
Status report of 20943-6: Framework for generating ontologies

**ISO/IEC JTC 1/SC 32/WG 2 Interim Meeting,
Redwood City, USA, November 17, 2010**

Dongwon Jeong, Kunsan National University
djeong@kunsan.ac.kr

Doo-Kwon Baik and Sukhoon Lee, Korea University
baikdk@korea.ac.kr , leha82@korea.ac.kr

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Discussion History

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

- ✓ SC32 Joint Study Period, Clearwater, Florida, USA, January 2007
- ✓ SC 32 Plenary and WG Meetings, New York, USA, May 2007
- ✓ SC 32/WG 2 Interim, Seoul, Korea, December 2007
- ✓ SC 32 Plenary and WG Meetings, Australia, May 2008
- ✓ SC 32/WG 2: Workshop on ROR-ODMS-SMMP Study Periods, Wuhan, China, November 2008
- ✓ SC 32/WG 2 Interim, Portugal, November 2008
- ✓ SC 32 Plenary and WG Meetings, Jeju, Korea, June 2009
- ✓ SC 32/WG 2: Wuhan Study Period Meeting on ROR, ODMS, PSO, SQL/MM-8 MDR, Wuhan, China, August 2009
- ✓ SC 32/WG 2 Interim, London, UK, November 2009

Discussion History (cont.)

- ❖ The idea of this proposal has been presented in the following meetings
 - ✓ SC 32 Plenary and WG Meetings, Kunming, China, May 2010
 - 32N2030-WG2N1434a-issues_for_20943-6_FBO_2010-05.pptx
 - **The project name was changed**
: FBO to FGO (Framework for Generating Ontologies based on 11179-3 Ed. 3)
 - ✓ SC 32/WG 2: Wuhan Study Period Meeting on Ontology-Metamodeling and Semantic Interoperability in Cloud Era, Wuhan, China, August 2010
 - Introduction to ISO/IEC 20943-6: Framework for Generating Ontologies

Motivation

- ❖ **Semantic Web became popular and recognized as an extension of the World Wide Web**
 - ✓ For realizing the Semantic Web, various methods and technologies are required
 - ✓ One of the most important things is ontology building
- ❖ **An ontology**
 - ✓ is an explicit specification of conceptualization and shared vocabulary to model a domain
- ❖ **ISO/IEC 11179 - Metadata registries (MDR)**
 - ✓ addresses the semantics of data, the representation of data, and the registration of the descriptions of that data
 - ✓ MDR provides a good introduction to metadata concepts, including a lot of insight into certain aspects of the granularity of metadata
- ❖ **Therefore, we apply these common concepts defined in MDR for generating ontologies**

Purpose and Scope

❖ This part of ISO/IEC 20943

- ✓ provides a standardized method to generate ontologies using resources in MDRs
- ✓ specifies procedures for generating ontologies and a mapping model between components of MDR and Ontology
- ✓ facilitates usability of ISO/IEC 11179

❖ The purpose of this part are to promote the followings:

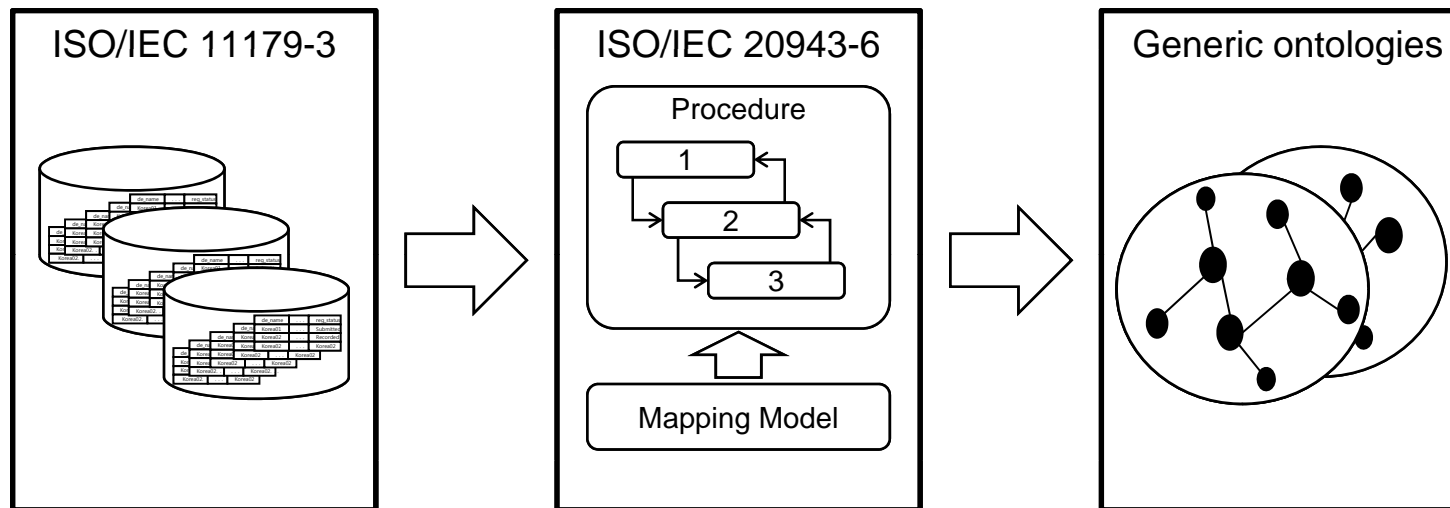
- ✓ Generating ontologies consisting of common concepts
- ✓ Easy and clear understanding of concepts across corresponding the same or similar application fields
- ✓ More formalized building of ontology
- ✓ Ease of definition (building) of ontology
- ✓ Enhancement of interoperability between ontologies

❖ This part does **not contain**

- ✓ ontology building methods by a specific ontology description language, such as RDF, RDF-S, OWL, Topic Maps, KIF, and so on

Framework

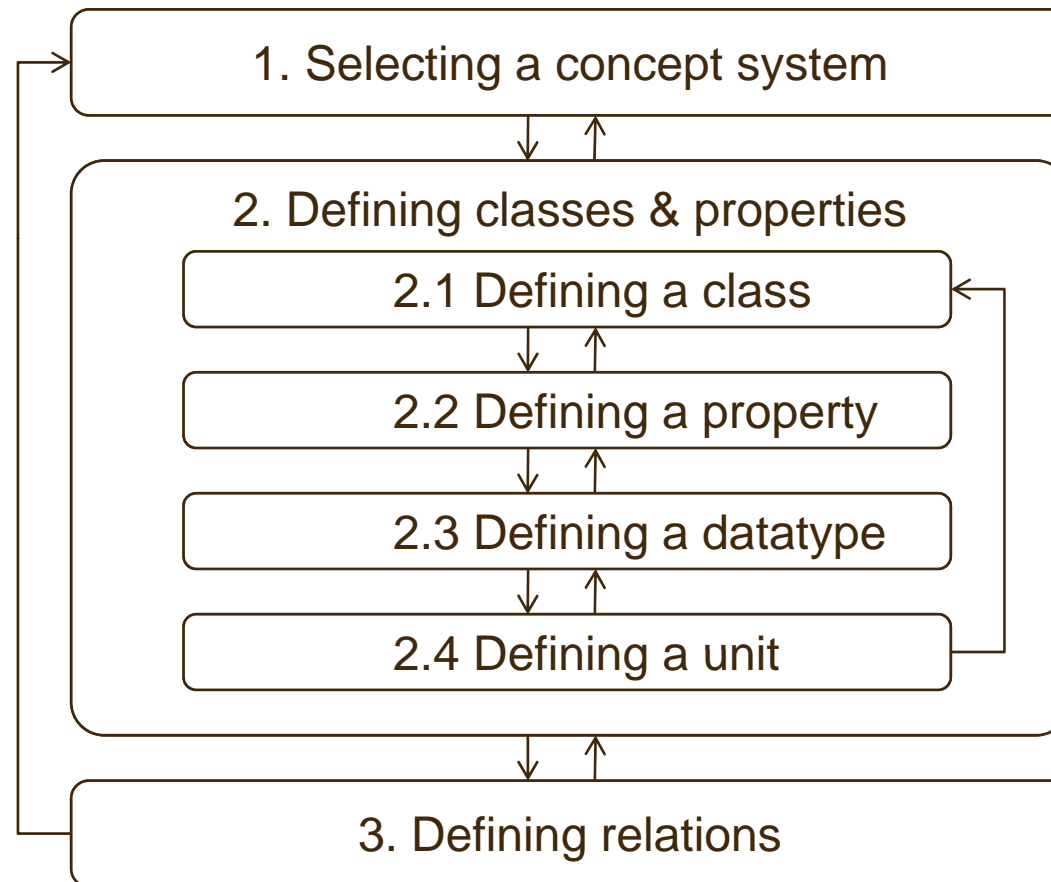
❖ A framework for generating ontologies



- ✓ ISO/IEC 11179-3 Ed.3 is a registry to administer and register metadata and ontologies
- ✓ ISO/IEC 20943-6 refers to common concepts of ISO/IEC 11179-3 for generating general ontologies
- ✓ Generic ontologies mean generated ontologies using a procedure and a mapping model defined in this part.

Procedure

❖ Procedure for generating ontologies



Common Components of Ontology

- Ref.: Wikipedia, [http://en.wikipedia.org/wiki/Ontology_\(information_science\)](http://en.wikipedia.org/wiki/Ontology_(information_science))

❖ Common components of ontologies include:

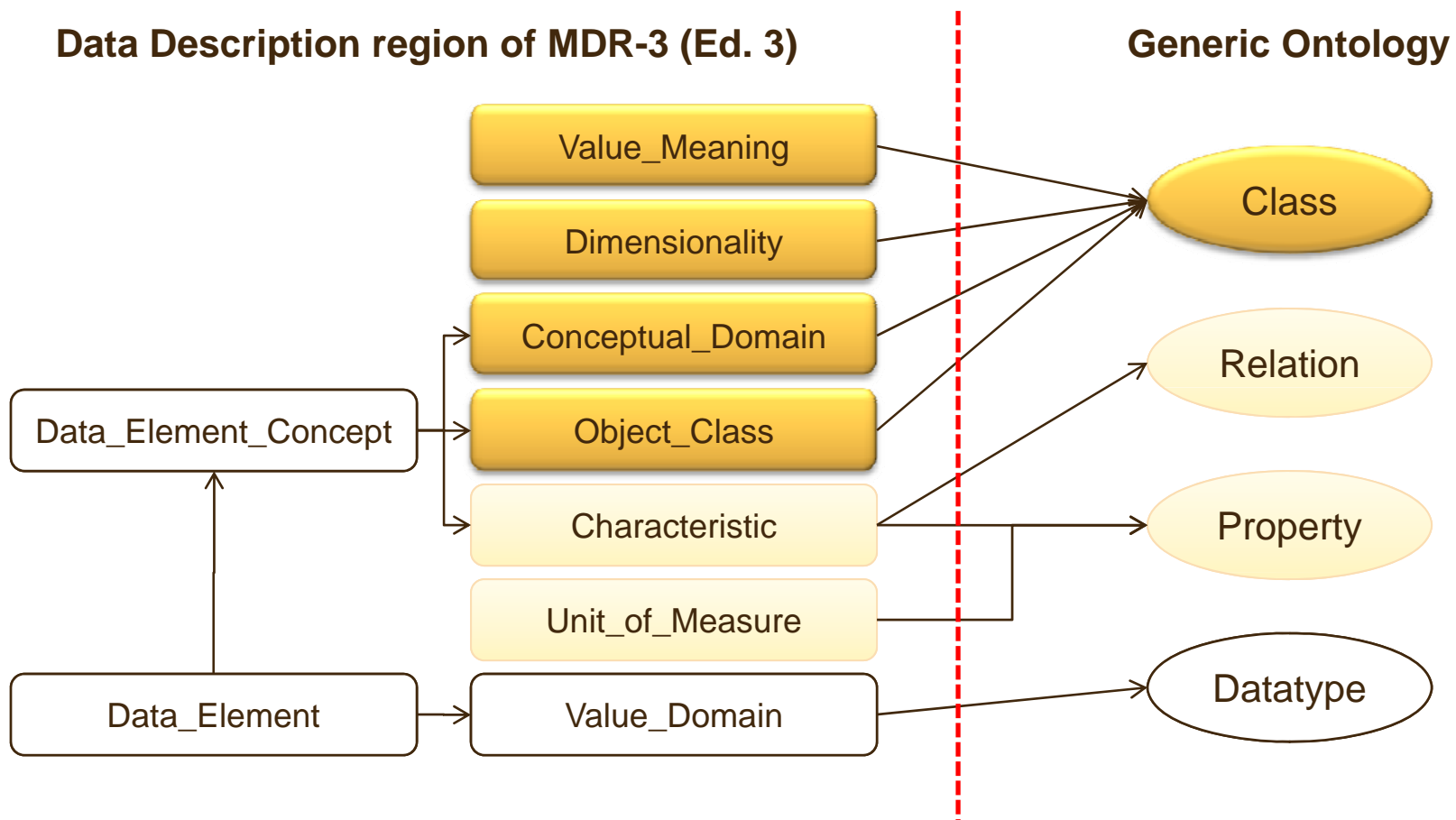
- ✓ **Individuals**: instances or objects (the basic or "ground level" objects)
- ✓ **Classes**: sets, collections, concepts, classes in programming, types of objects, or kinds of things.
- ✓ **Attributes**: aspects, **properties**, features, characteristics, or parameters that objects (and classes) can have
- ✓ **Relations**: ways in which classes and individuals can be related to one another
- ✓ **Axioms**: assertions (including rules) in a logical form that together comprise the overall theory that the ontology describes in its domain of application
- ✓ **Function terms**: complex structures formed from certain relations that can be used in place of an individual term in a statement
- ✓ **Restrictions**: formally stated descriptions of what must be true in order for some assertion to be accepted as input
- ✓ **Rules**: statements in the form of an if-then (antecedent-consequent) sentence that describe the logical inferences that can be drawn from an assertion in a particular form
- ✓ **Events**: the changing of attributes or relations

Ontology in this Part

- ❖ **This part considers ontologies consisting of**
 - ✓ concepts,
 - ✓ properties,
 - ✓ and relations

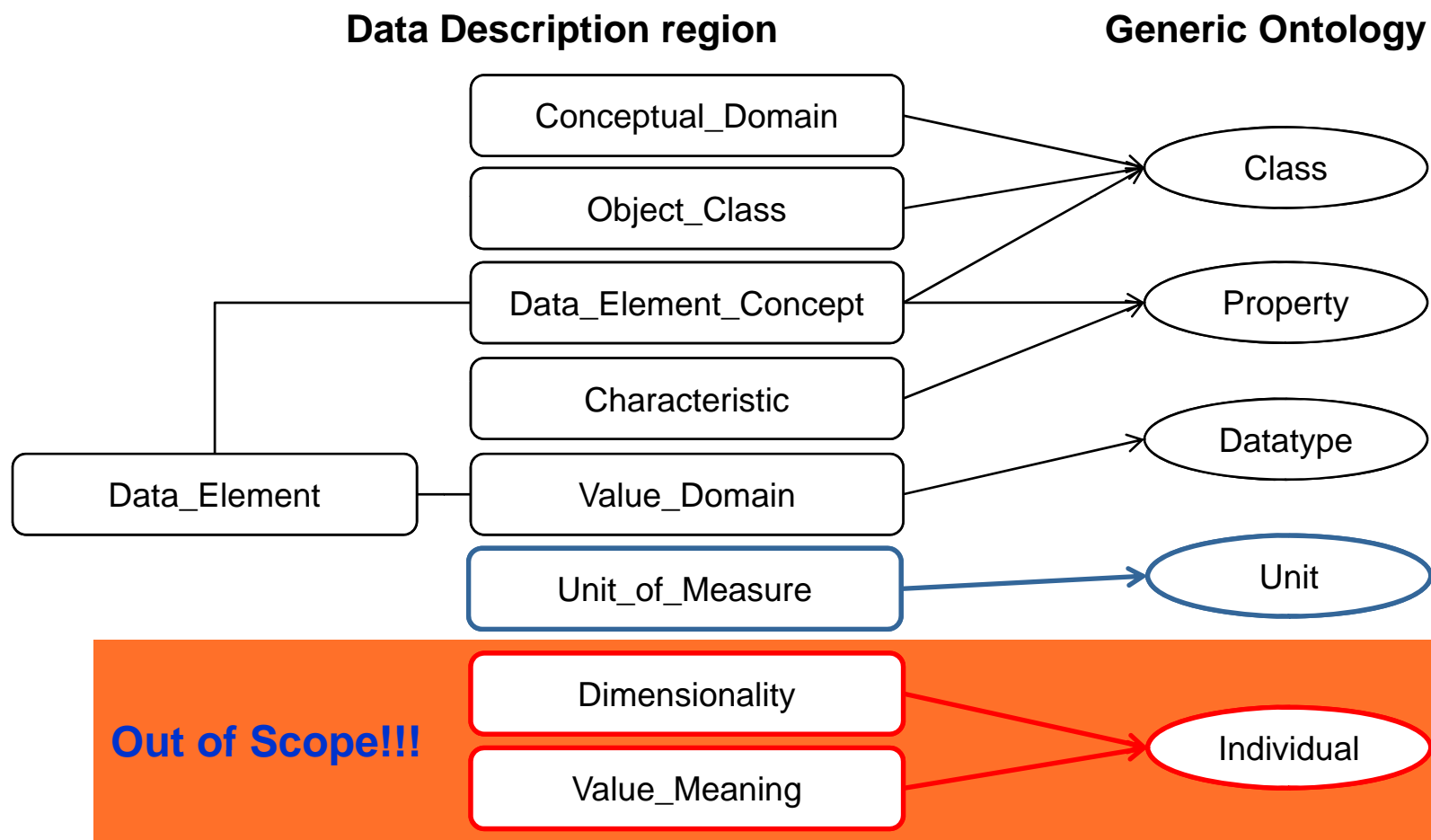
Mapping Model

❖ Mapping model presented at the Kunming meeting



Mapping Model (cont.)

- ❖ Mapping model changed with comments from the Kunming meeting



Mapping Model (cont.)

❖ Changes description

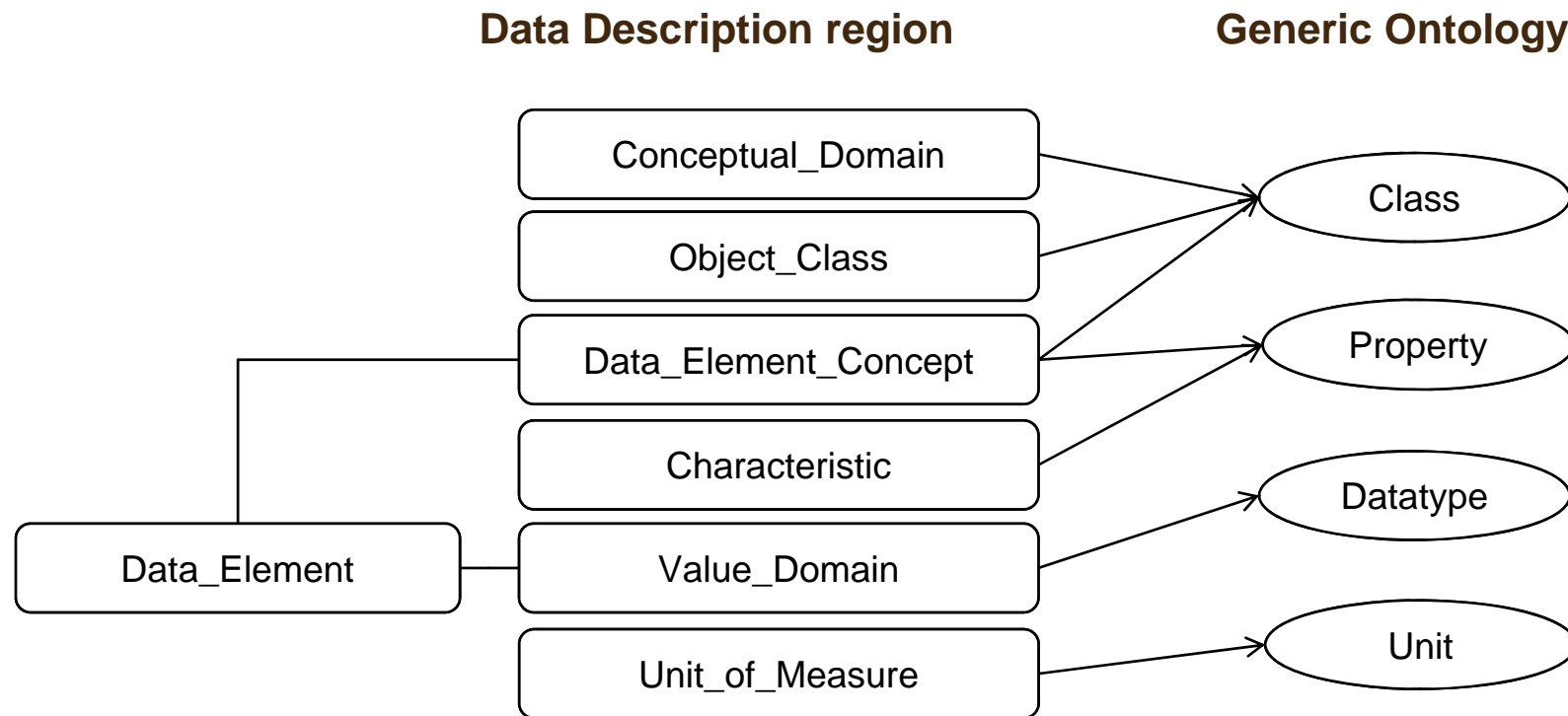
- ✓ Unit of Measure
 - No concepts of 'Unit' in most of ontology languages
 - Alternative methods for expression of 'Unit' in Researches
 - Unit of Measure → Unit

- ✓ Dimensionality
 - Dimensionality → Individual (by Horiuchi from Japan)
 - Eliminated 'Dimensionality' from the mapping model because this part only focuses on ontology schema

- ✓ Value Meaning
 - Value Meaning → Individual (by Kevin from USA)
 - Eliminated 'Value Meaning' from the mapping model because of the above same reason

Mapping Model (cont.)

❖ Revised mapping model



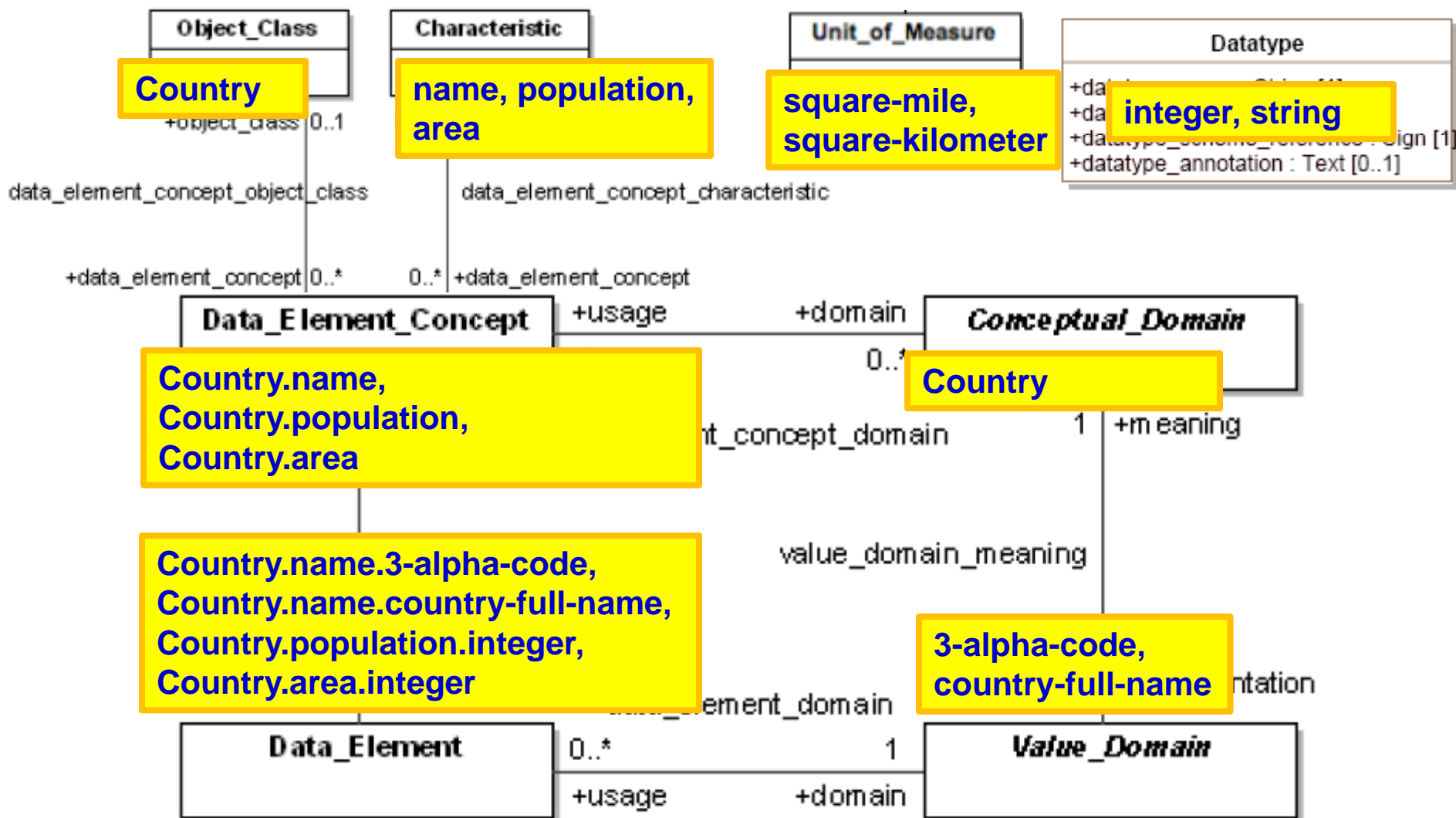
Examples: MDR

- ❖ **CD = {Country}**
- ❖ **OC = {Country}**
- ❖ **Characteristic = {name, population, area}**
- ❖ **VD = {3-alpha-code, country-full-name}**
- ❖ **UoM = {square-mile, square-kilometer}**
- ❖ **DT = {integer, string}**

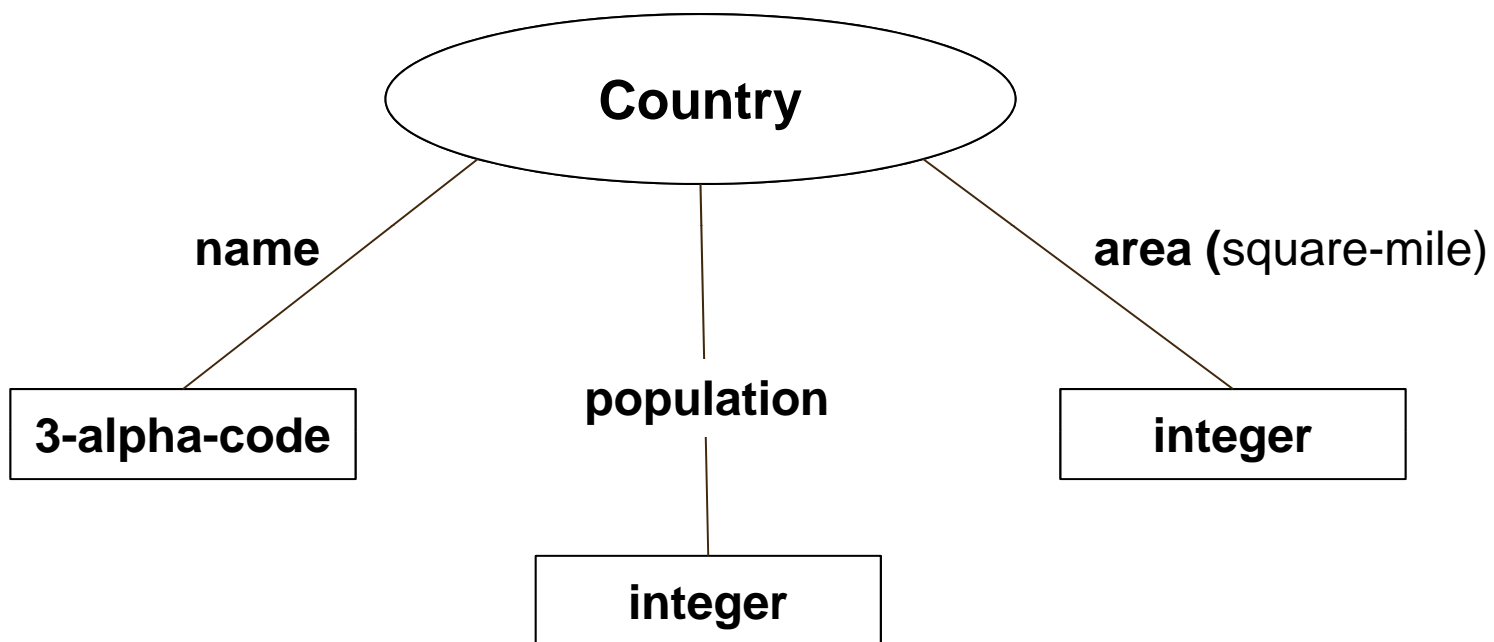
- ❖ **DEC = {Country.name, Country.population, Country.area}**
- ❖ **DE = {Country.name.3-alpha-code, Country.name.country-full-name, Country.population.integer, Country.area.integer}**

※UoM: Unit of Measure
※DT : Datatype

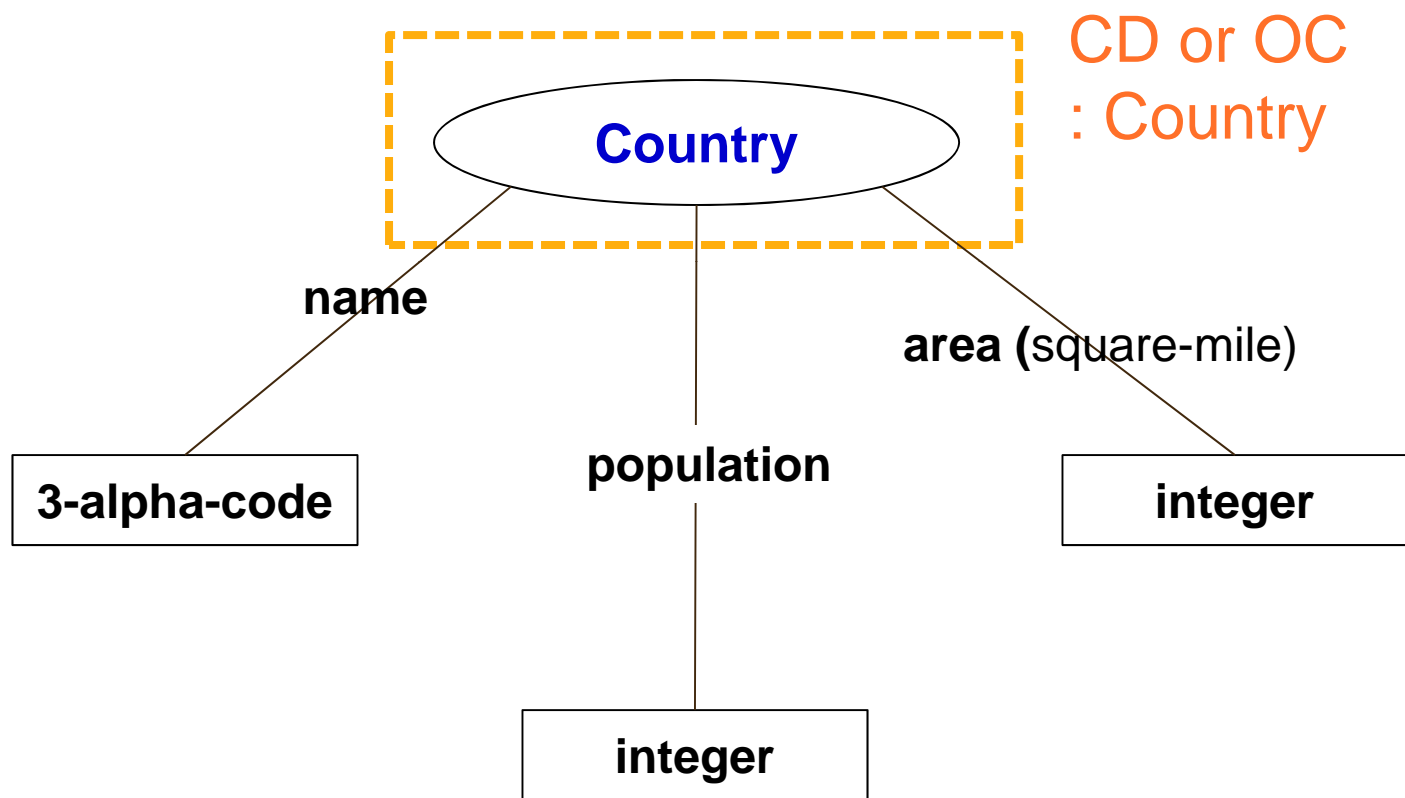
Examples: MDR (cont.)



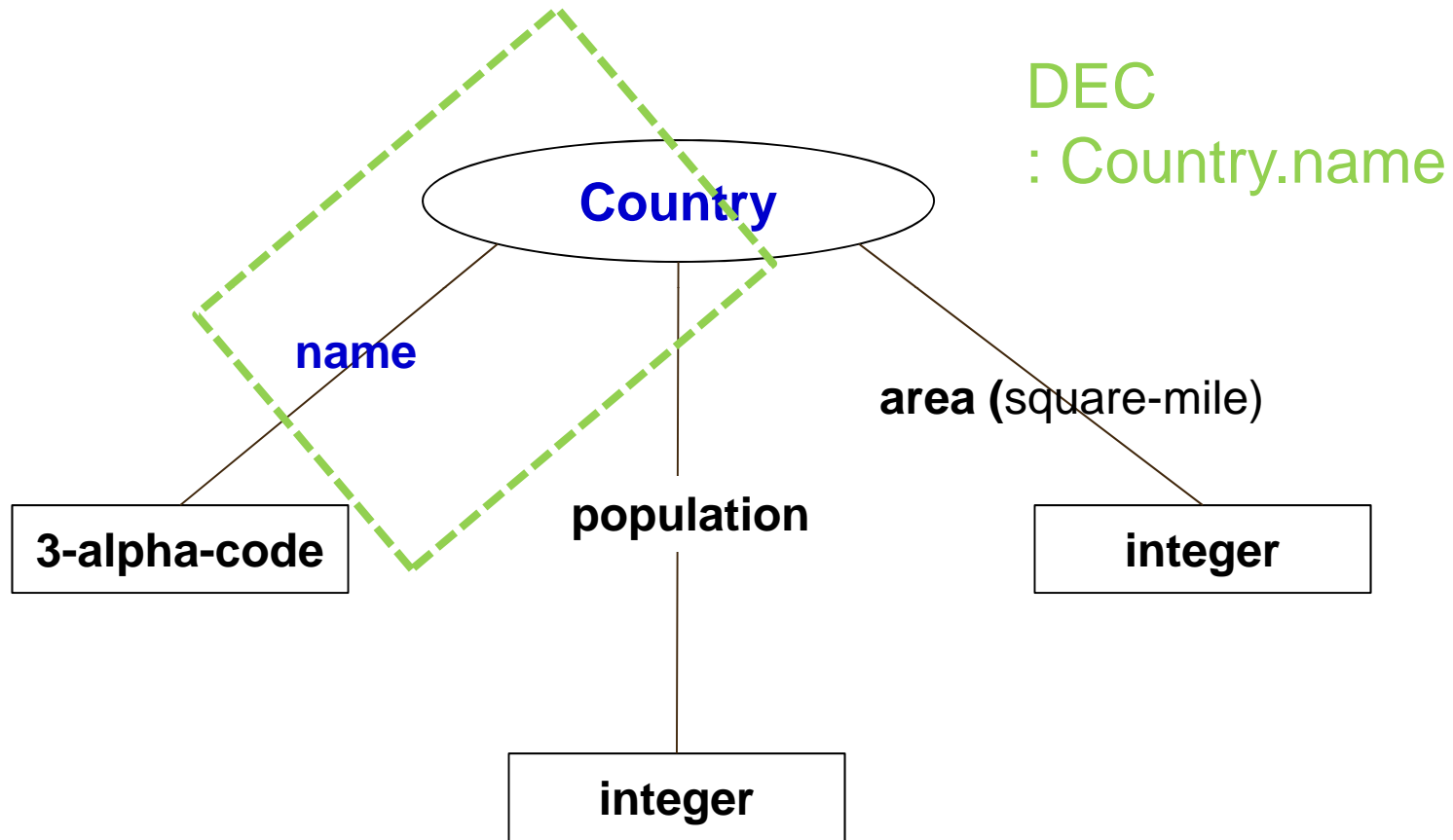
Examples: Ontology



Examples: Mapping Description

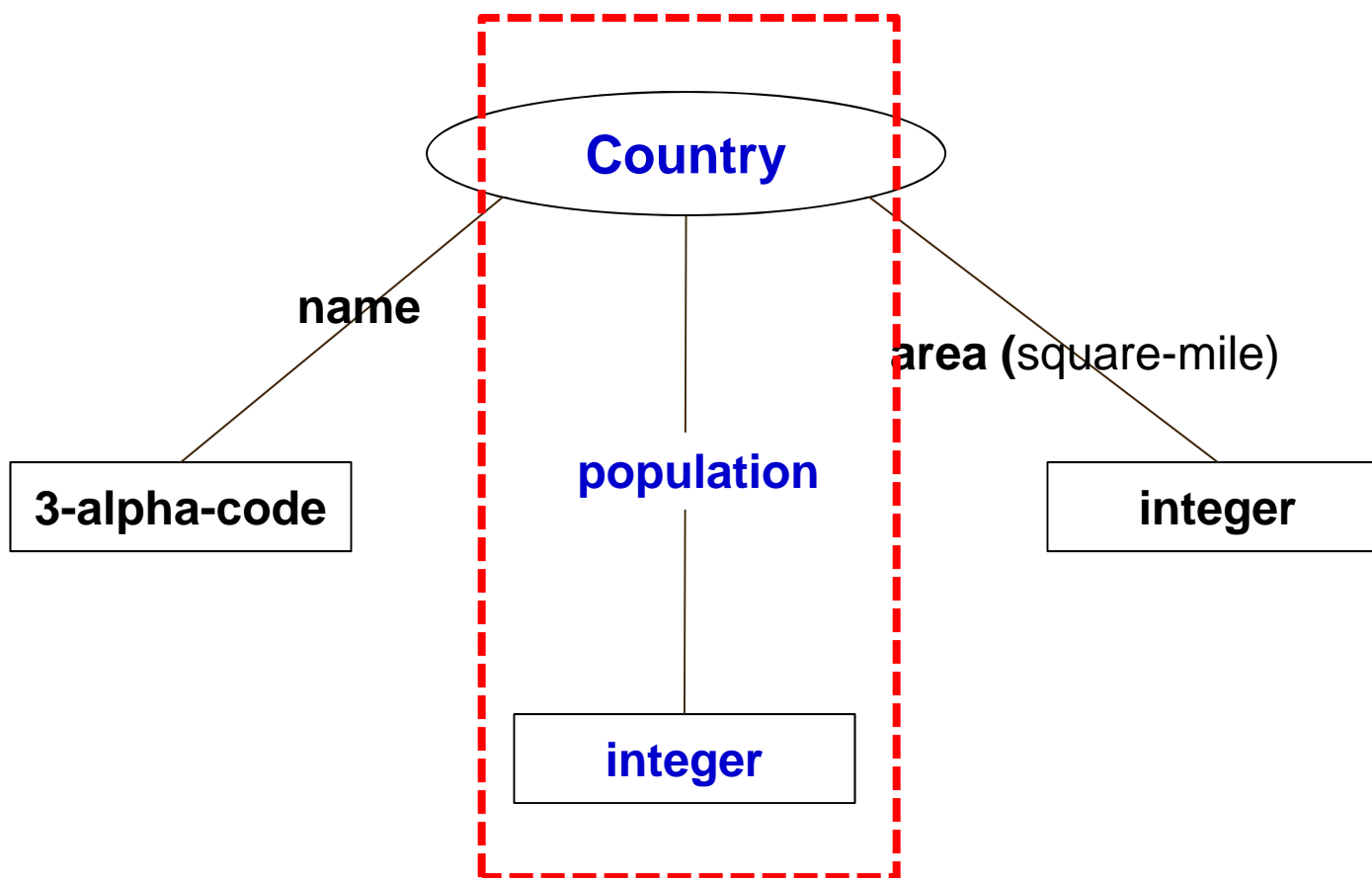


Examples: Mapping Description (cont.)



Examples: Mapping Description (cont.)

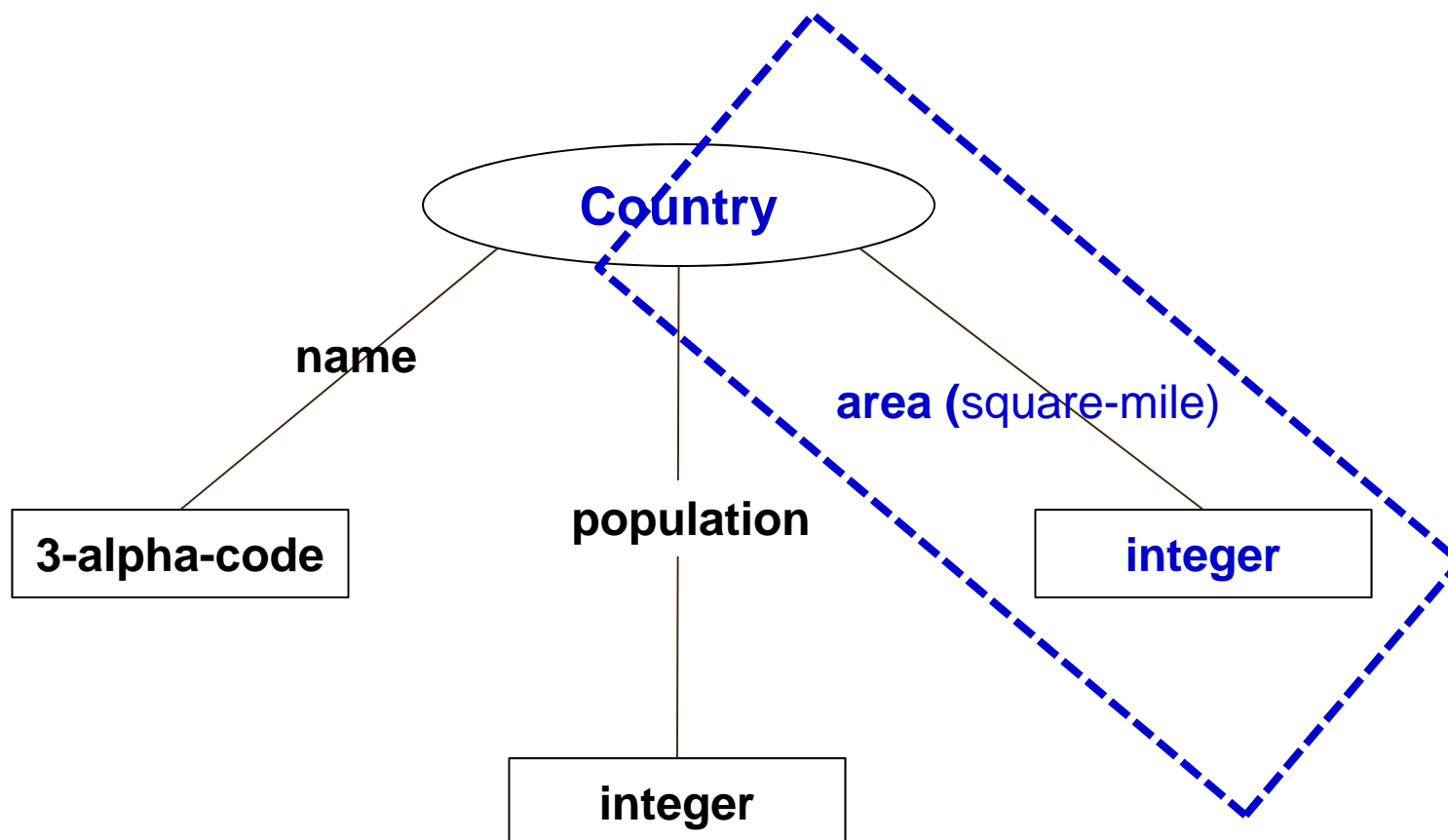
DE: Country.population.integer



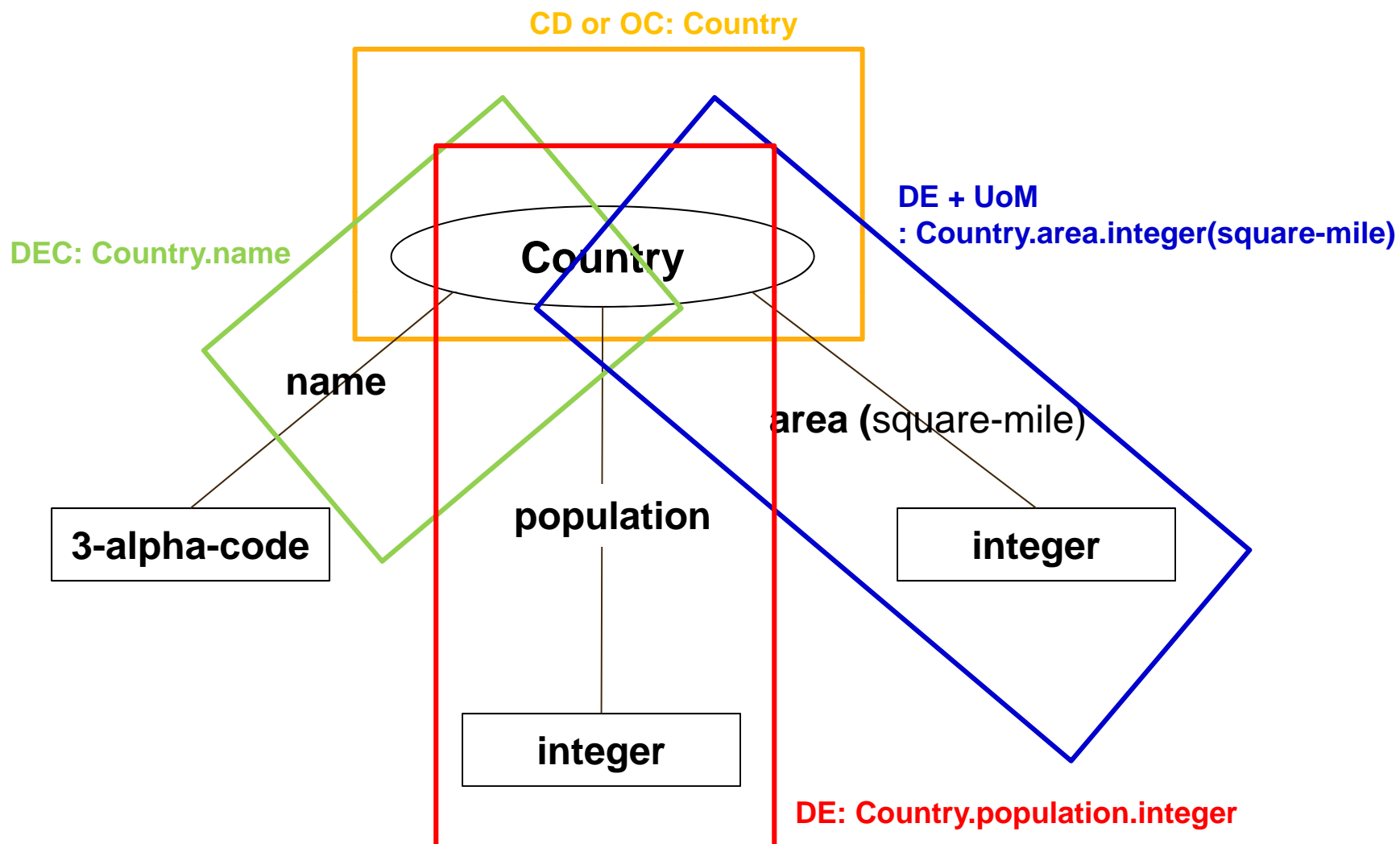
Examples: Mapping Description (cont.)

DE + UoM

: Country.area.integer(square-mile)

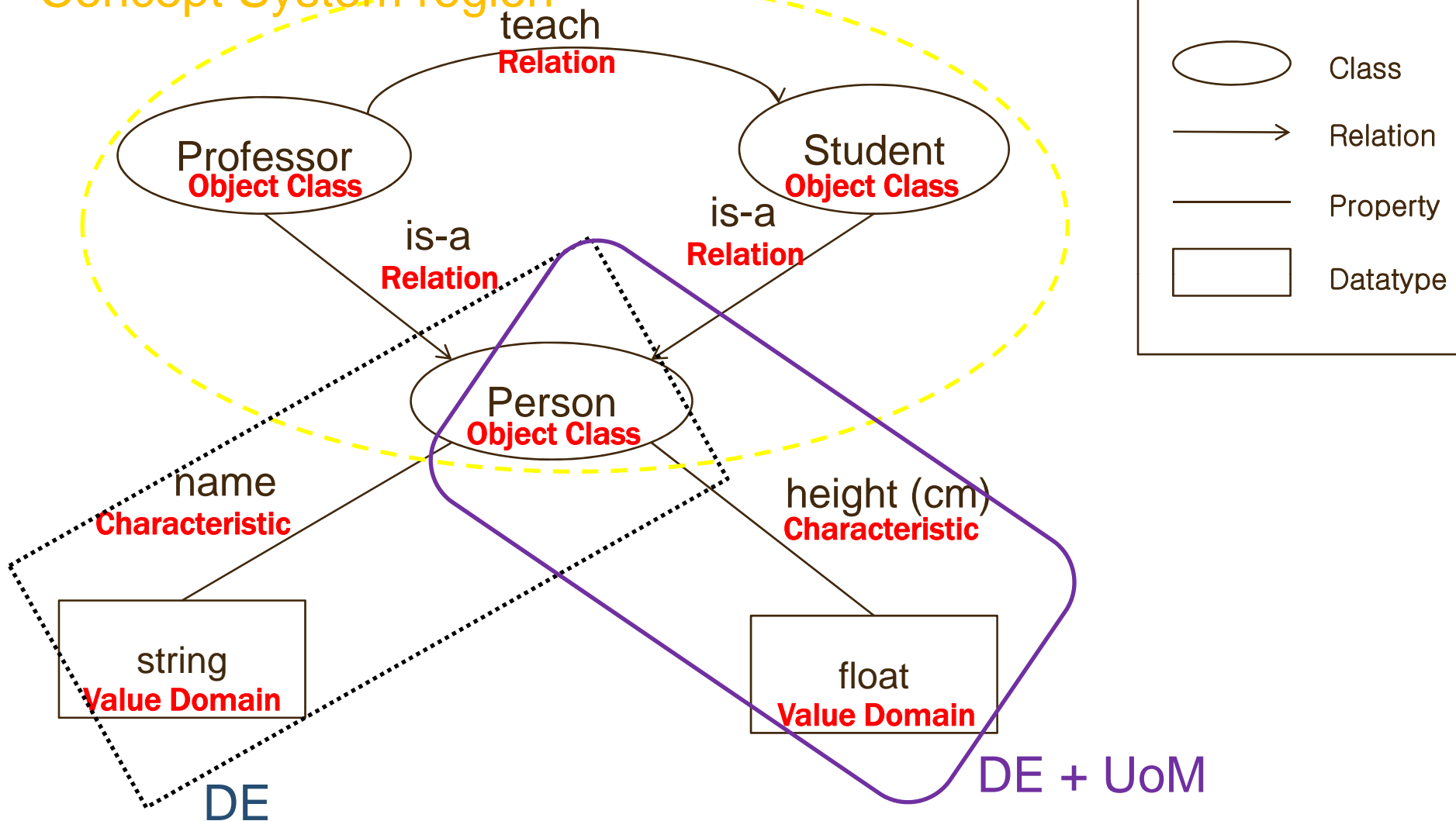


Examples: Mapping Description (cont.)



Examples: Another Example

Concept System region



Changing the Project Title

❖ Current Title

- ✓ Framework for generating ontologies based on ISO/IEC 11179-3 Ed.3

❖ Proposed Title

- ✓ Framework for generating ontologies

Any Other Issues or Comments?



An aerial photograph of a massive waterfall cascading into a large pool of water. A small boat is visible in the pool. The surrounding area includes a paved walkway with people and some greenery.

Thank you for attention!

Doo-Kwon Baik

Korea University, baikdk@korea.ac.kr

Dongwon Jeong

Kunsan Nat'l University, djeong@kunsan.ac.kr