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Message from the General Chair

Welcome to the Tenth International IEEE EDOC Conference (EDOC 2006) "The Enterprise Computing Conference"!

As enterprises demand increasing levels of networked information and services to carry out business processes, IT professionals need conferences like EDOC to discuss emerging technologies and issues in enterprise computing. EDOC's ongoing goal is to identify emerging technologies and trends, and focus discussion on the most promising solutions. EDOC focuses on integration and interoperability issues as the relate to business, application, and middleware levels of IT.

Since 1997, EDOC has grown into an annual event focusing on the convergence of the paradigms, technologies, and methods involved in enterprise computing. Now in its special tenth year, this conference again brings together leading researchers, architects, and practitioners from both academia and industry to discuss enterprise computing challenges and solutions. In particular, EDOC 2006 continues to strengthen the foundation for tackling the research challenges inherent in enterprise computing.

We want to take this opportunity to express our sincere thanks to City University of Hong Kong, the Hong Kong Polytechnic University, IEEE Computer Society, IEEE Communications Society, Hong Kong Web Society, IEEE IT Professional Magazine, ACM, K.C. Wong Education Foundation, IEEE Hong Kong Chapter and our keynote speakers Dr. Masayoshi Ejiri and Prof. Xindong Wu for their strong support.

Many people have worked very hard to make this conference possible. I would like to thank all who have helped in making EDOC 2006 a success. The Program Committee members and referees each deserve credit for the excellent final program that resulted from the diligent review of the submissions. Special thanks go to the program co-chairs, EDOC steering committee, workshop chairs and all the other organizing committee members. It is a great team work. In addition, I would like to thank Prof. Remco Dijkman (Eindhoven University of Technology, The Netherlands) for his design of EDOC 2006 flyers.

Enjoy your stay in Hong Kong!

Patrick C. K. Hung
University of Ontario Institute of Technology, Canada

Message from the Committee Chairs

From its origins as the Enterprise Distributed Object Computing Conference, EDOC has continued to evolve and mature to encompass the totality of distributed enterprise computing; and, thus, the loss of definition for the acronym and our current emphasis on "The Enterprise Computing Conference".

The conference has become even more relevant and significant as a forum for researchers, policy makers, architects and practitioners from academia, industry and government to discuss enterprise computing challenges, models and solutions. The emergence of the networked enterprise has had a profound effect on enterprise computing. Web Services (WS) and Service-Oriented Architecture (SOA) are combining to turn the network into a practical application platform, providing the infrastructure to enable higher levels of integration and interoperability. This emerging network-centric paradigm has significant implications for enterprises, vendors, and the market in general. This change in emphasis is clearly reflected in this year's conference program.

For the first time, this year's EDOC program includes short paper sessions allowing us to expand the program and include these extended abstracts in the conference. In total, the proceedings include 35 full-length research and experience papers in addition to 23 extended abstracts accepted specifically for the short paper sessions. All submissions were reviewed by at least three members of the program committee, more often by four or more. A number of high quality papers had to be rejected due to limitations of the three-day conference, but were recommended to the workshops associated with EDOC and will find publication in those proceedings.

Finally, we would like to thank all authors who submitted their papers to EDOC 2006 and all reviewers who contributed their time and expertise to the selection of the submitted papers. Our special thanks also to Thomas Preuss for supporting the ConfMan paper submission and reviewing system and to Bob Werner from the IEEE Computer Society Press for the production of these proceedings—the ultimate reflection of the outstanding efforts by all who participated in making EDOC 2006 a success.

We hope you will enjoy Hong Kong and EDOC 2006, "The Enterprise Computing Conference".

Qing Li
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Ontology Driven Definition of a Portlet Functionality Model[1]

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Abstract

In the software measurement context, there exists a lack of consensus among the concepts and terminology used. Even inconsistencies and terminology conflicts can be detected among standards. For this reason, a software measurement ontology (SMO) has come into existence with the aim of providing a coherent software measurement terminology. In this paper, an example of the use of SMO as framework for the definition of a portlet functionality model is presented. Attributes, measures as well as indicators have been identified for the portlet functionality following the SMO.

1. Introduction

This paper is focused on the context of software measurement whose importance is greater and greater. To be more specific, we focused on quality of second-generation portals. These portals let users create one or more personal pages composed of personalizable portlets – interactive web miniapplications, local or remote to the portal, that render markup fragments (news, weather, sports and so on) that the portal can aggregate into a page [1]. Thereby, if we want "good" portals, we must select the most appropriate portlets for building on them.

Bearing all that in mind, and having detected the deficiency of a quality model specific for portlets, in [4] a portlet quality model (PtQM) was developed. In this model, all the characteristics related to the portlet quality were defined. The main objective of PtQM was to help portal developers to choose the best portlet (among a set of portlets with the required functions for specified tasks and user objectives), which will be aggregated into the portal page.

Nevertheless, to identify the portlet characteristics is not enough if it is not possible to measure them. For this reason, measures for the different characteristics of PtQM must be defined. Hence, in this paper we try to identify measures for one of these characteristics, the functionality. However, when we started to carry out this task, a lack of consensus among the concepts and terminology used in this field was detected. Even worse, current software engineering international standards, such as ISO/IEC or IEEE present inconsistencies and terminology conflicts.

Nowadays, the problem of the terminology harmonization is still far from its resolution. To address this situation, in [3] the authors propose a software measurement ontology (SMO) which will be used to present consistently our portlet functionality model. The ontology allows us to present in a formal way all our measures, using concepts and terminology that have been reached by consensus.

This paper is structured as follows. Section 2 gives a brief on the software measurement ontology. In section 3 attributes and measures for the functionality characteristic are presented in detail. Section 4 defines the functionality indicator. Finally, conclusions and future work are drawn in section 5.

2. Software Measurement Ontology (SMO)

With the goal of contributing to the harmonization of the different software measurement standards and research proposals, in [3] the authors propose a Software Measure Ontology organized around four sub-ontologies: (1) Software Measurement Characterization and Objectives, (2) Software Measures, (3) Measurement Approaches and (4) Measurement. In [3] the reader can find more information about the SMO ontology.

3. Measures for functionality characteristic

In [4] a portlet selection model (PtSM) is proposed. This model is based on both a portlet quality model

[1] This work is part of CALIPO (TIC 2003-07804-C05-03), and DIMENSIONS projects (PBC-05-012-1).and CALIPSO network (TIN2005-24055E)

(PtQM) and a set of characteristics not related to the portlet quality as such. In PtQM a set of portlet quality characteristics were identified: functionality, reliability, usability, efficiency and reusability. This paper is focused on functionality characteristic which is composed of other sub-characteristics: (1) Accuracy: capability of the portlet to provide the right or agreed results or effects with the degree of precision accorded, (2) Security: ability of the portlet to prevent unauthorized access, whether accidental or deliberate, to information and data, (3) Self-Containment: capability of the portlet to accomplish by itself alone the function that it is expected to perform, (4) Functional-Cohesion: capability of the portlet to make use of all its elements in performing its services, (5) Compliance: capability of the portlet to adhere to standards, conventions or regulations in laws and prescriptions relating to functionality. These sub-characteristics are related, to a greater or lesser degree, to five measurable concepts (one for each of the sub-characteristics). Next, the terms of the SMO for our context are defined.

The Entity Class is defined as the "set of portlets which meets the desirable functions for specified tasks and user objectives" while an Entity is "a specific portlet which is measured".

Our Information Need is "to evaluate the functionality of a set of portlets, which provide similar functions for specified tasks and user objectives, with the aim of choosing the best".

The Quality Model is the model that we are defining for the functionality characteristic. This model evaluates the Measurable Concepts: accuracy, security, self-containment, functional-cohesion and compliance.

Next, each one of these measurable concepts is analysed in detail. For each measurable concept, we will define a set of attributes. All the attributes have been defined taking into account that portlets are like black boxes. Moreover, we consider that portlets adhere to the WSRP (Web Service for Remote Portlets) standard [5]. This standard defines standard interfaces, so, the only attributes definable are those that can be calculated using information obtained from their interfaces or information provided by the vendors.

The **accuracy measurable concept** relates to the following attributes: agreement and right results. Next, let's define measures to measure each attribute (Table 1). The derived measure "ratio of right results" will be assessed from the base measures "number of right results" and "total number of results". Hence, a measurement function to combine the base measures should be defined (Table 2).

The **security measurable concept** relates to four attributes, namely, access control, security control, confidentiality and integrity

In Table 3, the measures for the previous attributes are shown. And in Table 4, the measurement function for the derived measure "identification of the user", along with the rest of information related to this measure is shown.

The **self-containment measurable concept** relates to the attribute additional elements. In addition, a measure has been defined to this attribute whose information is shown in Table 5.

The **functional cohesion measurable concept** relates to one attribute, namely, unnecessary elements. In Table 6, the measure for this attribute along with its scale, type of scale and unit of measurement is shown.

The **compliance measurable concept** relates to the security compliance attribute.

In Table 7, the measure defined for this attribute is shown.

4. Functionality Indicator

This section seeks to present how to obtain the functionality indicator – measure that is derived from other measures using an analysis model as measurement approach. So firstly, indicators for the different measurable concepts will be defined. Then, these indicators will be transformed (by using an analysis model) into others to obtain the functionality indicator. In Figure 1, the different indicators that must be defined and their transformations are shown.

In order to calculate the value of an indicator, an analysis model must be defined.

For example, the analysis model for the **accuracy indicator** (ACC-IND) is a vector composed by two elements (where each element represents one of the measures defined for this measurable concept):

V(ACC-IND)=(Degree of agreement, ratio of right results)

The next step consists in defining decision criteria to describe the portlet accuracy value.

Decision criteria are thresholds, targets, or patterns used to determine the need for action or further investigation, or to describe the level of confidence in a given result.

In Table 8, the accuracy indicator values and decision criteria are defined. A "+" as superscript indicates that the value for this element is this or greater. One decision criterion for each element of the vector has been identified. Depending on the value of each element of V(ACC-IND) and using the decision criteria, we obtain an accuracy value for a portlet among excellent and non-acceptable. The reasoning previously outlined is the same for all the indicators. Then, with the aim of saving space, we do not show the indicator values and decision criteria for the rest of indicators. Finally, the accuracy, security, self-containment, functional cohesion and compliance indicators are transformed into the **functionality indicator** (Table 9).

5. Conclusion and future works

This paper attempts to provide an example of application of a software measurement ontology (SMO) [3], applying it to a functionality model for portlets. In future work, we plan to define formally the other characteristics identified for portlet quality. To date, we have also defined formally the reusability and usability characteristics.

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Table 1.- Measures defined for attributes of the accuracy measurable concept

Measurable Concept	Attribute	Measures				
		Derived Measure	Base Measure	Scale	Type of Scale	Unit of Measurement
Accuracy	Agreement	-----	Degree of agreement	List (1-3): low, intermediate, high	Enumerate	Degree of agreement
	Right results	Ratio of right results	Number of right results	Natural number	Ratio	Right results
			Total number of results	Natural number	Ratio	Results

Table 2.- Information related to the derived measure for an attribute of the accuracy measurable concept

Derived Measure	Measurement Function	Scale	Type of Scale	Unit of Measurement
Right results	$\frac{Number\_of\_right\_results}{Total\_number\_of\_results}$	Decimal number	Ratio	Ratio of right results

Table 3.- Measures defined for attributes of the security measurable concept

	Attribute	Measures				
		Derived measure	Base measure	Scale	Type of scale	Unit of measurement
Security	Access control	Identi-fication of the user	The portlet implements the *Registration* interface	Boolean (0/1)	Nominal	*Registration* interface
			The portlet supports the *register()* operation	Boolean (0/1)	Nominal	*Register* Operation
		-----	The portlet can not be used if the consumer has not been registered.	Boolean (0/1)	Nominal	Compulsory registration
		-----	Type of authentication mechanism	List: *none,pwd, ...*	Enumerate	-----
		-----	The portlet uses authorization mechanisms	Boolean (0/1)	Nominal	-----
	Security control	-----	The portlet stores events related to security	Boolean (0/1)	Nominal	Storage of security events
		-----	Number of mechanisms to detect attacks	Natural number	Ratio	Mechanisms to detect attacks
	Confiden-tiality	-----	The portlet supports secure communication between the client and the consumer.	Boolean (0/1)	Nominal	Security communi-cation
		-----	The portlet supports *SSL/TLS* standard	Boolean (0/1)	Nominal	Standard
		-----	The portlet supports *XML Encryption* standard	Boolean (0/1)	Nominal	Standard
		-----	The portlet events require a secure communication channel in order to be distributed.	Boolean (0/1)	Nominal	-----
			The portlet requires secure communication on all its markup	Boolean (0/1)	Nominal	-----
	Integrity	-----	The portlet identifies different user categories (UC)	Boolean (0/1)	Nominal	User category
		-----	The portlet uses UC to access to others components	Boolean (0/1)	Nominal	-----

Table 4.- Information related to the derived measure: "identification of the user

Derived Measure	Measurement Function	Scale	Type of Scale	Unit of Measurement
Identification of the user	The portlet implements the *Registration* interface **AND** The portlet supports the *register()* operation	Boolean (0/1)	Nominal	------

Table 5.- Measure defined for the attribute of the self-containment measurable concept

Measurable concept	Attribute	Measure			
		Base measure	Scale	Type of scale	Unit of measurement
Self-containment	Additional elements	Number of additional elements	Natural number	Ratio	Additional elements

Table 6.- Measure defined for the attribute of the functional cohesion measurable concept

Measurable concept	Attribute	Measure			
		Base measure	Scale	Type of scale	Unit of measurement
Functional cohesion	Unnecessary elements	Number of unnecessary elements	Natural number	Ratio	Unnecessary elements

Table 7.- Measures defined for attributes of the compliance measurable concept

Measurable concept	Attribute	Measure			
		Base measure	Scale	Type of scale	Unit of measurement
Compliance	Security compliance	Number of standards that the portlet adheres	Natural number	Ratio	Security standards

Table 8.- Values for accuracy indicator

Accuracy indicator values	*Decision criteria*	
	Degree of agreement	Ratio of right results
Excellent	3	1
Acceptable	2	0.75^+
Non-acceptable	1	<0.75

Table 9.- Values for functionality indicator.

Functionality indicator values	*Decision criteria*
Excellent	➢ All the indicators have obtained the *excellent* value.
High	➢ Four indicators have obtained the *excellent* value. ➢ Three indicators have obtained the *excellent* value, another one the *high* value and another one the *middle* value.
Middle	➢ Three indicators have obtained the *excellent* value and two indicators the *acceptable* value, or vice versa. ➢ One indicator has obtained the *excellent* value, another one the *high* value, another one the *middle* value and two have obtained the *acceptable* value. ➢ One indicator has obtained the *excellent* value, another one the *high* value and other three the *acceptable* value.
Acceptable	➢ All the indicators have obtained the *acceptable* value. ➢ Four indicators have obtained the *acceptable* value and another one the *excellent* (or *high* or *middle*) value. ➢ Three indicators have obtained the *acceptable* value and another one the *middle* value and another one the *excellent* (or *high*) value.
Non-accept.	Rest of cases

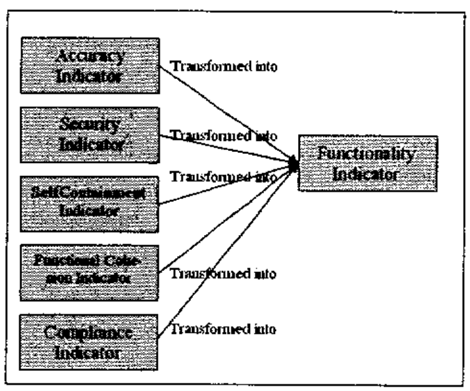

Figure 1.- Indicators to obtain the functionality indicator