

**REQUIREMENT MODEL FOR LOCAL GOVERNMENT
ENTERPRISE INFORMATION PORTAL (EIP)**

NORHAYATI ABDULLAH

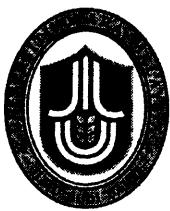
**UNIVERSITI UTARA MALAYSIA
2004**

**REQUIREMENT MODEL FOR LOCAL GOVERNMENT
ENTERPRISE INFORMATION PORTAL (EIP)**

**A dissertation submitted to the Faculty of Information Technology in partial
fulfillment of the requirements for the degree
Master of Science (Information Technology),
Universiti Utara Malaysia**

**By
Norhayati Abdullah**

Copyright © Norhayati Abdullah, 2004. All rights reserved



JABATAN HAL EHWAL AKADEMIK
(Department of Academic Affairs)
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK *(Certificate of Project Paper)*

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

NORHAYATI ABDULLAH

calon untuk Ijazah

(candidate for the degree of) **MSc. (INFORMATION TECHNOLOGY)**

telah mengemukakan kertas projek yang bertajuk
(*has presented his/her project paper of the following title*)

REQUIREMENTS MODEL FOR LOCAL GOVERNMENT ENTERPRISE INFORMATION PORTAL (EIP)

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project paper)

bawah kertas projek tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan.

(that the project paper acceptable in form and content, and that a satisfactory knowledge of the filed is covered by the project paper).

Nama Penyelia Utama

(Name of Main Supervisor): **PROF. MADYA NAZIB NORDIN**

Tandatangan
(Signature)

11/11/11

Tarikh
(Date)

PERMISSION TO USE

In presenting this thesis in partial fulfilment of the requirement 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 purposes may be granted by my supervisor, in their absence, by the Dean of the Faculty of Information Technology. 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 material in this thesis, in whole or in part should be addressed to:

Dean of Faculty of Information Technology
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman.

ABSTRAK

Kajian ini dijalankan untuk mengenalpasti ciri-ciri atau elemen-elemen utama yang terkandung di dalam sesebuah portal industri (Enterprise Information Portal) bagi kerajaan tempatan di Malaysia, mengulas kaedah-kaedah yang digunakan untuk mendapatkan maklumat keperluan pengguna terhadap portal tersebut, dan mentakrifkan satu model keperluan atau “requirement model” untuk portal kerajaan tempatan. Model keperluan (requirement model) adalah penting kerana ia memberi kemudahan kepada pembangun sistem untuk memahami keperluan pengguna, menjimatkan masa, dan kos pembangunan sistem, meningkatkan kecekapan dan keberkesanan sistem, dan mengurangkan risiko kegagalan sesuatu sistem.

Kajian ini menumpukan kepada dua portal kerajaan tempatan bagi tujuan mendapatkan maklumat keperluan. Portal-portal tersebut adalah portal bagi Majlis Perbandaran Subang Jaya (MPSJ), dan portal bagi Majlis Perbandaran Ampang Jaya (MPAJ). Selain itu Majlis Perbandaran Kota Star (MPKS) turut menjadi lapangan kajian untuk mendapatkan maklumat keperluan yang lain atau untuk mengukuhkan lagi maklumat keperluan yang telah didapati sebelumnya. Maklumat-maklumat keperluan tersebut dianalisa dan digabungkan untuk menghasilkan keperluan yang standard untuk portal kerajaan tempatan. Kajian ini walaubagaimanapun hanya menumpukan kepada keperluan pengguna awam kerana kekangan masa.

Keperluan yang dikenalpasti dari kajian dimodelkan dengan menggunakan notasi UML. Model yang dihasilkan adalah merangkumi “use-case package”, “use-case diagram”, dan “use-case specification”. Selain itu senibina sistem atau “system architecture” turut disertakan. Teknik prototaip telah digunakan bagi mengesahkan keperluan. Prototaip yang dibangunkan pula telah disahkan dengan menggunakan teknik “system requirement testing” dan “heuristic evaluation method”. Kesimpulan, dari pengujian tersebut adalah, keperluan pengguna telah ditepati dan prototaip dapat beroperasi dengan baik. Walaupun begitu, pada masa hadapan fungsi prototaip dan rekabentuk antaramuka haruslah dilengkapskan bagi meningkatkan keupayaan sistem portal yang dibangunkan. Kajian ini diakhiri dengan kesimpulan, yang menyatakan masalah dan limitasi yang dihadapi dalam melaksanakan kajian disamping mengutarakan beberapa cadangan untuk kajian akan datang.

ABSTRACT

The purposes of this project are to identify the characteristics of local government Enterprise Information Portal (EIP), review the various methods use in capturing the requirement, and define a requirement model for local government Enterprise Information Portal. A requirement model is important as it serves as a good starting point for system developers to understand users' requirement, and it saves time, resources, and cost, reduces risk, improves effectiveness and efficiency, and reduces ambiguity.

The study focuses on two local governments portals for the purpose of requirement capture. The local governments' portals chose are Subang Jaya Municipal Council (MPSJ) portal, and Ampang Jaya Municipal Council (MPAJ) portal. Besides that Kota Star Municipal Council (MPKS) also becomes the fields of study to capture the user' requirements. The requirements captured from the MPSJ and MPAJ portals and requirements from MPKS are analysed and combined together to produce the requirements for local government in general. However due to time constraint this study only focuses on public user requirements.

The requirements captured from the study are modelled out using Unified Modelling Language's (UML) notation. The models are use case packages, use case diagrams, and use case specification. Besides that system's architecture is also included. The prototyping technique is used to validate the requirements. In this technique, a simple prototype is developed by using PHP scripting language, MySQL Database server, Apache Web Server, and Macromedia Dreamweaver MX for interface. The portal system was validated using system requirements testing and Nielsen's Heuristic Evaluation method. It was concluded that, users requirements were met and the prototype system was operating well, however the functionality and interface of the prototypes were recommended for further improvement. This project concludes by discussing problems and limitations that were encountered in completing this project, and offers a few recommendations for future development in this subject.

ACKNOWLEDGEMENTS

My heartiest acknowledgements to several individuals who have helped to shape my perspective on this study. First and foremost, my supervisor, Assoc. Prof. Nazib Nordin, who has had a profound influence on me ever since I got to know him. He is not only a deep thinker, but also an excellent lecturer. His unique style of encouragement has provided great motivation. Prof. Nazib, ensured that I was realistic in my goals, provided excellent expert advice and clear path for the completion of this thesis.

Heartfelt thanks also go to my beloved family, for their prayers and constant support, morally and financially. Thanks dad (Abdullah), mom (Rokiah), uncle (Mansor), sisters (Nor 'Aini and Siti Hajar), and brother (Yusni).

Not forgetting my friends, Mazlina, Suhana, Mawarny, Shakirah, Fatrah, Suhaizawati, Zulaini, and Azie for their support and help. Their assistance has been a great compromise for the accomplishment of my study.

Thank to you all, great and wonderful persons.

Last but not least, my utmost thanks and gratitude to God for giving me the courage to persevere with high dedication till the accomplishment of my Masters degree study.

TABLE OF CONTENTS

	Page
PERMISSION TO USE	I
ABSTRAK	II
ABSTRACT	III
ACKNOWLEDGEMENTS	IV
TABLE OF CONTENTS	V
LIST OF TABLES	IX
LIST OF FIGURES	X
CHAPTER 1: INTRODUCTION	1
1.1 Problem Statements	2
1.2 Objectives	4
1.3 Scope of Project	4
1.4 Significance of the Study	4
1.5 Report Structure	5
CHAPTER 2: LITERATURE REVIEW	6
2.1 Introduction to Enterprise Information Portal	6
2.1.1 Enterprise Information Portal Characteristics	8
2.1.1.1 Access or search	8
2.1.1.2 Single Logon and Security	9
2.1.1.3 Categorization	9
2.1.1.4 Collaboration	10
2.1.1.5 Personalization	11
2.1.1.6 Expertise and Profiling	11
2.1.1.7 Application Integration	12
2.1.2 The Enterprise Information Portal Advantages	12
2.2 Requirement Analysis	13
2.3 Requirement Model and Reference Model	15
2.3.1 CRM System Reference Model for Small and Medium Enterprises	15
2.3.2 Business Reference Model for Federal Enterprise Architecture	16

2.3.3	Strategic E-government Concepts Reference Model	16
2.3.4	Reference Model for Electronic Business Messages based on XML	17
2.3.5	Public Transport Data Model Reference Model	18
2.4	Conclusion	18
CHAPTER 3: RESEARCH METHODOLOGY		19
3.1	Introduction	19
3.2	Review on Related Literatures	19
3.3	Requirements Capture	19
3.3.1	Heuristic Evaluation on Portals	20
3.3.1.1	Data Collection Procedures	21
3.3.2	Portals Analysis	24
3.3.3	Background Reading	24
3.3.4	Interview	24
3.4	Derived Rich Picture	24
3.4.1	Rich Picture Components	25
3.4.2	Steps on Drawing Rich Picture	26
3.5	UML's Graphical Notation	26
3.6	UML's Specification	27
3.7	Requirement Validation	27
3.8	System Validation	27
3.8.1	System Requirement Testing	28
3.8.2	Heuristic Evaluation on MPKS Portal	28
3.9	Conclusion	28
CHAPTER 4: FINDINGS AND DISCUSSIONS		29
4.1	Introduction	29
4.2	Characteristics of Local Government EIP	29
4.2.1	Local Government General Information	29
4.2.2	Application Services	30
4.2.3	Shared Contents	30
4.2.4	News and Advertisement	30
4.2.5	Event Calendar	31
4.2.6	Collaboration	31

4.2.7	Directory	31
4.2.8	Unified Search	31
4.2.9	Single Logon and Security	31
4.2.10	Familiar User Interface	32
4.3	Results: Various Methods Use to Capture Requirements	32
4.3.1	Portal Evaluation Result	32
4.3.2	Background Reading Result	34
4.3.3	Interview Result	35
4.3.4	Rich Picture	35
4.4	Requirement Model for Local Government EIP	37
4.4.1	Use Case Packages	37
4.4.2	Use Case Diagram	38
4.4.3	Requirement List	40
4.4.4	Use Case Specification	42
4.4.4.1	E-Checking Package	43
4.4.4.2	E-Application Package	47
4.4.4.3	E-Payment Package	50
4.4.4.4	E-Complaint Package	56
4.4.4.5	Non-package use cases	57
4.4.4.6	Online Management Package	68
4.4.5	System architecture	70
4.5	Conclusions	71
CHAPTER 5: PROTOTYPE APPLICATION INTERFACE DESIGN		72
5.1	Introduction	72
5.2	Prototype Development	72
5.3	Interface Design	73
5.3.1	Portal Main page	73
5.3.2	MPKS Profile	74
5.3.3	Service Interface	75
5.3.4	Check Compound Status Interface	76
5.3.5	Make Complaint Interfaces	77
5.3.6	Tourism Interface	78
5.3.7	Additional features	79

5.4 Conclusion	79
CHAPTER 6: SYSTEM'S VALIDATION	80
6.1 Introduction	80
6.2 validation	80
6.2.1 System Requirement Testing	80
6.2.2 Heuristic Evaluation on MPKS Portal	83
6.3 Conclusion	86
CHAPTER 7: CONCLUSIONS	87
7.1 Introduction	87
7.2 Problems and Limitation	87
7.3 Recommendations for Future Project	88
7.4 Conclusion	88
REFERENCES	90
APPENDICES	95

LIST OF TABLES

	Page
Table 3.1: Nielsen's Ten Heuristics Adapted for the Web	21
Table 4.1: Analysis of Results and Severity Rating on MPSJ Portal	32
Table 4.2: Analysis of Results and Severity Rating on MPAJ Portal	33
Table 4.3: Requirement List for Local Government EIP	40
Table 6.1: System Requirement Testing Table	81
Table 6.2: Results of Heuristic Evaluation on MPKS Portal	84

LIST OF FIGURES

	Page
Figure 4.1: Rich Picture of Local Government EIP	36
Figure 4.2: Use Case Packages: Local Government EIP	37
Figure 4.3: Use Case Diagram for E-Public Service Package	39
Figure 4.4: Overview of System Architecture	70
Figure 5.1: Portal Main page Interface	73
Figure 5.2: MPKS Profile Interface	74
Figure 5.3: Public User Service Interface	75
Figure 5.4: Registered User Service Interface	76
Figure 5.5: Check Compound Status Interface	76
Figure 5.6: List of Compound Record Found Interface	77
Figure 5.7: The interface to make Online Complaint	77
Figure 5.8: Message Box for successful Complaint	78
Figure 5.9: Tourism Interface	78

CHAPTER 1

INTRODUCTION

Internet and web technologies have changed the way we view and interact with information. In the past year, portals have received more attention from organization than any other internet technology (Finkelstein, 2000). The Enterprise Information Portal (EIP) is a concept for web-site that serves as a single gateway to a company's information and knowledge base for employees, customers, business partners, decision makers, and the general public as well. According to Shilakes and Tylman (1998), Enterprise Information Portal is application that enables companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decision. EIP combine software applications that consolidate, manage, analyze, and distribute information across and outside an enterprise.

In Malaysia, the use of EIP in government sector is still in the early stage. This is because based on review on related literatures; there are no specific guidelines such as requirement model for EIP and the lack of expertise. Requirement model is important to make sure that the portal will meet the expectations of customers, users, or stakeholders and are delivered on time and within the budget. Besides that, the requirement model is important to avoid project failure. According to McIntosh (2003), 78% of the IT software projects in United Kingdom failed because the requirements of the project were not defined well.

At this stand, the motivations behind this study are to identify the characteristics of Enterprise Information Portal, review various methods use in capturing the

The contents of
the thesis is for
internal user
only

REFERENCES

Arasan J. (2003). Reference Model for Office of Defense Cooperation (ODC) Training Support System (OTSS). *Thesis UUM*.

Bennett, S., McRobb, S. and Farmer, R. (2002). *Object Oriented System Analysis and Design Using UML (2nd Ed.)*. Berkshire: McGraw-Hill Education.

Blaine, T. *Enterprise Information Portal Overview*. Available Online at:
[http://knowledgemanagement.ittoolbox.com/documents/document.asp?](http://knowledgemanagement.ittoolbox.com/documents/document.asp)
[10th October 2003].

Booch, G., Rumbaugh, J., and Jacobson, I. (1999). *The Unified Modeling Language User Guide*. Boston: Addison-Wesley

Bruecher, H. (2002). *A Reference Model to develop Strategic E-Government Concepts*. Available online at:
http://www.ercim.org/publication/Ercim_News/enw48/bruecher.html
[15th November 2003]

Cadmus, D. (2000). *Enterprise Information portal Revolution*. Available online at:
www.tdan.com/i017hy02.htm. [22nd December 2003]

CHAOS. (1994, 1997). The Standish Group International, Inc., Dennis, MA

Computer Industry Daily. (1997, December 12)

Cover, R. (2002). *ASC X12 Reference Model for XML Design*. Available online at:
<http://xml.coverpages.org/ni2002-07-29-a.html> [15th November 2003]

Donegan, M. (2000) *Contemplating portal strategies*; Telecommunications (Intenational Edition); February, 2000, Available at:
<http://www.telecomsmag.com/issues/200002/tci/portal.html>

eMarketer, Inc. (2000): *Top 10 Online Portals*. Available Online at:

<http://www.emarketer.com/elist/t10portals/top10portals.html>

European Prestandard (1996). *TRANSMODEL*. Available online at:

<http://www.transmodel.org/en/transmodel/online.htm> [15th November 2003]

FEAPMO. (2002). *The Business Reference Model Version 1.0: A Foundation for Government-wide Improvement*. Available online at:

<http://coverpages.org/ni2002-08-13-c.html> [15th November 2003]

Firestone, J.M. (2000) *Defining the Enterprise Information Portal*. Available at:

<http://www.tgc.com/dsstar/00/0822/102054.html> [10th October 2003]

Finkelstein, C. (2000). *The Emergence and Potential of Enterprise Information portals (EIPs)*. Available Online at: <http://www.infoworld.com/cgi-bin/displayStory.pl?/features/990125eip.htm>

Gunter, A., Gunter, L., Jackson, M., and Zave, P. (2000). A Reference Model for Requirements and Specifications. *ACM Transactions on Software Engineering and Methodology*, 6(1): 1-30, January 2000

Hummingbird Ltd. (2000): *Hummingbird EIP. A Hummingbird White Paper*; Available Online at: http://www.hummingbird.com/whites/pdf/EIP_Whitepaper.pdf [15th January 2004]

IISME Consortium. (2000). *CRM System Reference Model for Small and Medium Enterprises*. Available Online at: <http://www.vis.iao.fhg.de/vis-de/projects/iisme/index.htm> . [15th November 2003].

Jacobson, I., Christerson, M., Jonsson, P., and Overgaard, G. (1992). *Object Oriented Software Engineering: A Use Case Driven Approach*. Wokingham: Addison-Wesley.

Lethbridge, T and Laganiere, R. (2001). *Object Oriented Software Engineering: Practical Software Development Using UML and Java*. England: Mc-Graw Hill Education.

Loucopoulos, P. and Karakostas, V. (1995). *System Requirement Engineering*. Berkshire: McGraw-Hill Book Company Europe.

Macaulay, A.L. (1996). *Requirement Engineering*. London: Springer-Verlag London

Matte, F. (2000). Enterprise Information Portals: A Brief Summary and White Paper Critical Reviews. *Technical Module Assignment*: Available at:
<http://www.magma.ca/~fmatte/Interests/Papers/EIP-paper.htm>
[10th October 2003]

McIntosh, S. (2003). *Qualitative Modelling for Requirement Engineering*. INCOSE UK Autumn Assembly.

Monk, A., and Howard, S. (1998). The Rich Picture: A Tool for Reasoning About Work Context. Interactions: Mac and April 1998. Available Online at:
<http://www.ics.uci.edu/~wscacchi/Software-Process/Readings/RichPicture.pdf>

Murray, G. (1999). *The Portal is the Desktop*. Intraspect, Inc., Los Altos, CA

Nielsen, J.(1994). *Heuristic Evaluation*. Available at :
http://www.useit.com/papers/heuristic/heuristic_evaluation..html
[22nd December 2003]

Nielsen, J.(1995, June 27). *Technology Transfer of Heuristic Evaluation and Usability Inspection*. Available Online at:
http://www.useit.com/papers/heuristic/learning_inspection.html
[15th December 2003]

Nielsen, J. and Landeur, T.K. (1993). A Mathematical Model of the finding of usability problems. *Proceedings ACM/IFIP INTERCHI 1993 Conference* (Amsterdam, The Netherlands, April 24-29), 206-213.

Pierotti, D.(1994). Usability Techniques: Heuristic Evaluation activities. Available at: <http://www.stcsig.org/usability/topics/articles/he-activities.html>. [14th February 2004]

Quatrani, T. (2000). *Visual Modeling with Rational Rose 2000 and UML*. Addison-Wesley

Reynolds, H., and Koulopoulos, T. (1999): *Enterprise knowledge has a face; Intelligent Enterprise*, Available Online at: <http://www.intelligententerprise.com/993003/feat1.shtml> [22th November 2003]

Roberts-Witt (1999). *Making Sense of Portal Pandemonium: What's behind the portal boom and what it means for the future of the enterprise*. Available Online at: <http://www.destinationkm.com/articles/default.asp?ArticleID=84> [2nd October 2003]

Shilakes and Tylman (1998). *Sagemaker*. Available at: <http://www.sagemaker.com> [10th October 2003]

Scheucher, R.(2000). *A study on Information Portals*. Available at <http://www2.iicm.edu/cguel/education/projects/rscheuch/seminar/node21.html> [21th December 2003]

Sommerville, I. (1995). Software Engineering (5th ed.). England: Addison-Wesley

Spitzer, T., (2000) *Vertical horizon. Surveying the landscape of online industry; WEB Techniques*; February, 2000, Available Online at: <http://www.webtechniques.com/archives/2000/02/spitzer/index.html>

The Star (July 8th, 2003). Most Council doesn't have Proper Websites.

Viador, Inc. (1999). *Enterprise Information Portals: Realizing the Vision of Information at your Fingertips*. Available Online at:
<http://knowledgemangement.ittoolbox.com/documents/document.asp?i=1086> [6th October 2003]

Watkins, J. (2002). *Portal Evaluation Criteria*. Available Online at:
<https://evals.webmethods.com> [12th January 2004]

Welling, L. and Thomson, L. (2001). *PHP and MySQL Web Development*. Indianapolis: Sams Publishing.

White. C. (January, 1999). *The Enterprise Information Portal Marketplace, Decision Processing Brief:DP-99-01*, Database Associates International, Inc., Morgan Hill, CA

Wieringa, R.J. (1996). *Requirement Engineering: Framework for Understanding*. England: John Wiley & Sons Ltd.