global System for Mobile communication) networks. Almost all GSM phones can send and receive SMS messages, so this is a way to serve many more clients than just those using a new WAP phone. The Agile Method is a particular approach to project management that is utilized in software development. This method assists teams in responding to the unpredictability of constructing software.

Index Terms— SMS, SMSC, GSM, WAP, Email, Kannel, PHP

1 INTRODUCTION

Computers have evolved over the past decades that saw the addition of several features to make life easier and to enhance communications. Despite the computer was originally developed to be used as a calculator, it has now evolved into a communication device that links people to each other and to information.

One of the most widespread computer applications used for person-to-person or organization-to-organization communication is the electronic mail (email or e-mail).

Millions of mobile phones are in use all over the world, the market for value added services (VAS) targeting at mobile users is mind-boggling. Even simple services find plenty of users, as long as they're useful or fun. Being able to get news, send or receive e-mails or just be entertained wherever you are is extremely attractive to many.

One the hottest technology for implementing mobile services is Wireless Application Protocol (WAP). It lets the phone act as a simple web browser, but optimizes the markup language, scripting language, and the transmission protocols for wireless use.

Email facilitates communication by its high speed, asynchronousness, and computer processability (Palme 1995a), and provides opportunities to increase productivity, worker satisfaction, and organisational viability (Rice & Bair 1984; Safayeni, Lee & MacGregor 1988).

According to (Katz & Aspden 1997), Among Internet users, email is considered as the most important application on the Internet.

According to the Internet World Stats, Ghana with a population of 29,463,643 and a land size of 238,538 sqkm has 10,110,000 internet users as at December 2017 representing about 34.3% of the population. Despite the number of internet users in Ghana, the internet penetration rate is just 16.6% of the total land mark of Ghana.

Although WAP is the hot and technically superior technology, SMS phones exist in huge numbers and SMS services are thus quite useful (Andres Fink et al, 2018).

Email is distinguished from communication services such as chat or talk by its asynchronous character. Asynchronous refers to the possibilities for the sender and the receiver of a message to send and read the message at different times. Bowers & Churcher (1988) divided this time difference in to three parts: the time between message creation and the time of transmission (allowing the sender to edit the message), the time between the transmission and the receiver's opening of the message, and finally the time between opening and the responding to the message.

Asynchronous systems require the message to be stored on a computer (server) and inbox of email addresses are seen as folders.

Email communication is becoming a burden for many employees and the way we handle email is far from efficient (Kimble et al, 1998; Jackson et al, 2003).

2 KANNEL

Kannel is an open source WAP gateway. It attempts to provide this essential part of the WAP infrastructure freely to everyone so that the market potential for WAP services, both from wireless operators and specialized service providers, will be realized as efficiently as possible. Kannel also works as an SMS gateway for GSM (Global System for Mobile communication).

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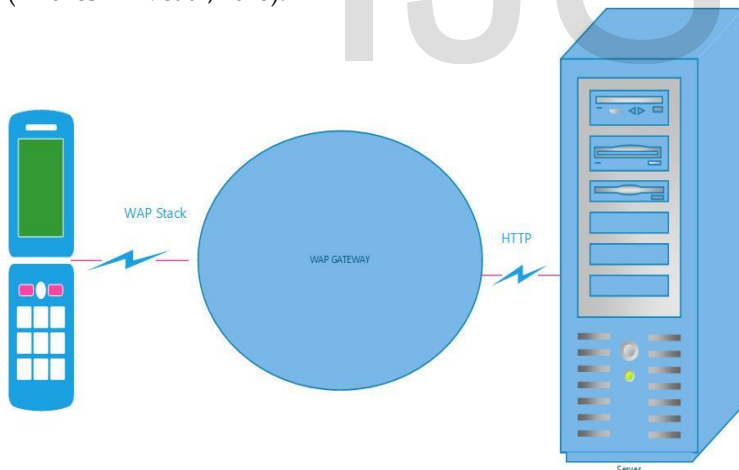
tion) networks. Almost all GSM phones can send and receive SMS messages, so this is a way to serve many more clients than just those using a new WAP phone. In addition, Kannel operates as Push Proxy Gateway, or PPG, making possible for content servers to send data to the phones. WAP makes it possible to implement services similar to the World Wide Web.

3 PROBLEM WITH EXISTING SYSTEMS

One of the main problems is that Internet content is mainly in the form of HTML (HyperText Markup Language) pages, and they are written in such way that they require fast connections, fast processors, large memories, big screens, audio output and often also fairly efficient input mechanisms.

Portable phones have very slow processors, very little memory, abysmal and intermittent bandwidth, and extremely awkward input mechanisms. Most existing HTML pages do not work on mobile phones, and never will (Andres Fink et al, 2018).

WAP defines a completely new markup language, the Wireless Markup Language (WML), which is simpler and much more strictly defined than HTML. It also defines a scripting language, WMLScript, which all browsers are required to support. To make things even simpler for the phones, it even defines its own bitmap format (Wireless Bitmap, or WBMP) (Andres Fink et al, 2018).



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Figure 1 WAP Gateway setup

The WAP gateway talks to the phone using the WAP protocol stack, and translates the requests it receives to normal HTTP (HyperText Transfer Protocol). Thus content providers can use any HTTP servers and utilize existing know-how about HTTP service implementation and administration.

4 METHODOLOGY

The Agile Method is a particular approach to project management that is utilized in software development. This method assists teams in responding to the unpredictability of constructing software. It uses incremental, iterative work sequences that are commonly known as sprints. A sprint is a period of time allocated for a particular phase of a project. Sprints are considered to be complete when the time period expires.

These methodology is rooted in adaptive planning, early delivery and continuous improvement, all geared toward being able to respond to change quickly and easily.

The Scrum approach of the Agile methodology takes a highly iterative approach that focuses on defining key features and objectives prior to each sprint. It is designed to reduce risk while providing value quickly. Scrum starts with a requirement or user story that outlines how features should perform and be tested.



Figure 2 Agile Scrum Methodology

5 OVERVIEW OF SHORT MESSAGING SERVICE (SMS)

SMS, short messaging service, is a way to send short (160 character) messages from one GSM phone to another.

When SMS services are used, the client (mobile terminal) sends an SMS message to certain number, usually a very short specialized number, which points to specific SMS center responsible for that number (plus possibly many others). This SMS center then sends the message onward to specified receiver in intra- or Internet, using an SMS center specific proto-

col. For example, MTN SMS center number is +233244500000 and Vodafone is +233200000007.

An SMS gateway is used to handle connections with SMS centers and to relay them onward in a unified form. Kannel's biggest feature is to abstract each SMSC protocol to a well-known HTTP protocol, simplifying services deployment.

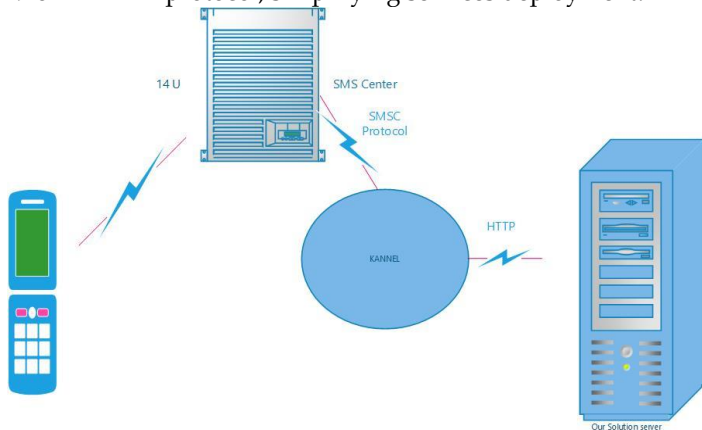


Figure 3 Our Proposed SMS Gateway Set UP

6 OUR PROPOSED SOLUTION

The SMS Gateway Content Management System (CMS) is a software system for managing SMS interactive application using SMS gateway like Kannel or Gammu. It interact with the gateway using Inbox and Outbox database table. It will process every records found on the Inbox, create the respons according to the "keyword" on the message, manage sessions between messages, and compose the response and store it on the Outbox.

SMS gateway will then read back the records found on the Outbox and send it to the carriers SMSC (in Kannel) or GSM modems (in Gammu).

PROPOSED SYSTEM OVERVIEW

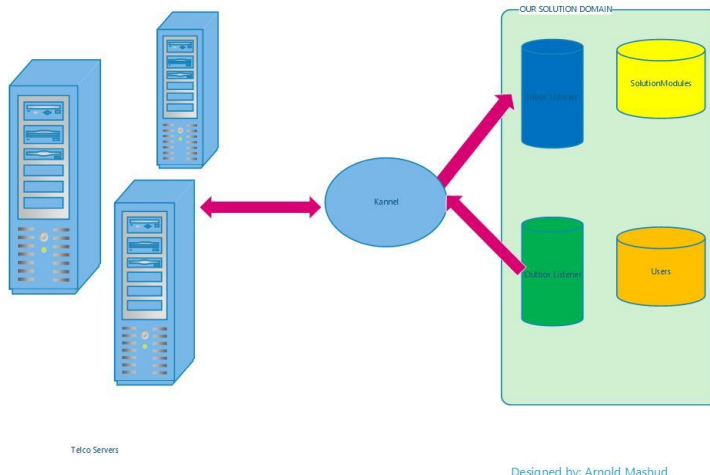


Figure 4 Our Proposed System design

6.1 OUR SMS GATEWAY SETTINGS

The kannel.conf file is configured as below:

```
group = core
admin-port = 13000
admin-password = *****
admin-deny-ip = " *.*.*"
admin-allow-ip = ""
wapbox-port = 13002
smsbox-port = 13003
wdp-interface-name = "*"
log-file = "/var/log/kannel/bearerbox.log"
box-deny-ip = " *.*.*"
box-allow-ip = "127.0.0.1"
log-level = 1
#log-level = 0
```

6.2 OUR NETWORK OPERATOR SETTINGS

```
group=smsc
smc=smpp
smc-id=mtn
smc-username = "arnoldmashud"
smc-password = *****
host=196.201.34.183
port=6101
interface-version=34
system-type="VMA"
source-addr-ton = 1
source-addr-npi = 1
dest-addr-ton = 2
dest-addr-npi = 1
log-level=0
transceiver-mode=1
denied-smc-id=vodafone;vodafone-
billed;cbf;expresso;airtel1;airtel
allowed-prefix=+23324
log-file = "/var/log/kannel/mtn.log"
log-level=0
```

6.3 OUR KANNEL SMSBOX SETTINGS

6.3.1 SMSBOX SETUP

```
group = smsbox
bearerbox-host = localhost
#sendsms-port = 13131
sendsms-port = 9300
sendsms-chars = "0123456789+"
log-file = "/var/log/kannel/smsbox.log"
log-level = 0
access-log = "/var/log/kannel/access.log"
```

6.3.2 SEND-SMS USERS

```
group = sendsms-user
username = arnoldmashud
password = pwd
concatenation = 1
max-messages = 10
```

6.3.3 OUR DATABASE SETTINGS

```
$db['default']['hostname'] = "localhost";
$db['default']['username'] = "root";
$db['default']['password'] = "1234";
$db['default']['database'] = "smsgw_ghana";
```

6.3.4 OUR SIGNUP MODULE

The signup module of our solution is for managing the SMS Email Signup module response messages.

Response Messages for Module: smsemail
[Create New](#)

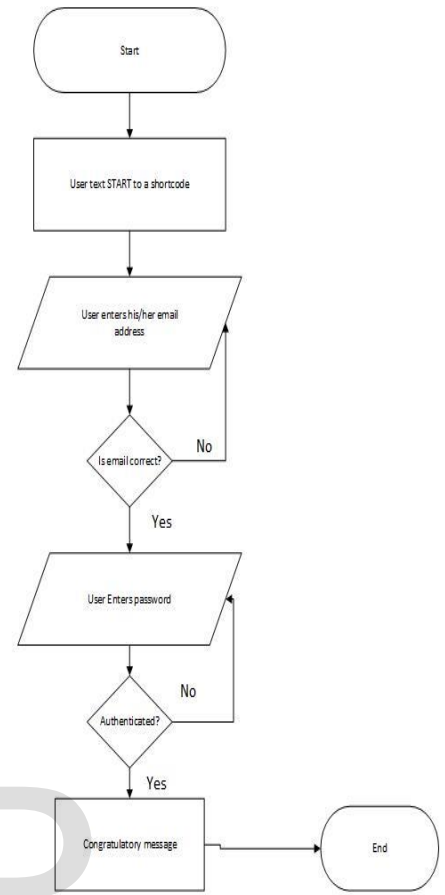
Module	Message key	Message value	Description
smsemail	START	Please type your email address and send to %s	user send START keyword
smsemail	YAHOO_ACCOUNT_HOLDER	Thank you for trying SMS Email, for yahoo.com account holders, contact our customer care at 0302917185 or visit our website www.pushmeportal.com for solution	response to users who have yahoo email account
smsemail	ENTER_PASSWORD	Please reply with your password	
smsemail	ENTER_VALID_EMAIL	Please input a valid email address	user enters invalid email
smsemail	ENTER_EMAIL	Please type your email address	
smsemail	ENTER_START	Please type START to begin then sign up process	
smsemail	STOP_ERROR	There are some errors stopping your account. Please try again.	
smsemail	STOP_SUCCEED	You have successfully unsubscribed to the %s Push Email service. You are welcome to use the service again by texting RESUME to %s. Thank you	
smsemail	RESUME_SUCCEED	You have successfully subscribed to the %s Push Email service. Thank you	
smsemail	RESUME_ERROR	There are some errors resuming your account. Please try again.	

Figure 5: SMSEmail signup processes keywords

6.3.5 OUR USER MODULE

This module is for managing users on the system. Users can log into the system when we assign them with username and password. Otherwise users can not login, but we still can send them SMS or assign them to groups.

PROPOSED SIGNUP MECHANICS



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Figure 6: Proposed Signup flowchart

List users
[create new](#) [Import from myPushme Portal](#) [Upload](#)

	Username	Email	First Name	Last Name	MSISDN	Is Admin?
Edit Delete Change Pass					+233204185405	0
Edit Delete Change Pass					+233204185408	0
Edit Delete Change Pass					+233204185433	0
Edit Delete Change Pass					+233204185466	0
Edit Delete Change Pass					+233204185472	0
Edit Delete Change Pass					+233204185473	0
Edit Delete Change Pass					+233204185481	0
Edit Delete Change Pass					+233204185482	0

<First < 16875 16876 16877

Figure 7: User data

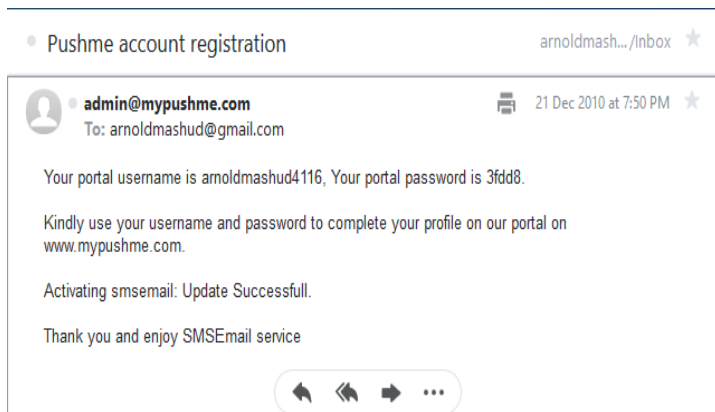


Figure 8: Signup success

User			
Id	Phone	Email	Actions
1	212	eq.eristha@gmail.com	Edit Delete View Change Pin
3	200	rahasiaZalpha@gmail.com	Edit Delete View Change Pin
5	100	akhdad.daniel@gmail.com	Edit Delete View Change Pin
6	admin	adm@admin.com	Edit Delete View Change Pin
7	+233200807215	arnoldmashud@yahoo.com	Edit Delete View Change Pin

Figure 9: Registered clients

7 ANALYSIS OF RESULTS

We inserted some test data into inbox using our DBMS, phpmyadmin:

Mandatory Fields:

1. TextDecoded = keyword
2. SMSC = carrier to test
3. ReceiverNumber = the shortcode
4. Processed = false

SenderNumber	varchar(20)		1234
Coding	enum	--	Default_No_Compression
UDH	text		
SMSCNumber	varchar(20)		
Class	int(11)		-1
TextDecoded	text		START
ID	int(10) unsigned		
RecipientID	text		
Processed	enum	--	<input checked="" type="radio"/> false <input type="radio"/> true
SMSC	varchar(50)		vodafone
ReceiverNumber	varchar(50)		1545

Figure 10: Snapshot of Database testing requirement

7.1 TESTING PARAMETERS

```
INSERT INTO `msgw_ghana`.`inbox` (
`UpdatedInDB` , `ReceivingDateTime` , `Text` ,
`SenderNumber` , `Coding` , `UDH` , `SMSCNumber` ,
`Class` , `TextDecoded` ,
`ID` , `RecipientID` , `Processed` , `SMSC` , `ReceiverNumber`
) VALUES (
CURRENT_TIMESTAMP , '0000-00-00
00:00:00' , '' , '1234' , 'Default_No_Compression' , '' , '' ,
'-1' , 'START' , NULL , '' , 'false' , 'vodafone' , '1545'
);
```

7.2 PARSER LOG OUTPUT

```
[2017-11-28 15:19:27] receive message at 0000-00-00 00:00:00
from:+12342332, to:1545, smsc:vodafone
[2017-11-28 15:19:27] message : START
[2017-11-28 15:19:27] php /opt/msgw-ghana/engine/modules/smsemail.php +12342332 start ""
vodafone 757482
[2017-11-28 15:19:27] Welcome to SMS Email service.You have
up to 29 Jan 2011 to answer all your 90 questions
correctly.Terms and Conditions apply
[2017-11-28 15:19:27] Welcome to SMS Email service.You have
up to 29 Jan 2011 to answer all your 90 questions
correctly.Terms and Conditions applyQuestion no1
[2017-11-28 15:19:27] insert into sms_session
(keyword,senderNumber,shortcode,smsc, ts) values ('SCO'
,'+12342332','1545','vodafone',now())
[2017-11-28 15:19:27] reply sent to outbox for +12342332 from
1545
```

4 CONCLUSION

Electronic mails are regarded as one of the official communication tools for corporate institutions and individuals across the globe.

The proposed email system offers alternative solution to accessing emails on the go without having to worry about inter-

net irrespective of the type of phone being used. This solution enhances the productivity of email users.

The research has succeeded in offering an alternative solution that will contribute to enhancing the productivity of email users.

4.1 RECOMMENDATIONS

- 1) Telecom operators should implement the solution as a value added service (VAS)
- 2) More research should be conducted to expand beyond yahoo mails and gmails
- 3) More security measures should be instituted to protect email users' information from unauthorized access.

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