Mobile-Based Notification System for University's Events

QUSAY MOHAMMAD IBRAHIM AL-ZOUBI

UNIVERSITI UTARA MALAYSIA

2009

Mobile-Based Notification System for University's Events

A thesis submitted to the Graduate School in partial fulfillment of the requirements
for the degree Master of Science (Information Technology)

Universiti Utara Malaysia

By

Qusay Mohammad Ibrahim Al-Zoubi (801087)

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the Graduate School.

It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

Dean of Postgraduate

College of Arts and Sciences (UUM-CAS)

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman.

Abstract

Mobile phone plays a very important role in people life today; its functionality has been extended from voice communication only devices to internet surfing and data transfer. UUM as a higher education institute, hold and organize numerous events throughout the academic year and it relies on email communications for notifying its staff. Using the email notification to announce the staff for the function is suffering from two main problems which are: First, some of the staff do not check his/her email periodically, so they may miss read the notification email about the function and therefore they will not attend the function. Second, sometimes internet service is not available or staffs are at some place where they can not access internet which will lead also to make them unaware about the function or the notification about that function. This study has successfully designed and developed a notification system in order to be used by UUM to send the notifications direct to the staff mobile phones via SMS and thus helps in make sure that the notification is delivered to all interested staff. Successfully implementing this notification system in UUM will provide the university a reliable and convenient inter communication channel.

Dedication

I dedicate this humble work to my father and mother; the spring of loyalty, affection, and dedication. They raised me on the principles of virtue, to my dear brothers and sisters; who spared no effort helping me during my school years.

I dedicate this work also for my uncle Ahmad, my grandfather and my grandmother souls.

I am also expressing my great thankful to all my colleagues and friends at UUM, especially from the Applied Science, College of Arts and Sciences for their help and support, with whom I shared pleasant times, My thanks and gratitude goes to Dr. Mouafaq Al-Zoubi "My Uncle", Mohammad Al-Zoubi"Abo Issa", Dr. Salem Al-Zoubi, Rezek Al-Zoubi "Abo Jabeer", Ahamd, Ashraf, Ra'fat, Murad, Sattam, Faris, Housam, Ziad, Malik Al-Zoubi, Wissam, Malik Jawarneh, Ibragim, and all my family members for their encouragement and support all the period of my studying, and to my AL-ZOUBI family.

Acknowledgement

Praise be to ALLAH for helping me to accomplish this humble study. Also, my thanks to ALLAH who has seen me through to this level in my academic achievement, I would like to seize this opportunity to extend my gratitude to ASSOC.PROF.DR.WAN ROZAINI BT SHEIK OSMAN for kindly supervising this study, her priceless instruction and valuable directions had great role in the accomplishment of this report, my evaluator Mr. ROSMADI B BAKAR for his suggestions and help, and Dr. HASLINA BINTI MOHD for her suggestions.

I would like also to thank all my instructors in the College of Arts and Sciences in the University Utara Malaysia (UUM) for their support.

Thank you UUM.

Table of Contents

CHAPTER 1

INTRODUCTION

CHAPTER 2

LITERATURE REVIEW

CHAPTER 3

RESEARCH METHODOLOGY

CHAPTER 4

THE EVENT NOTIFICATION SYSTEM DESIGN

CHAPTER 5

CONCLUSION & DISCUSSION

Appendix A

Table of Figure

Table of Table

List of Abbreviations

ADO	ActiveX Data Objects
BD_ADDR	Bluetooth device address
CAS	College of Arts and Sciences
CLR	Common Language Runtime
EMTEL	Emergency Management Telecommunication
ENS	Event Notification System
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
HTTP	Hyper Text Transfer Protocol
JSP	Java Server Pages
LAN	Local Area Network
MCMC	Malaysian Communications and Multimedia Commission
MDA	Model-Driven Architecture
MSISDN	Mobile Subscriber Integrated Service Digital Network
ODBC	Open Database Connectivity
OLE DB	Object Linking and Embedding for Databases
PC	Personal Computer
PDA	Personal Digital Assistant
PG	Postgraduate Group
PPG	Push Proxy Gateway
RAM	Random Access Memory
SD	Secure Digital

SI	Service Indication
SMPP	Short Message Peer to Peer
SMS	Short Message Service
SMSC	Short Messaging Service Center
SMTP	Simple Mail Transfer Protocol
SOAP	Simple Object Access Protocol
SSL	Secure Sockets Layer
TCP/IP	Transmission Control Protocol/Internet Protocol
TV	Television
UA	University Adminsration
UMTS	Universal Mobile Telephony Service
UML	Unified Modeling Language
UUM	University Utara Malaysia
VML	Voice Markup Language
W3C	World Wide Web Consortium
WAP	Wireless Application Protocol
WAN	Wide Area Networks
WLAN	Wireless Local Area Network
WS	Web Services
XML	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1.1. Background

The mobile devices and the emergence of wireless technologies have become today an important element of society. Firms adopted mobile devices and wireless technologies to support and improve their business' performances. Today even small mobile devices can access the internet. Therewith, mobility issues have become an important technical and economic research interests.

Mobile phone has reformed our life, from the means we communicate to the means we conduct business, the mobility of mobile phone make it easier for user to make a call from almost anywhere and anytime. The Malaysian Communications and Multimedia Commission reported that in 2005, there are 16.551 millions mobile phone subscribers in Malaysia from its 26.13 millions populations compared to only 2.150 million mobile phone subscribers in 1998 with 22.18 millions populations, that is on average 63.3 mobile phone subscribers for every 100 inhabitants for the year 2005 (Mcmc.gov, 2008).

The contents of the thesis is for internal user only

6.0 References

Aalto, L. , Gothlin, N. , Korhonen, J. & Ojala, T. (2004). Bluetooth and WAP Push
    Based Location-Aware Mobile Advertising System.

Ashri, R., Atkinson, S., Ayers, D., Haglind, M., Ray, B., Machin, R., Nashi, N.,
    Taylor, R. & Wiggers, C. (2001). Java Mobile Programming United States:
    Wrox Press.

Attardi, G., Picciaia, D.,& Zoglio, A. (2005). A Web Service Gateway for SMS-based
    Services. Dipartimento di Informatica Università di Pisa– Italy. Retrieved Jan
    21, 2008, from http://www.garr.it/conf_05/articoli/GARR05-Attardi.doc

Beaulieu, M. (2002). Wireless Internet Applications And Architecture. Canada:
    Addison- Wesley

Bennett, S., McRobb, S. & Farmer R. (2002). Object-oriented Systems Analysis and
    Design using UML. United Kingdom: McGraw-Hill.

Biemer, M., J. F. Hampe (2005). A Mobile Medical Monitoring System: Concept,
    Design and Deployment. Mobile Business, 2005. ICMB 2005. International
    Conference on: 464 - 471.

Bodendorf, F., & Schobert, A. (2004). Enhancing e-CRM in the Insurance Industry by
    Mobile e-Services. Proceeding of the IEEE International Conference.

Bodoff, S. (2002). The Java Web Services Tutorial. Pearson Education.

Carzaniga, A. Rosenblum, D. & Wolf, A.(2001). Design and Evaluation of a Wide-

Area Event Notification Service. ACM Transactions on Computer Systems, Vol. 19, No. 3, August 2001, Pages 332–383.

Carlsson, C., Hyvonen K., Repo P. & Walden P. (2005). Asynchronous Adoption

Patterns of Mobile Services. Proceeding of the 38" Hawaii International Conference on System Sciences 2005.

Chappell, D. and Liu, L.(2004). "Web Services Brokered Notification (v1.2)",

Available: http://docs.oasis-open.org/wsn/2004/06/wsn-WSBrokeredNotification-1.2-draft-01.pdf

Chow, J. Web-Based SMS Notifications Service using Open ACS. Retrieved March 1

2009 from http://www.usyd.edu.au/

Clickatell (2007). Clickatell Bulk SMS Gateway. Retrieved Jan11, 2009 from

http://www.clickatell.com

Daly B.K. (2007). Network Architecture &Standards. Emergency Notification

System. Retrieved January 21, 2009, from ftp://ftp.cpuc.ca.gov/puc/hottopics/2telco/attwirelessr04-07-015emergencynotification.pps.

Elliott, G.. & Phillips, N. (2004). Mobile Commerce And Wireless Computing

Systems: Pearson Education Limited.

Elmasri R., Navathe S. (2000). Fundamentals of Database Systems (3 rd Edition).

Addison-Wisley pp42-43

EMTEL (1999). Automated Campus Hazard Notification 911. Retrieved on Jan 9,

2009, from http://www.emtel911.com/Emergency-elecommunications/pdf/SchoolCall911-Case-Study.pdf.

Armstrong, E., Bodoff, S., Carson, D., Fisher, M., Green, D., and Haase, K. (2004). The Java Web Services Tutorial. Pearson Education.

Fletcher, S.W. Fletcher, R.H., Thomas, D.C. and Hamann, C. (1979). Patients' understanding of prescribed dimgs. Journal of Community Health, 4 (3), 183-189

Furht, B., Ilyas, M. (2003). *Wireless Internet handbook, Technologies, Standards and Applications*. Florida: CRC Pres.

Graham, S. and Murray, B. (2004). "Web Services Base Notification(v1.2)", Available: http://docs.oasis-open.org/wsn/2004/06/wsn-WSBaseNotification-1.2-draft-03.pdf

Grassi V., Mirandola, R. and Sabetta, A.(2004). A UML Profile to Model Mobile Systems. 7th International Conference on UML Modeling Languages and Applications, UML 2004. Lisboa, Portugal.

Holtzblatt, K. (2004). Rapid Contextual Design: A How-to Guide to Key Techniques for User-Centered Design. Elsevier Inc. San Francisco, CA 94111.

Hjelm, B. (2000). The International Standardization of Third-Generation Mobile System. ISCC 2000: 274-279

Kang, M., Wang, L. & Taguchi K.(2005). Modeling Mobile Agent Applications in

UML 2.0. Retrieved January 11,2009, from www.auml.org/_auml_supplements_UML2-AD.pdf

Kanjanarat, P., Winterstein, A.G., Johns, T.E., Hatton, R.C., Gonzalez-Rothi, R. and Segal R. (2003). Nature of preventable adverse drug events in hospitals: a literature review. Am J Health SystPharm. 60:(17), 1750-1759

Karolidis, D., Papadakis, A., Prentakis, P., & Samarakou, M. (2005). MoBINo: an integrated mobile and web based environment for automatic SMS notification. In Proceedings of the 9th WSEAS international Conference on Communications (Athens, Greece, July 14 - 16, 2005).

Kothari, C. R. (1985), Research Methodology Methods and Techniques, Delhi: Wiley Eastern Limited

Kosiuczenko. P. (2003). Sequence Diagrams for Mobility. .Krogstie J. (ed.): Advanced Conceptual Modeling Techniques, MobIMod, Tampere, Finland, October 7-11, 2002, LNCS 2784, Springer.

Koyama, A., Sasaki, A., Barolli, L., & Cheng, Z. (2001). *An Agent Based Education System for Cellular Phone.* Paper presented at the Database and Expert Systems Applications, 2001. Proceedings. 12th International Workshop

Lee, W. M., Foo, S. M., Watson, K. & Wufofski, T. (2000). *Beginning WAP, WML & WMLScript.* Canada: Wrox press.

Lewis, J. R. (1995). IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for Use. International Journal of Human-Computer Interaction, 7:1, 57-78.

Lwin, C.H.; Mohanty, H.; Ghosh, R.K.; Chakraborty, G.(2005). Resilient

dissemination of events in a large-scale event notification service system e-Technology, e-Commerce and e-Service, 2005. EEE '05. Proceedings. The 2005 IEEE International Conference. Page(s):502 – 507.

Malaysian Administrative Modernisation and Management Planning Unit MAMPU

(2000). Retrieved march 10, 2009 from http://www.mampu.gov.my/

Melewski, D., and Vaughan, J. (2004). Modeling for .NET. retrieved March 10, 2009

from http://adtmag.com/articles/2004/01/01/modeling-for-net.aspx

Mcmc.gov (2008) *Facts & Figures, Statistics & Records*. Retrieved Jan 30, 2009

From http://mcmc.gov.my/facts_figures/stats/index.asp

Microsoft TechNet (2000). Microsoft SQL Server Notification Services. Retrieved

Jan   12,   2009   from
http://www.microsoft.com/technet/prodtechnol/sql/2000/evaluate/sqlnsto.msp
x

Miller., C.A (2004). Teaching Older Adults Medication Self-Care, Geriatric Nursing

25 (5), 318-319

Nielson,J. (1993). *Usability Engineering*. San Diego, CA: Morgan Kaufmann

Nielsen. J. (2000). Why You Only Need to Test With 5 Users, Retrieved January 28.

2009, from http://www.useit.comlalertbox/20000319.html

Mohd. Zaini Nasri. (2009). Director of Chancellery UUM.

Openwave (2002).WAP Push Technology Overview. Retrieved form

> http://odn.openwave.com/docs/wappush_tech_overview.pdf   Accessed at 9th Jan 2009

Pallickara, S. and Fox, G. (2005)."An Analysis of Notification Related Specifications

> for Web/Grid applications," International Conference on Information Technology: Coding and Computing (ITCC'05).

Parkin, D. M. (1976) British Medical Journal, 2, 686..

Ranganathan, A. and Campbell, R. H. 2002. Advertising in a pervasive computing

> environment. In Proceedings of the 2nd international Workshop on Mobile Commerce (Atlanta, Georgia, USA, September 28 - 28, 2002).

Riggos, N., Skalkidis, I., Karkalis, G., Haritou, M., Koutsouris, D., (2007). A web-

> based service for improving conformance to medication treatment and patient-physician relationship. IFIP International Federation for Information Processing, (247), 157-162.

Pressman, R. S. (2001). Software Engineering: A practitioner's approach. (5th

> edition). McGrew Hill Higher Education. New York.

Sayer, P. (2005). Mobile phone sales reached new records in first quarter. Retrieved

> January 10 from
> http://www.computerworld.com.my/ShowPage.aspx?pagetype=2&articleid=1301&pubid=3&issueid=49

Samanta, V.(2005).A Study of Mobile Messaging Services. Retrieved March 1, 2009,

> from   http://www.it.kth.se/courses/2G1330/Lectures-2007/MWA-20070117-tagged.pdf

Schwartz, D., Wang, M., Zeitz, L., Goss., M.E. (1972). Medication Errors Made by

   Elderly Chronically 111 Patients, American Journal of Public Health, 52,
   2018-2019.

Smith, G. (2004). A Formal Framework for Modelling and Analysing Mobile

   Systems. Conferences in Research and Practice in Information Technology
   Australasian Computer Science Conference (ACSC2004), Vol. 26. Vladimir
   Estivill-Castro, Ed. Reproduction for academic, Retrieved January   10,2009,
   from www.itee.uq.edu.au_~smithpapers_acsc2004.pdf

Spool, J., & Schroeder, W. (2001). Testing web sites: Five users is nowhere near

   enough. In CHI 2001 Extended Abstracts (pp. 285-286). New York: ACM
   Press.

Stewart, R. B. and Cluff, L. E.(1972). Review of medication errors and compliance in

   ambulant patients, Clin. Pharmacol. Ther, 13,463.

Virzi, R. A. (1992). Refining the test phase of usability evaluation: How many

   subjects is enough? Human Factors, 34, 457-468.

Vaishnavi, V., & Kuechler, B. (2005). *Design Research in Information System.* Paper

   presented at the Association for Information System

Vambenepe, W. (2004). "Web Services Topics (v1.2)", Available: http://docs.oasis-
open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.pdf

Wandless, I. and Davie J. W. (1977). Can drug compliance in the elderly be

   improved? British Medical Journal 1,359-361.

Williams, M. (2003). Microsoft Visual C# (Core Reference). Microsoft Press.

 Redmond, WA, USA

W3C, (n.d.). "SOAP Version 1.2", Available: http://www.w3.org/TR/soap12-part1/

W3C, (n.d.). "Web Services Description Language (WSDL) 1.1", Available:

http://www.w3.org/TR/wsdl

W3C, (n.d.). "Extensible Markup Language (XML) 1.0 (Second Edition)", Available:

http://www.w3.org/TR/2000/REC-xml-20001006

Yue, W., Mu, S., Wang, H. and Wang, G. (2005). TGH: a case study of designing

natural interaction for mobile guide systems, Proceedings of the 7th

international conference on Human computer interaction with mobile devices

& services, September 19-22, 2005, Salzburg, Austria

Yi Huang & Gannon, D.(2006). A comparative study of Web services-based event

notification specifications. Parallel Processing Workshops, 2006. ICPP 2006
Workshops. 2006 International. Page(s):8 pp.