

Study Period Meeting on
ROR/ODMS/PSO & SQL/MM-8 MDR



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Issues for Standardization of SQL/MM-8: MDR

State Key Laboratory for Software Engineering (SKLSEI),
Wuhan University, Wuhan, China, August 21-22, 2009

Dongwon Jeong, Kunsan National University
Jangwon Kim, Korea University

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- ❖ Introduction to SQL/MM MDR
- ❖ Issue List
- ❖ Future Works



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- ❖ **Introduction to SQL/MM MDR**
 - ❖ Issue List
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Discussion History

SC 32 Joint Study Periods Meeting (WG2,3,4), Clearwater, FL, February 2007

- First presentation
- Simple Introduction to SQL/MDR (Idea description)

SC 32 Plenary and WG Meetings, New York, USA, July 2007

- Request for a study period on SQL/MM MDR
- Documents: 32N1656-WG4N0061-jfk0023-studyrequest-sql_mdr-jfk.pdf
& jfk0024-wg4-presentation-sql-mdr.ppt
- Presentation title: *SQL/MDR: Query Language for Sharing and Exchanging of Metadata between MDRs - Proposal for a Study Period in WG4 –*

WG 4 Meeting, Jagsthausen, Germany, November 2007

- A tough draft has been provided
- Documents: str015 wg4-sqlmm-mdr.doc

Discussion History (cont.)

SC 32 Plenary and WG Meetings, Sydney, Australia, May 2008

- **Proposed NWIP**

- Resolutions: SC321737a

SC 32 approves the following subdivisions and SC32 instructs its secretariat to conduct a 60-day letter ballot for Project 1.32.04.01.08.00, and accept the project subdivision if at least four National Bodies support the subdivision.

Project Number	Title	Project Editor	Rationale Doc #
1.32.04.01.08.00	SQL Multimedia and Application Packages – Part 8: MDR	Dongwon Jeong	WG4N0070 (rationale 3)

November 15, 2008: Approved

- **SC32N1809: Five NBs approved**

SC 32/WG 4 Interim Meeting, Portugal, November 2008

In addition, Open Forums and Workshops

Discussion History (cont.)

SC 32 Plenary and WG Meetings, Jeju, Korea, July 2009

- **Presentaion for the SC 32 Tutorial**
- **Discussion on WD1 (WG 2 and WG 4 joint meeting)**
- **Re-definition of the scope: SC 32 N 1911**
 - to support retrieval facility

Purpose

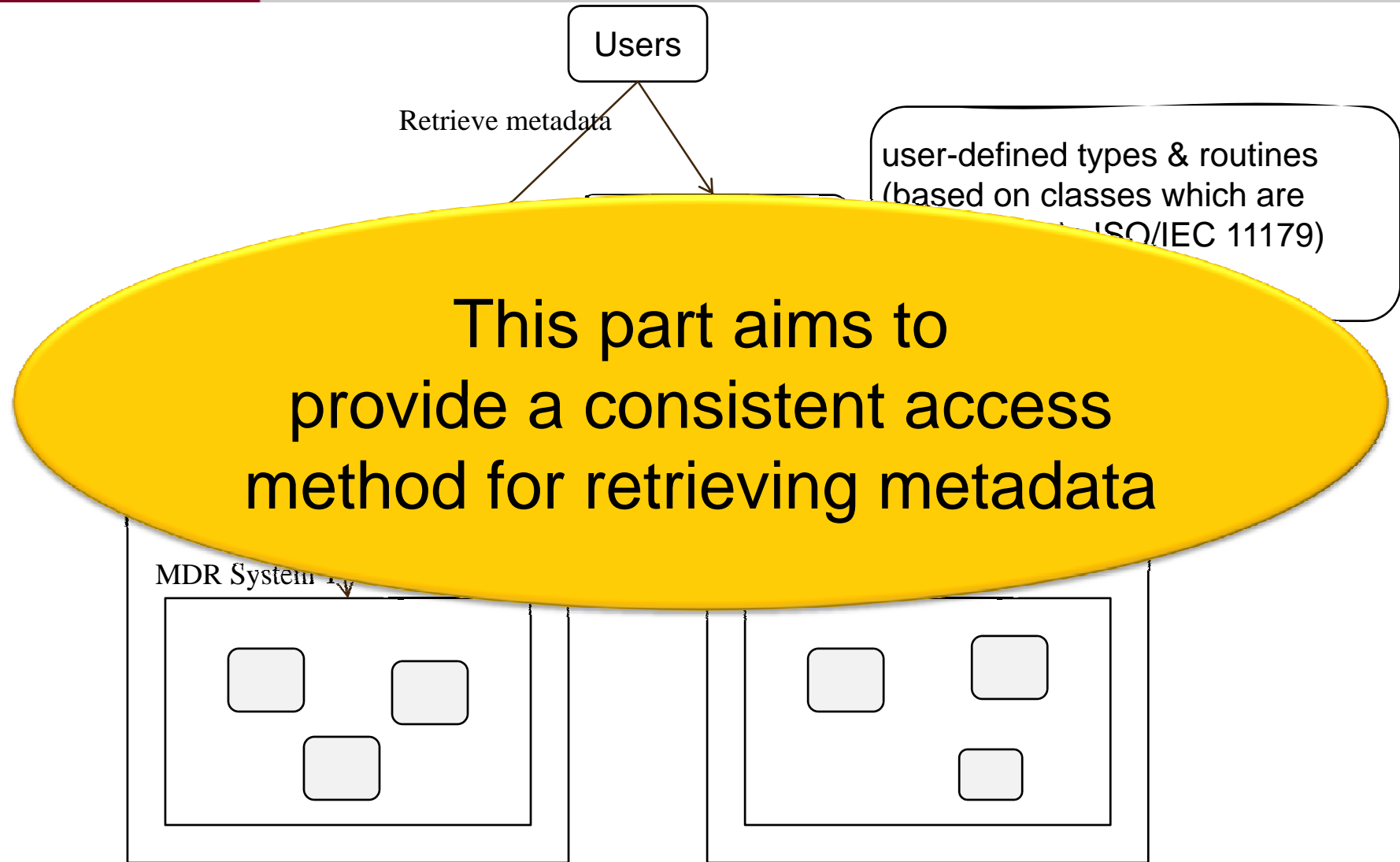
- ❖ The purpose of this International Standard is to define multimedia and application specific types and their associated routines for retrieval of metadata using the user-defined features in ISO/IEC 9075
- ❖ ISO/IEC 13249 SQL/MM is structured as a multi-part standard, and at present, it consists of the following parts:
 - ✓ Part 1: Framework
 - ✓ Part 2: Full-Text
 - ✓ Part 3: Spatial
 - ✓ Part 4: Multimedia and Application
 - ✓ Part 5: Still Image
 - ✓ Part 6 : Data Mining
 - ✓ Part 7: History
 - ✓ Part 8: MDR

Scope

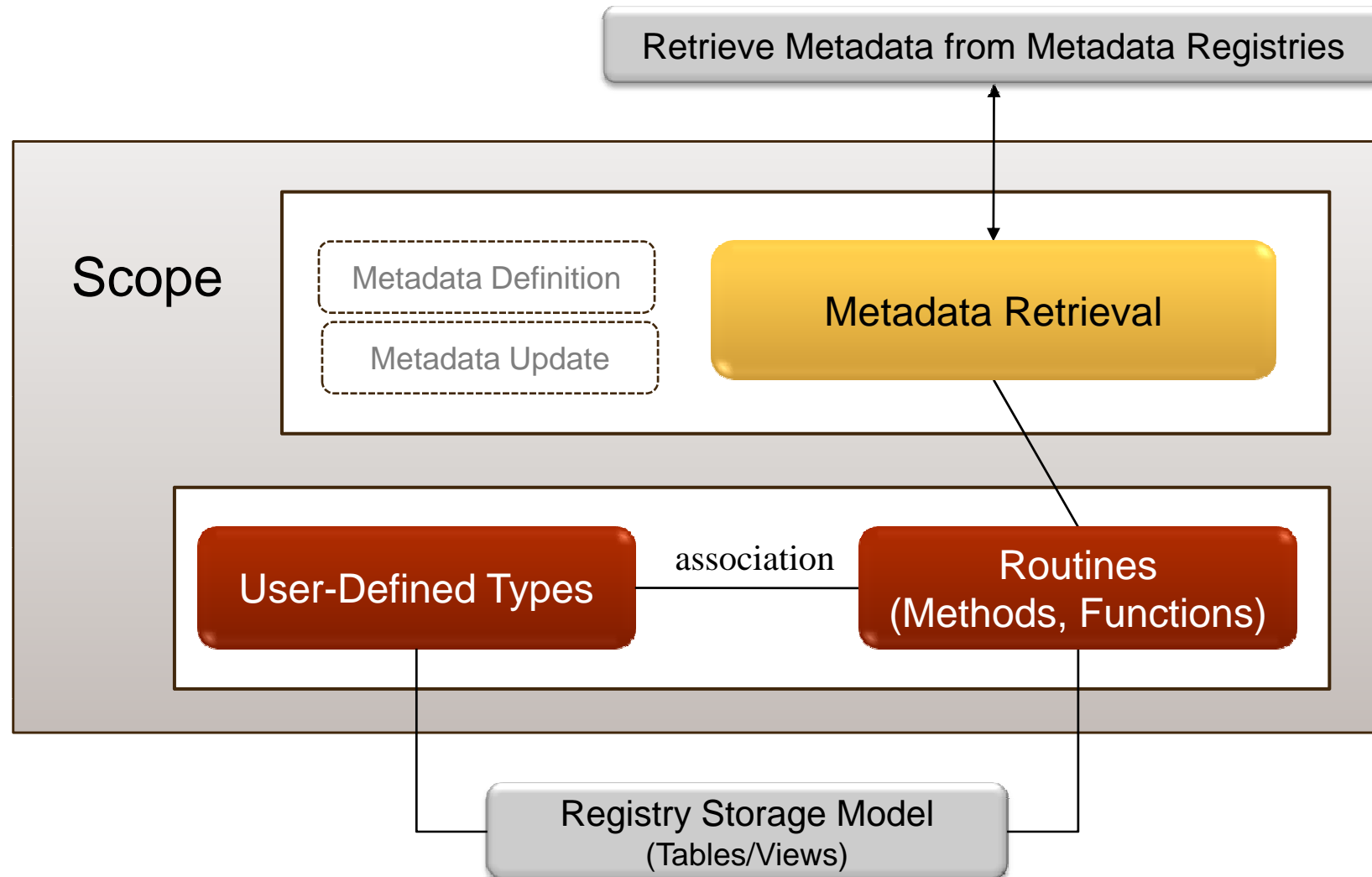
❖ This Part of ISO/IEC 13249

- ✓ introduces the metadata registry part of ISO/IEC 13249,
- ✓ gives the references necessary for this part of ISO/IEC 13249,
- ✓ defines terms, notations, conventions, and definitions specific to this part of ISO/IEC 13249,
- ✓ defines concepts specific to this part of ISO/IEC 13249,
- ✓ defines metadata registry using user-defined types and associated routines
- ✓ covers specifications for retrieving metadata from metadata registries
- ✓ does not covers specifications for insertion, deletion, modification of metadata including creation of schema structures for registries
 - Re-defined this scope through the discussion on this issue, Joint meeting of WG 2 and WG 4, SC 32 Plenary and WGs Meetings, Jeju, Korea, July 2009

Scope (cont.)



Conceptual Model



Definition of User-Defined Types and Routines

❖ MDR User-Defined Types

- ✓ An MDR user-defined type is mapped to its corresponding a MDR class
- ✓ Examples of the MDR classes = {data element, conceptual domain, ...}

❖ Type Notation

- ✓ The MDR_<ClassName> type is an abstraction for classes of metamodel of ISO/IEC 11179

MDR_<ClassName> type

- ✓ For example, the user-defined type for the class '*Data_Element*' of the ISO/IEC 11179 metamodel is defined as follows:

MDR_Data_Element

Definition of User-Defined Types and Routines (cont.)

❖ Statement for Creation of a UDT

```
CREATE TYPE MDR_data_element  
AS ( <ALLColumns> )
```

```
STATIC METHOD MDR_administered_item_administration_record()  
RETURNS TABLE(<ALLColumns>),
```

```
STATIC METHOD MDR_data_element()  
RETURNS TABLE(<ALLColumns>),
```

```
METHOD MDR_data_element_name()  
RETURNS <data_element_name>
```

Definition of User-Defined Types and Routines (cont.)

- ❖ Definition of the Static Method `MDR_data_element()`
 - ✓ Obtain all data of data element

```
CREATE STATIC METHOD MDR_data_element()  
RETURNS TABLE(<AllColumns>)  
FOR MDR_data_element  
BEGIN  
    RETURN TABLE(  
        SELECT <AllColumns>  
        FROM user_de_table);  
END
```

user_de_table is the table name, which is defined by a user so that it guarantees independence of physical structure.
i.e., **BEGIN-END** part should be implemented by users.

Definition of User-Defined Types and Routines (cont.)

- ❖ Output Parameters of the Static Method `MDR_data_element()`

data_element_administration_record `MDR_Administration_Record`,
representation_class_qualifier `CHARACTER VARYING(30)`,
data_element_precision `Integer`

- ✓ The attribute *data_element_administration_record* is the structured type `MDR_Administration_Record`

Retrieve Metadata

❖ Select Statement

```
SELECT
    DE.data_element_name, DE.status
FROM
    TABLE (MDR_data_element::MDR_data_element()) AS DE
WHERE
    DE.data_element_administration_record.administrative_status()
    = 'Recorded';
```

In the SELECT clause, data_element_name and status are defined based on attribute names in metamodel of ISO/IEC 11179



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Issue List for Standardization of SQL/MM MDR

- ❖ We need to consider the following issues for standardization of SQL/MM MDR (Metadata Registry):
 - ✓ How to define user-defined types and routines
 - Have to prevent loss of metadata when we define user-defined types
 - Done → Referred the specification 20944 (binding API)
 - ✓ How to validate user-defined types in Part 8
 - The defined UDTs should correspond to classes of ISO/IEC 11179
 - Each UDT contains all metadata information of its correspondent class of ISO/IEC 11179
 - ✓ How to consider relations between classes in ISO/IEC 11179

[Click](#)

Relations between Classes

❖ 1:N relation → DEC : DE

✓ Ex) p54, Figure 11 — Consolidated metamodel (11179-3_2003)

Data_Element_Concept	
data_element_concept_administration_record	Administration_Record
data_element_concept_object_class	Object_Class
data_element_concept_property	Property
object_class_qualifier	String
property_qualifier	String

1:N

Data_Element	
data_element_administration_record	Administration_Record
representation_class_qualifier	string
data_element_precision	integer

Value_Domain	
value_domain_administration_record	MDR_Administration_Record
value_domain_datatype	Datatype
value_domain_format	String
value_domain_maximum_character_quantity	Integer
value_domain_unit_of_measure	Unit_of_Measure

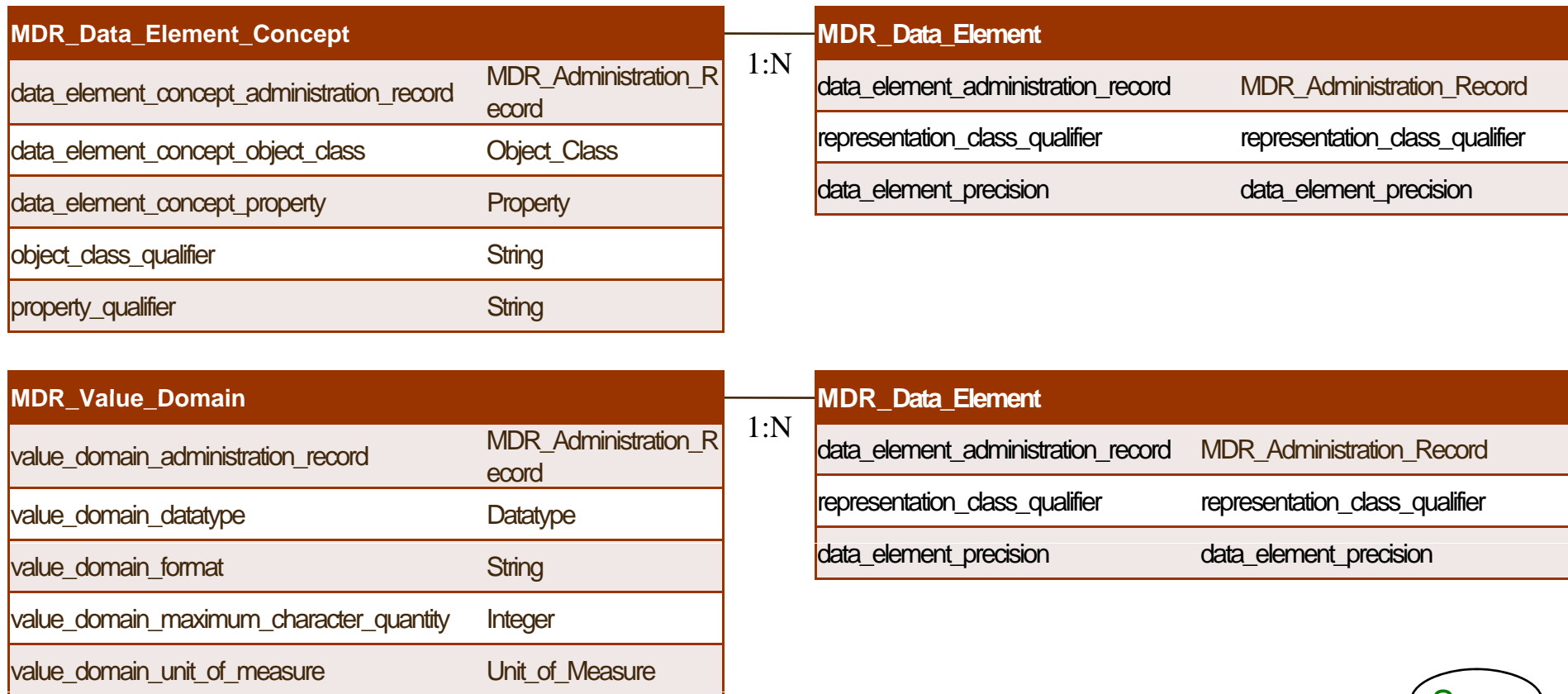
1:N

Data_Element	
data_element_administration_record	Administration_Record
representation_class_qualifier	string
data_element_precision	integer



Relations between Classes (cont.)

- ❖ Defined UDTs - Has a problem
 - ✓ How to query to get results from tables

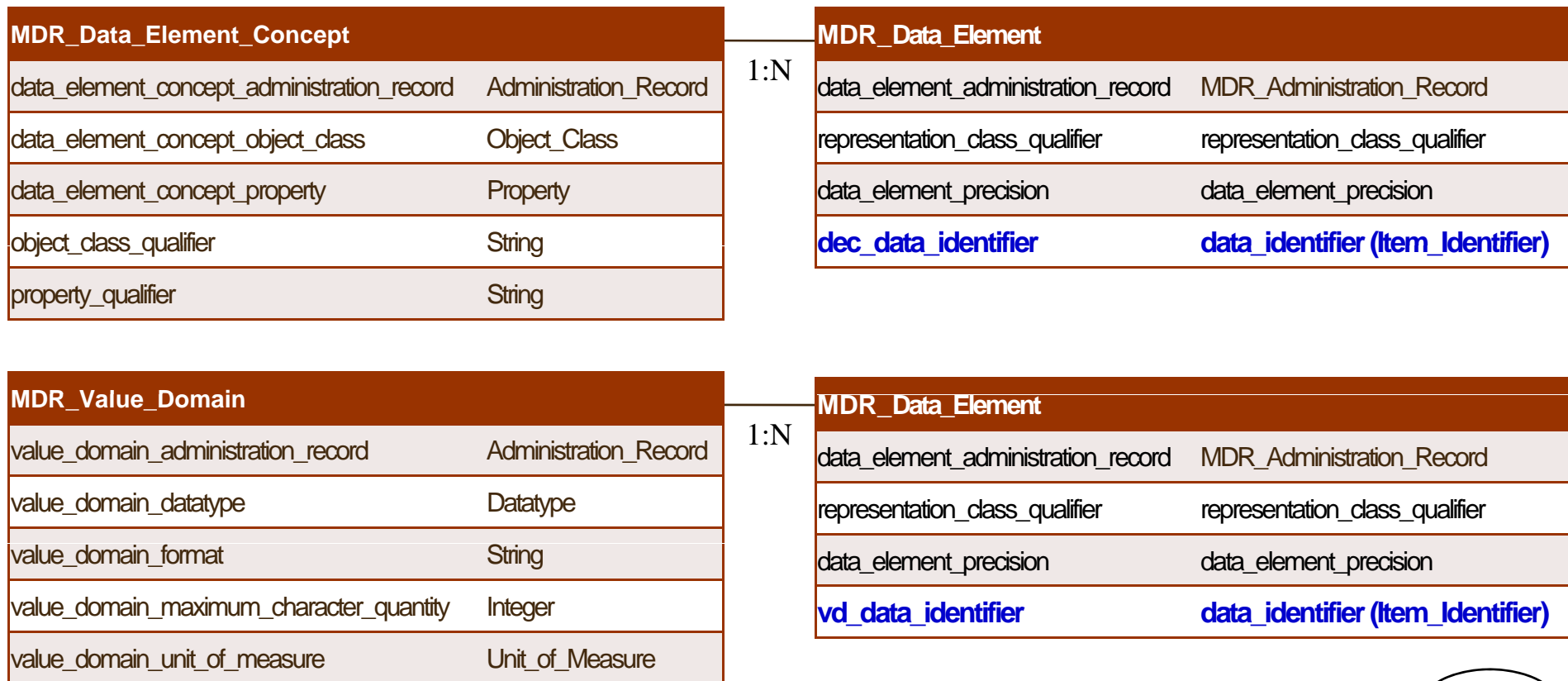


Spec.

Relations between Classes (cont.)

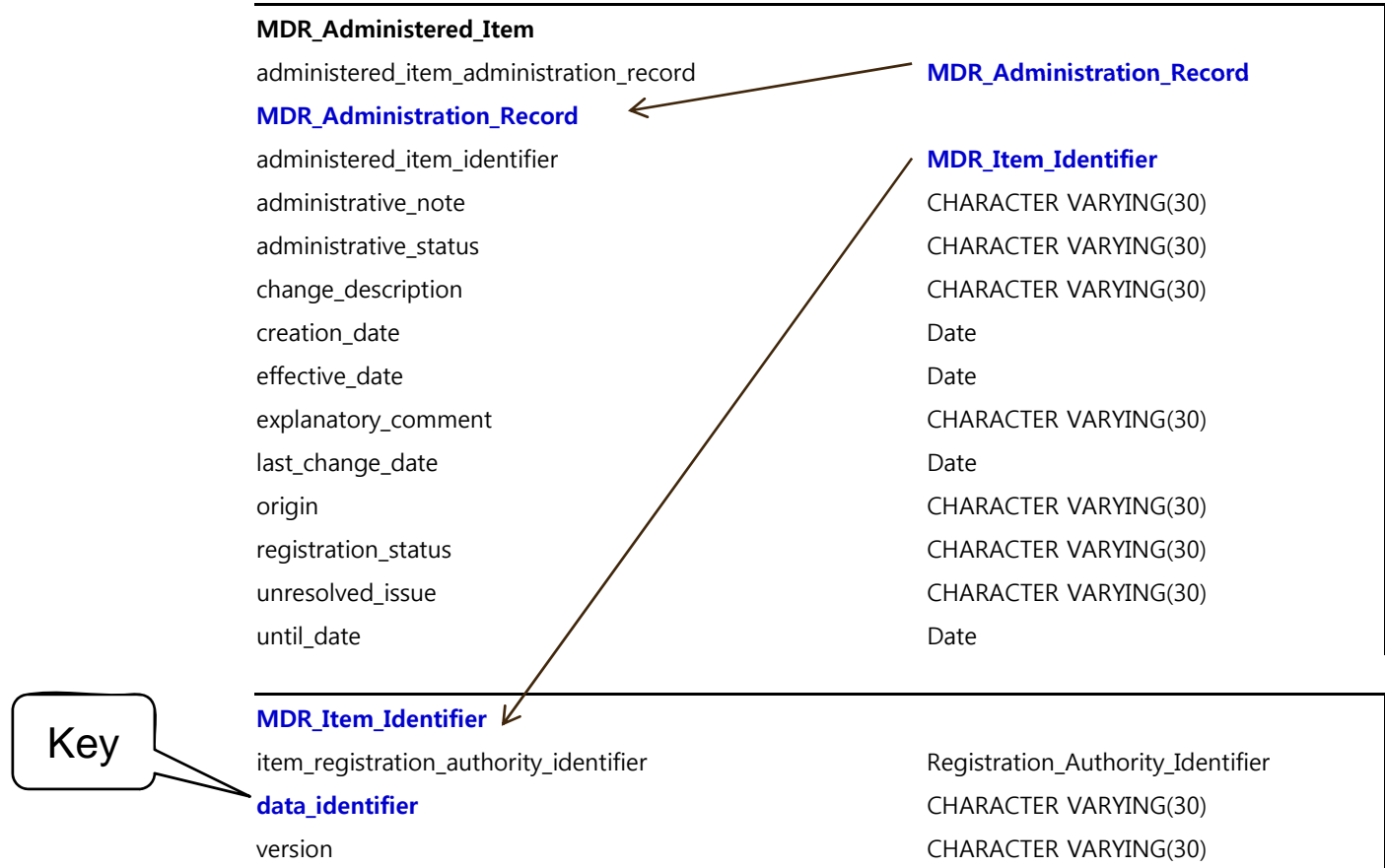
❖ Solution

- ✓ Put IDs as foreign key into refereneceing tables



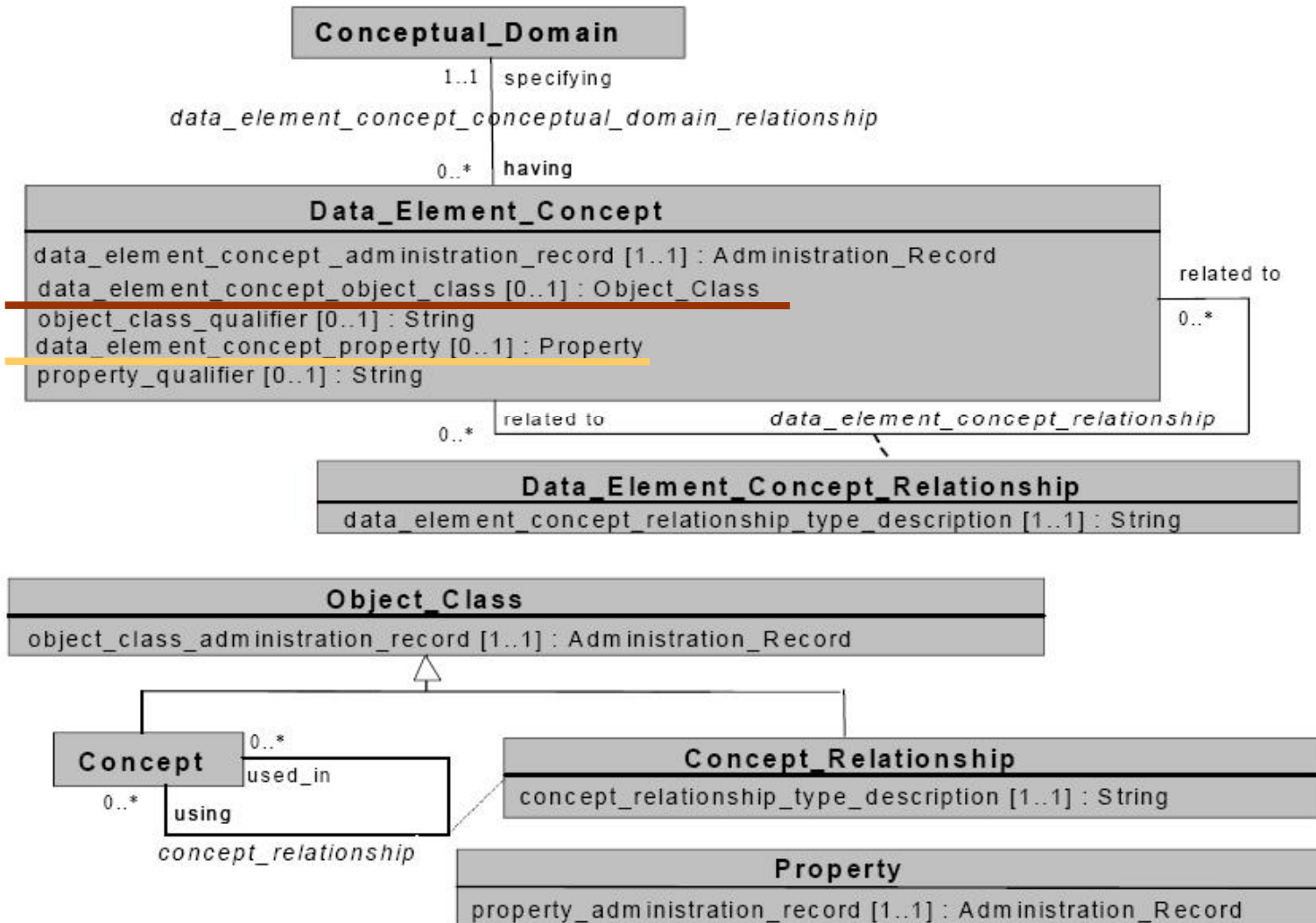
Spec.

Relations between Classes (cont.)

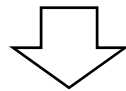
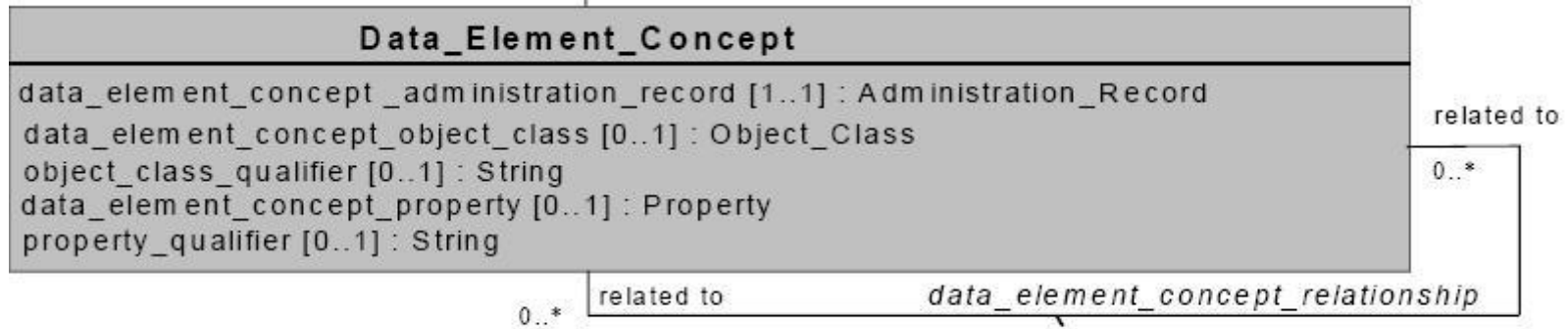


Ref. 20944

Relations between Classes (cont.)



Relations between Classes (cont.)



MDR_Data_Element_Concept	
data_element_concept_administration_record	MDR_Administration_Record
oc_data_identifier	data_identifier of Object Class (Item_Identifier)
data_element_concept_property	MDR_Property
object_class_qualifier	CHARACTER VARYING(30)
property_qualifier	CHARACTER VARYING(30)



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Future Works

- ❖ Define methods and routines of UDTs
 - ✓ To retrieve metadata among classes which are defined in MDR
- ❖ Verification and Validation of UDTs
 - ✓ Whether there is information loss or not
 - ✓ Using a scenario or implementation based on real MDR systems



Q/A

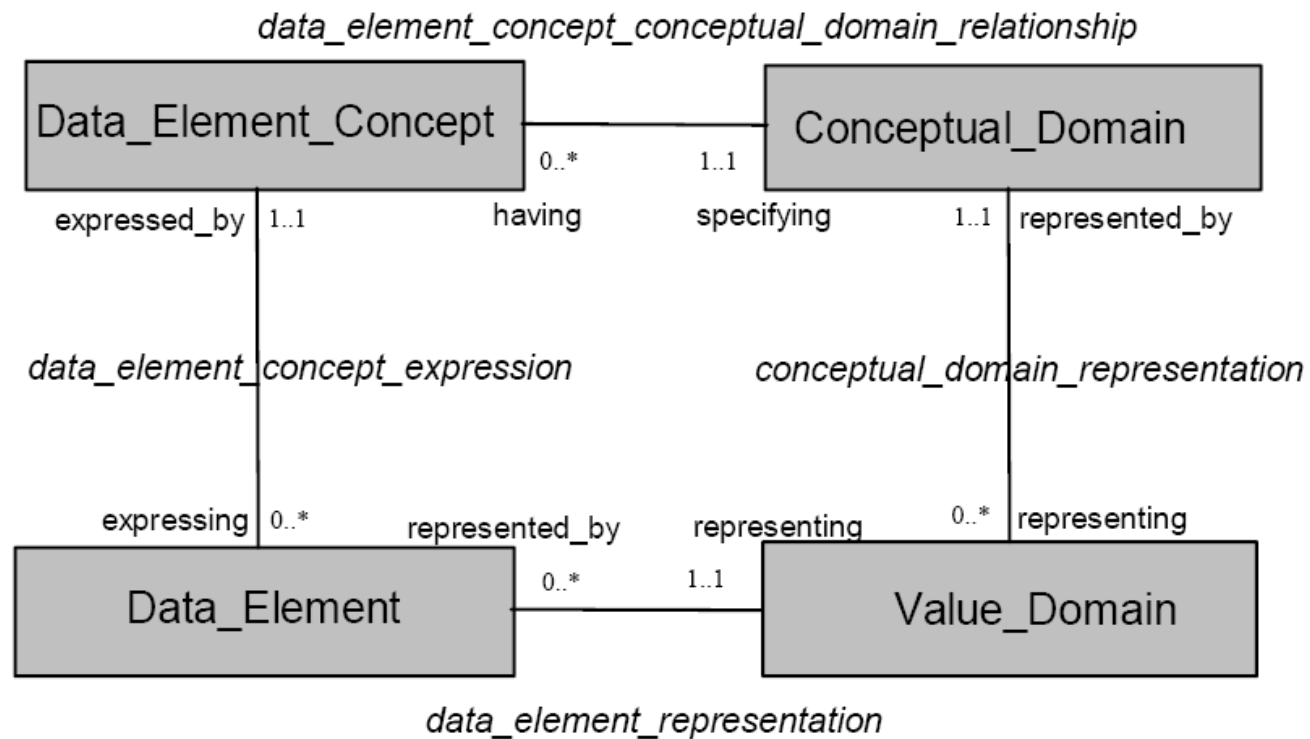
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High-level metamodel of ISO/IEC 11179

- ❖ High-level overview of the central regions of the metamodel



Spec.