Study Period on

Extending the MDR for Semantic Web

- Procedure for the Specification of Web Ontology -

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Doo-Kwon Baik (baikdk@korea.ac.kr), Korea University
Dongwon Jeong (djeong@kunsan.ac.kr), Kunsan National University
Jeong-Dong Kim (kjd4u@korea.ac.kr), Korea University
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Background

- **ISO/IEC 11179, MDR (Metadata Registry) is**
  - Used whenever data must be used consistently within an organization or group of organizations

- **Semantic Web**
  - Extension of the current Web, Next generation Web, Intelligent Web
  - *The Semantic Web is an evolving extension of the World Wide Web that the semantics of information and services on the web are defined, making it possible for the web to understand and satisfy the requests of people and machines to use the web content*

- **Web Ontology**
  - For the web, ontology is about the exact description of web information and relationships between web information
  - Consists of concepts (classes), and their relations (predicates)
  - Triple set <S, P, O>
Motivation

❖ **MDR**

✓ provides a good introduction to metadata concepts, including a lot of insight into certain aspects of the granularity of metadata

✓ MDR contributes knowledge integrity in a large scale
  – The simplicity provides the organization of implemental adaptation
  – The representational simplicity allows for easy sharing of metadata

✓ In a word, MDR contains standardized concepts for various applications fields.

❖ **Semantic Web promotes structured metadata representation, such as an ontology schema that concepts are associated via relationships**

❖ **For creating Web ontology, concepts are firstly defined, and then relationships are linked between the concepts**
Under such a situation, we can use the standardized concepts in MDR for building Ontology.

In other words, we need to specify Web ontology using standardized concepts in MDR for Semantic Web.

However, there is no standard for specifying Ontology using concepts in a registry.

The goal of this proposal is to provide the specification support of Ontology using the concepts in a registry.
The purposes of this proposal are to promote the followings:

- Ease of definition of Web Ontology schema
- Creation of Web Ontology schema consisting of standardized concepts
  - i.e., well-known concepts or generalized concepts, which are accepted by general users as well as domain experts
- Common understanding of concepts across corresponding application fields
- More formalized specification of Web ontology
Specifying Ontology using concepts in MDR

Between MDR level and Semantic Web level
Procedure for the specification of Web Ontology using standardized concepts in MDR
Discussion History of the Proposal

- The idea of this proposal has been presented in the following meetings

  - SC32 Plenary and WG Meetings, Australia, May 2008
    - N1127 Extending the Metadata Registry for Semantic Web

    - N1177 Extending the Metadata Registry for Semantic Web
Scope

❖ This proposal consists of the following parts:
  ✓ Part 1: Framework
  ✓ Part 2: Mapping Model between MDR and Web Ontology
  ✓ Part 3: Procedure for Specification

❖ This proposal does not contain
  ✓ Ontology building methods by a specific ontology description language, such as RDF, RDF-S, OWL, Topic Maps, KIF, and so on
Our Proposal

- Part 1: Framework
- Part 2: Mapping Model between MDR and Web Ontology
- Part 3: Procedure for Specification
Our Proposal (cont.)

Part 1: Framework

- Web Ontology
- Web Ontology

Procedure for Specification

Metadata Registry (MDR)

Semantic Web Level

PSO Level

Conceptual Level

MDR Level

Representational Level
Part 2: Mapping Model between MDR and Web Ontology

- Analyzes mapping relations between Web ontology and MDR
- Defines the relationships between components of MDR and Web Ontology
- Defines a metamodel for the mapping relations between MDR and Web ontology
Our Proposal (cont.)

**Part 2: Mapping Model between MDR and Web Ontology**

- Concepts and Relationships in MDR

![Diagram of concepts and relationships]
Part 2: Mapping Model between MDR and Web Ontology

Our Proposal (cont.)
Our Proposal (cont.)

**Part 3: Procedure for Specification**

- This part contains the overall process for building Web ontology, and develops and defines concrete/detailed operations of each process.
Our Proposal (cont.)

A Case of Specifying Ontology Using Concepts in MDR

[Diagram showing relationships between classes, properties, and concepts in a domain and range, including relations like DEC_Relationship, CD_Relationship, and VD_Relationship.]
Conclusion

- **The goal of this proposal is**
  - To specify ontology using standardized concepts registered and managed in MDR

- **This proposal**
  - facilitates usability of MDR
  - enables creation of Web Ontology consisting of standardized concepts
  - supports common understanding of concepts across corresponding application fields
  - enables a more formalized specification of Web ontology
Thank you!