Chapter 8
An Approach to Using Ontologies for the Development of High Quality Disaster Recovery Plans

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ABSTRACT

Disasters have the potential to cripple a country and those countries that are particularly susceptible to disasters must have effective disaster recovery plans (DRP) in place to ensure that the country can return to normalcy as soon as possible after the devastation. However, for the plan to be effective it must be of high quality, which is often viewed as a multidimensional concept containing essential factors for DRP, such as consistency, completeness, reliability and feasibility. Therefore, any methodology for the development of DRP must take these dimensions into account as their affect on quality is considerable. In this regard, the authors describe a quality based methodology for the development of DRP, including a methodology that makes use of ontologies containing properties that are suited to the development of these high quality plans. The applicability of the proposed methodology will be demonstrated through a case study of an electric utility company in Jamaica.

INTRODUCTION

Disasters have been defined as serious disruptions of the functioning of societies (or organizations), causing widespread losses (e.g., human, material, environmental) to the point where the society is unable to continue to function using only its resources (e.g., human, monetary). These disasters are often classified as either natural (e.g., hurricanes, earthquakes) or manmade (e.g., terrorism, oil spills) (Alcantara-Ayala, 2002; Faulkner, 2001; IDNDR, 1992).
Regardless of their classification, disasters are likely to inflict extensive damage on a country’s society and infrastructure and the longer it takes to return to normalcy following the disaster, the more costly it will be for the country. The frequency and scale of recent disasters highlights the need for a holistic approach to address and plan for them. The aim of a Disaster Recovery Plan (DRP) is to ensure that entities (e.g., organisations, countries) function effectively during and following a disaster (Bryson et al., 2002). A well thought out DRP can play a major role in an organization’s/country’s survival/success (Fallara, 2003). However, the plan should be evaluated before it is deployed as this can identify problems in the plan before the consequences are felt.

In order to evaluate the plan, a set of criteria must be defined against which quality is measured. Quality is often viewed as a multi-dimensional concept (Wand & Wang, 1996; Wang et al., 1995). Bryson et al. (2002) identified four properties that could be used to evaluate the DRP: feasibility, consistency, completeness and reliability. Therefore, these quality criteria should be the focus for a methodology that aims to produce high quality DRPs.

Ontologies have been defined as a formal description of a domain that can be shared among different applications and can be expressed in a language that can be used for reasoning (Noy, 2004). Dimensions have been proposed for measuring the quality of these ontologies (Burton-Jones et al., 2005; Rao & Osei-Bryson, 2007), these include completeness (coverage) and consistency and methodologies proposed for the development of ontologies must ensure that the quality dimensions are considered (Rao, Reichgelt et al., 2009).

A comparison of the characteristics of ontologies and the requirements of a disaster recovery plan shows that an ontology can support the development of an effective DRP in a number of ways, for example:

1. It provides a common language for all stakeholders, thus reducing confusion and ambiguity that may arise when different groups of stakeholders come together to make decisions (Altay & Green, 2006; Zhang et al., 2002) as is common in disaster recovery planning.
2. The use of a common language in the development of a DRP, would facilitate the sharing of DRPs among enterprises.
3. If the quality dimensions for DRPs can be addressed through the use of an ontology, it is likely that if the quality of the ontology is high, then the quality of the DRP will be high. Additionally, as the ontology is a formal description, the evaluation can be automated which makes the evaluation process more efficient and is likely to lead to improved quality of the ontology.

Many organizations have realized the importance of these DRPs and do have them in place. However, few have recognized the role that ontologies can play in improving the effectiveness of the plans. This study proposes a methodology for Disaster Recovery Planning that focuses on quality by using ontologies. The applicability of this methodology will be demonstrated by examining the information requirements for recovery management of an electric utility company in Jamaica, a country in the Caribbean that is faced with the annual threat of hurricanes.

The following section reviews the disaster planning and ontology literature and the limited research on applying ontologies to DRP. The methodology for the development of the DRP will be described and its applicability to the electric utility company in Jamaica will be demonstrated. The final section includes some concluding remarks and suggestions for future directions for this research.
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