Ontology of Zakat Management System

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ABSTRACT

Zakat Management System is a system that manages all the processes that are involved in zakat activities. At present, there exist no standard which can be utilized to develop Zakat Management System. In order to support the development of Zakat Management System, this paper provides the ontology of Zakat Management System aimed specifically to share the knowledge of zakat. Each person who are involved in the development of this system will hopefully share a common understanding of Zakat Management System. This in turn will make the process of development faster.

Keywords

Ontology, Zakat Management System, Methontology

1.0 INTRODUCTION

Ontology can be defined as a collection of term (concepts) and their definitions stated in a natural language (Kalinichenko et al., 2003). Ontology may take a variety of forms, but necessarily it will include a vocabulary of terms, and some specification of their meaning. This includes definitions and an indication of how concepts are inter-related which collectively impose a structure on the domain and constrain the possible interpretations of terms (Uschold, 1998).

Zakat is the forth of the Five Pillars of Islam. Zakat refers to spending a fixed portion of one's wealth for the poor and needy in the society. Giving money for charity is highly commendable, however zakat is different because it is obligatory on all Muslims and is given in a calculated amount.

2.0 METHODOLOGY

The Zakat Management System ontology described in this paper has been developed using METHONTOLOGY (Fernandez Lopez et al., 1997). This ontology is based on the widely used terms and concepts in the zakat domain. We attempt to include all of the important concepts in zakat domain, as follows:

a. We have considered all the processes that were involved in zakat management, which are the amil/agent constitution, zakat collection, budget allocation and zakat distribution.
b. We have established relationships between all the concepts available from the same point of view.

We have tried to cover the most common cases in Zakat Management System. The current version of the Zakat Management System ontology is the results from analyzing the services provided by zakat centers in Malaysia. From this analysis we have extracted the most representative concepts, unifying the different ways used to express them and removing duplicates.

2.1 Framework

There are four major activities involved (refer to figure 1):

Phase 1: Literature review - review the past and current researches which are related to zakat management. Study and compare various methodology of ontology development and select appropriate methodology.

Phase 2: Data collection and preparation – data and information are collected through literature review and through interview with individual from several zakat center i.e. Lembaga Zakat Selangor, Pusat Zakat Wilayah Persekutuan, Pusat Zakat Kedah and Pusat Zakat Perlis.

Phase 3: Domain Analysis and Modeling - model the zakat management system using Unified Modeling Language (UML) to understand the overall view of zakat management domain.

Phase 4: Ontology Development - model the zakat domain knowledge and represent it in a conceptual form, define the concepts and relationships between concepts. By using a tool named Protégé, we convert it into RDF/XML language.

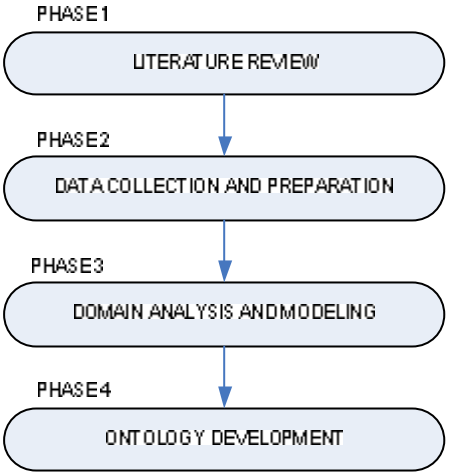

Figure 1: Framework

2.2 Methontology

METHONTOLOGY guides in how to carry out the whole ontology development through the specification, the conceptualization, the formalization, the implementation and the maintenance of the ontology. We now describe briefly each activities that are included in the Zakat Management System ontology development process:

2.2.1 Specification

The *specification* activity states why the ontology is being built, what its intended uses and who the end-users are. The Zakat Management System Ontology goal is:
To share domain information. Ontology binds the different communities in the software development to overcome barriers created by disparate vocabularies, approaches, representations, and tools in their respective contexts.
To be used as a basis for software specification and development Ontology solves this problem by bridging the gap between domain analysis and application system construction.

Zakat Management System Ontology is designed for interoperability of systems. In the next sections the process to conceptualize an ontology of entities (amil, agent, etc.) in the zakat management domain will be presented.

2.2.2 Conceptualization, Formalization, Implementation and Maintenance

The *conceptualization* activity in METHONTOLOGY organizes and converts an informally perceived view of a domain into a semi -formal specification using a set of intermediate representations (IRs) based on tabular and graph notations that can be understood by domain experts and ontology developers. The result of the conceptualization activity is the ontology conceptual model.

The *formalization* activity transforms the conceptual model into a formal or semi-computable model. *Formalization* is not a mandatory activity, because using ontology tools the conceptualization model is usually automatically implemented with translators to ontology languages.

The *implementation* activity builds computable models in an ontology language (Ontolingua) (Farquhar et al., 1997), RDF Schema (Brickley & Guha, 2004), OWL (Chaudhri et al., 1998), etc.). Tools implemented automatically on conceptual models have varieties of ontology languages. This ontology has been implemented in OWL since it has been modeled with the Protégé tool.

The *maintenance* activity updates and corrects the ontology if needed.

3.0 FINDINGS

Ontology Development Using METHONTOLOGY

The zakat management ontology is composed of several ontologies at different levels of abstraction: application, collection, distribution, documents and users.

Below is the example of Application Ontology (refer to figure 2 and table 1), Collection (refer to figure 3 and table 2), Distribution (refer to figure 4 and table 3, Document (refer to figure 5 and table 4) and User (refer to figure 6 and table 5). Figure 7 shows the example of computable model in an ontology language (OWL).

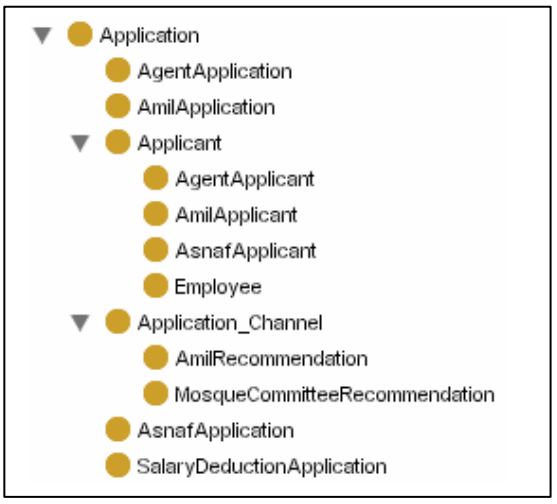

Figure 2: Concept Classification Tree - Application

Table 1: Terms Glossary – Application

Name	Description	Type
Application	Official requests or applications.	C

AgentApplica-tion	Application. An agent candidate application to be constituted as agent.	C
AmilApplica-tion	Application. An amil candidate application to be constituted as amil.	C
Applicant	Application. A person or organization who applies.	C
Application_ Channel	Application.	C
AsnafApplica-tion	Application.	C
SalaryDeduc-tionApplication	Application. The application by employee to the employer to deduct his salary for zakat payment.	C
AgentApplicant	Applicant. An agency which apply to be agent	C
AmilApplicant	Applicant. A person who apply to be amil.	C
AsnafApplicant	Applicant.	C
Employee	Applicant.	C
AmilRecom-mendation	Application_Channel.	C
AgentApplica-tion(AgentApplicant, AgentApplica-tion)	Agent applicant makes agent application.	R
AmilApplication(AmilApplicant, AmilApplica-tion)	Amil applicant makes amil application.	R
AsnafApplication(AsnafApplicant, AsnafApplica-tion)	Asnaf applicant makes asnaf application.	R
SalaryDeduc-tionApplication (Employee, SalaryDeduc-tionApplication)	Employee makes salary deduction application.	R

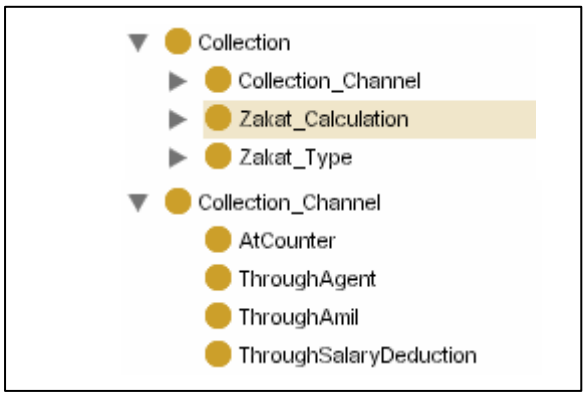

Figure 3: Concept Classification Tree - Collection

Table 2: Terms Glossary – Collection

Name	Description	Type
Collection_ Channel	Collection	Concept
AtCounter	Collection_Channel	Concept
ThroughAgent	Collection_Channel	Concept
ThroughAmil	Collection_Channel	Concept
ThroughSalary Deduction	Collection_Channel	Concept
ZakatCalcula-tion	Collection	Concept
AgriculturalZa-katCalculation	Zakat_Calculation	Concept
BusinessZakat Calculation	Zakat_Calculation	Concept
GoldZakatCalcu lation	Zakat_Calculation.	Concept
IncomeZakatCal culation	Zakat_Calculation	Concept
RikazZakatCal Culation	Zakat_Calculation	Concept
SavingMoneyZa katCalculation	Zakat_Calculation	Concept
ShareZakatCal Culation	Zakat_Calculation	Concept
SilverZakatCal Culation	Zakat_Calculation	Concept
Payments	Payments of Zakat Al Mal based on zakat calculation.	Relation
Zakat_Al_MalC ollectionChan Nel	Zakat Al Mal is collected through collection channel.	Relation
Zakat_FitrahCol lectionChannel	Zakat Fitrah is collected through collection channel.	Relation
CollectionAt Counter	Zakat payer pays zakat at counter	Relation
Collection ThroughAgent	Zakat payer pays zakat through agent.	Relation

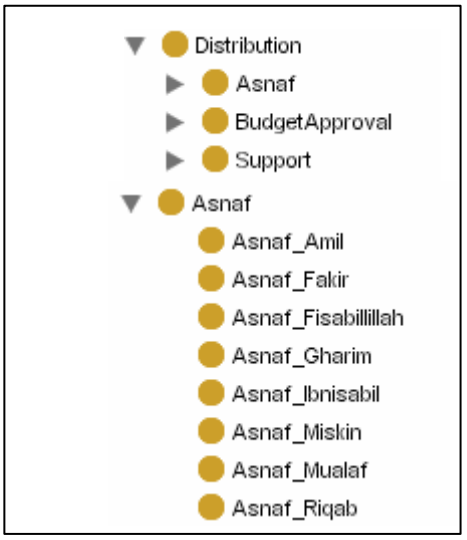

Figure 4: Concept Classification Tree - Distribution

Table 3 : Terms Glossary – Distribution

Name	Description	Type
Distribution	The distribution process of zakat money to asnaf.	Concept
Asnaf	Distribution. People who receive zakat.	Concept
Asnaf_Fakir	Asnaf. Poor people. One who has neither material possessions nor means of livelihood.	Concept
BudgetApproval Committees	The committees that involve in determining the amount of zakat to be distributed.	Concept
Board	BudgetApproval.	Concept
Committee	BudgetApproval.	Concept
SupportType	The type of given support.	Concept
HouseRentalSupportForPoor	SupportForAsnafFakir	Concept
SchoolFeesSupportForPoor	SupportForAsnafFakir	Concept
CourseOrTrainingForPoor	SupportForAsnafFakir	Concept
HouseRepairForPoor	SupportForAsnafFakir	Concept
BatchHouseDevelopmentForPoor	SupportForAsnafFakir	Concept
IndividualHouseDevelopmentForPoor	SupportForAsnafFakir	Concept
DemiseManagementForPoor	SupportForAsnafFakir	Concept
ElderlyPoorHouseManagement	SupportForAsnafFakir	Concept
PlumbingAndWiringForPoorHouse	SupportForAsnafFakir	Concept
AsnafPoorProject	SupportForAsnafFakir	Concept

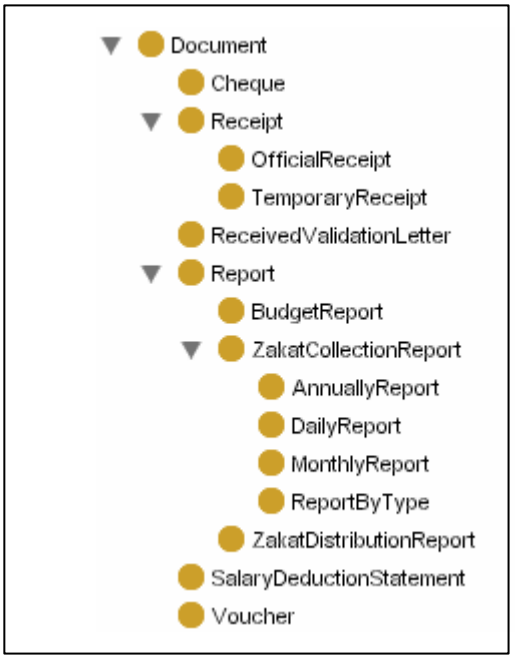

Figure 5: Concept Classification Tree - Document

Table 4 : Terms Glossary – Document

Name	Description	Type
Document		Concept
Cheque	Document. A payment method	Concept
Receipt	Document. The receipt is produced as a proof to the zakat collection transaction to payer.	Concept
OfficialReceipt	Receipt. The official receipt is produced by zakat department.	Concept
Temporary-Receipt	Receipt.The temporary receipt that is produced by amil or agent.	Concept
Report	Document.	Concept
BudgetReport	Report.	Concept
ZakatDistributionReport	Report.	Concept
ZakatCollectionReport	Report.	Concept
Annually-Report	ZakatCollectionReport. Collection annually report.	Concept
DailyReport	ZakatCollectionReport. Collection daily report.	Concept
MonthlyReport	ZakatCollectionReport. Collection monthly report.	Concept
ReportByType	ZakatCollectionReport. Collection report categorized by type.	Concept
SalaryDeductionStatement	Document. The statement that is produced by zakat department to zakat payer to inform that they have received the zakat payment.	Concept
Voucher	Document.	Concept
CheckReceivedFromPayer	The check received from the zakat payer.	Relation

VoucherProduced	The voucher produced by the zakat department staff	Relation
CheckReceivedFromStaff	The check received from the zakat department staff.	Relation
OfficialReceiptsProduced	The zakat department staffs produce official receipt.	Relation
ReceiptsReceived	The receipts received from zakat payer.	Relation
TemporaryReceiptsProduced	The agent or amil produce a temporary receipt.	Relation
ReceivedValidationLetters	The zakat payer receive the Received Validation Letters	Relation

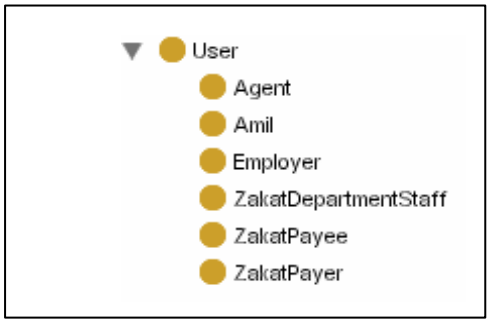

Figure 6: Concept Classification Tree - User

Table 7 : Terms Glossary – User

Name	Description	Type
User	Any user of the system.	Concept
Agent	User. An agency that is appointed by zakat department to collect zakat.	Concept
Amil	User. Amil are defined as those who are assigned to perform all the activities with regard to zakat matters, from the collection up to distribution stages.	Concept
Employer	User. The employer of the zakat payer.	Concept
ZakatDepartmentStaff	User. The internal staff of zakat department.	Concept
ZakatPayer	User. A person who pay zakat.	Concept
AmilConstitution	Zakat department staff constitutes amil	Relation
AgentConstitution	Zakat department staff constitutes agent.	Relation

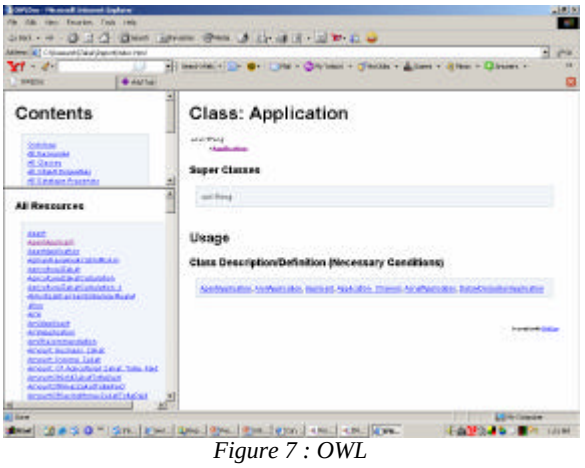

Figure 7 : OWL

4.0 CONCLUSION

This ontology will make the process of understanding and developing the Zakat Management System faster.

This ontology only covers two main processes in zakat management:

i. Collection
ii. Distribution

This ontology can be updated by including more processes that are involved in zakat management such as Customer Relationship Management.

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