

ISO 11179
CTS2
and
Value Set Binding

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ISO 11179

- Information technology - Metadata registries (MDR)
- Owning group is ISO/IEC JTC 1/SC 32
 - Organization responsible for SQL standard
- Six part standard
 1. Framework
 2. Classification
 - 3. Registry Metamodel and basic attributes**
 4. Formulation of data definition
 5. Naming and Identification Principles
 6. Registration

ISO 11179-3 Edition 3

- First edition published 1994
- Second edition 2004
- Edition 3 is FDIS
- One of the goals of edition 3 is to fill out the “upper right hand corner” to describe how ontology/terminology aligns with data models

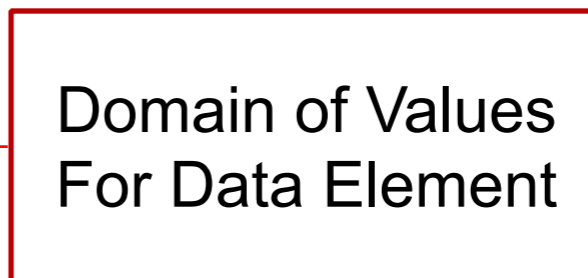
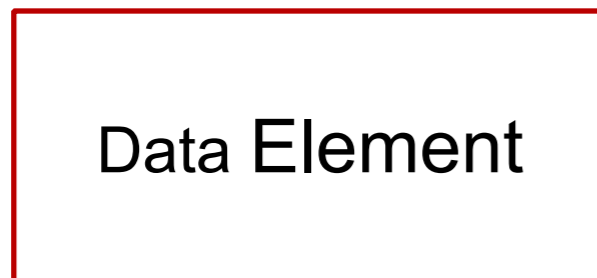
ISO 11179 Part 3

Registry metamodel and basic attributes

- A *metadata* registry — “data that describes data”
 - Includes provenance, work flow, ownership update frequency, intended use, *intended meaning*
- The *intended meaning* (conceptual area) and accompanying model is of particular interest

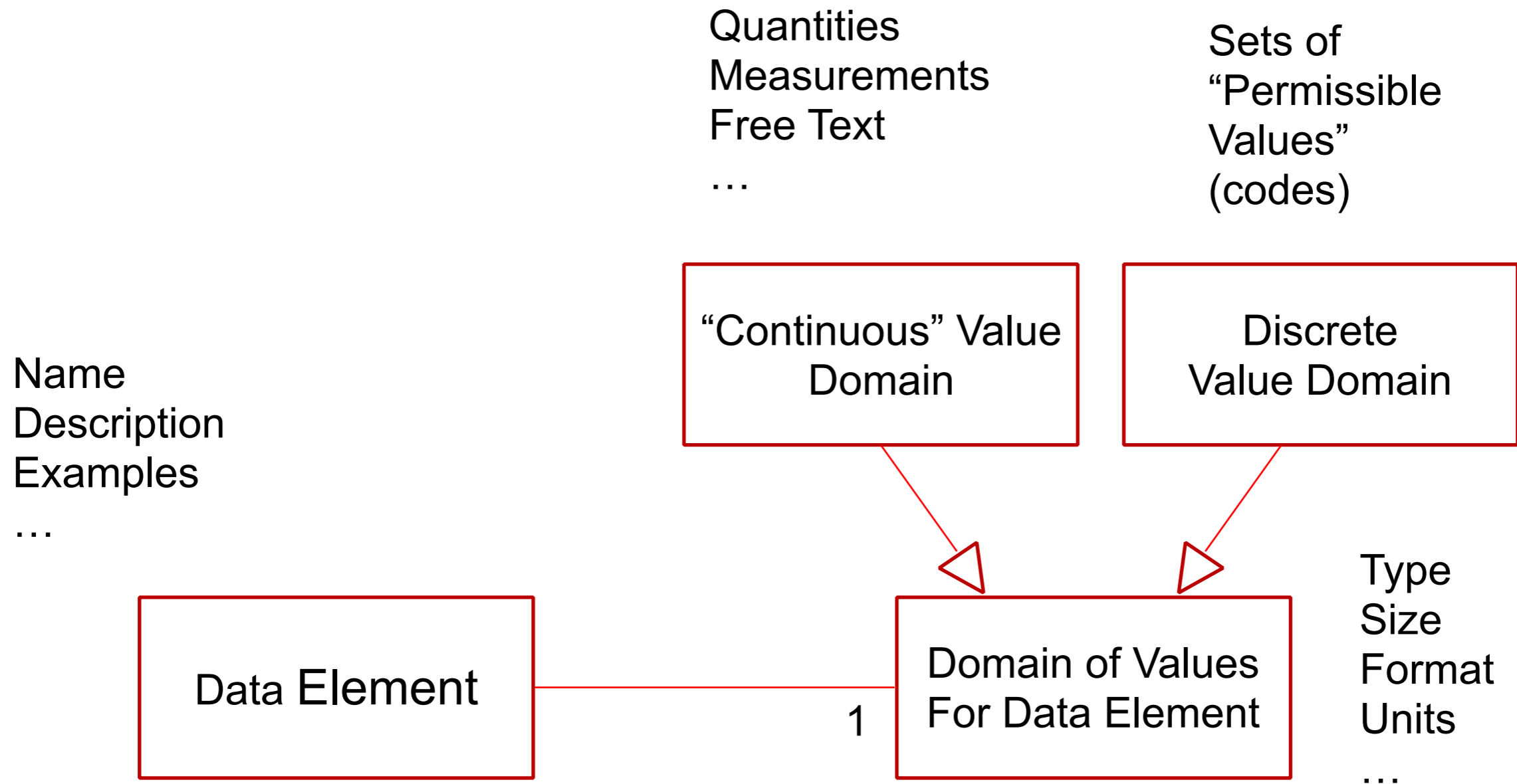
Describing Data

Name
Description
Examples
...

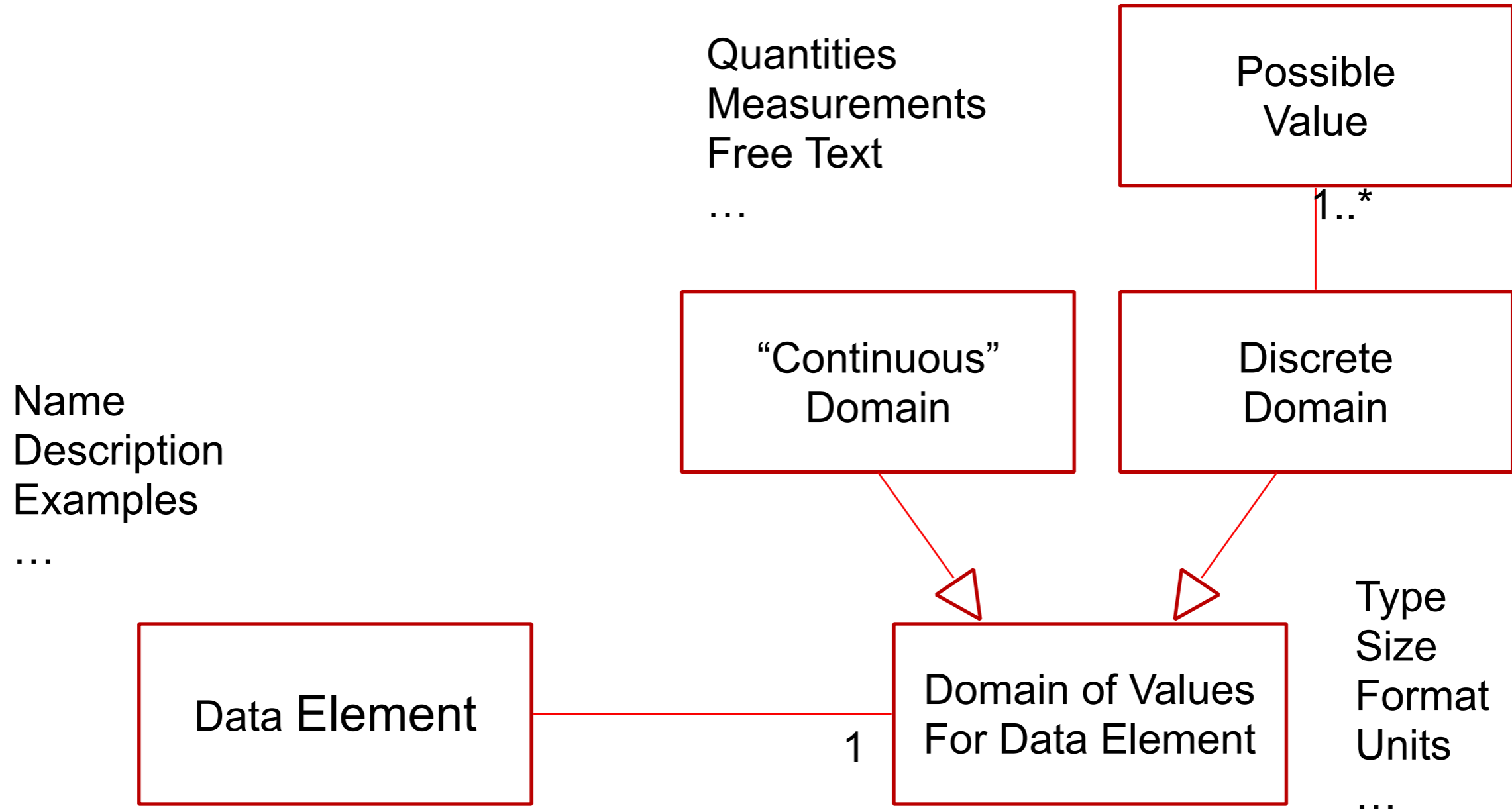


Type
Size
Format
Units
...

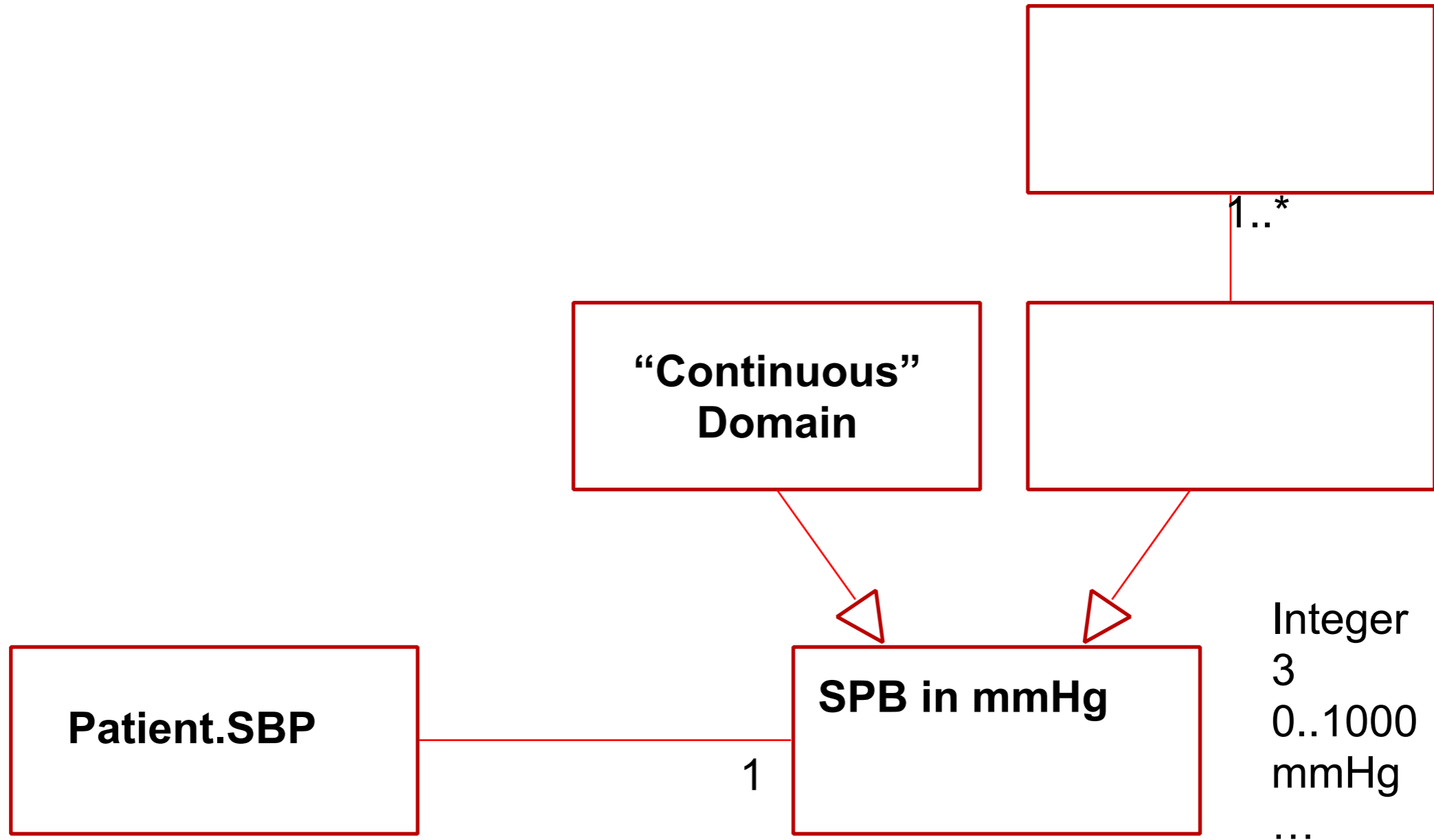
Describing Data



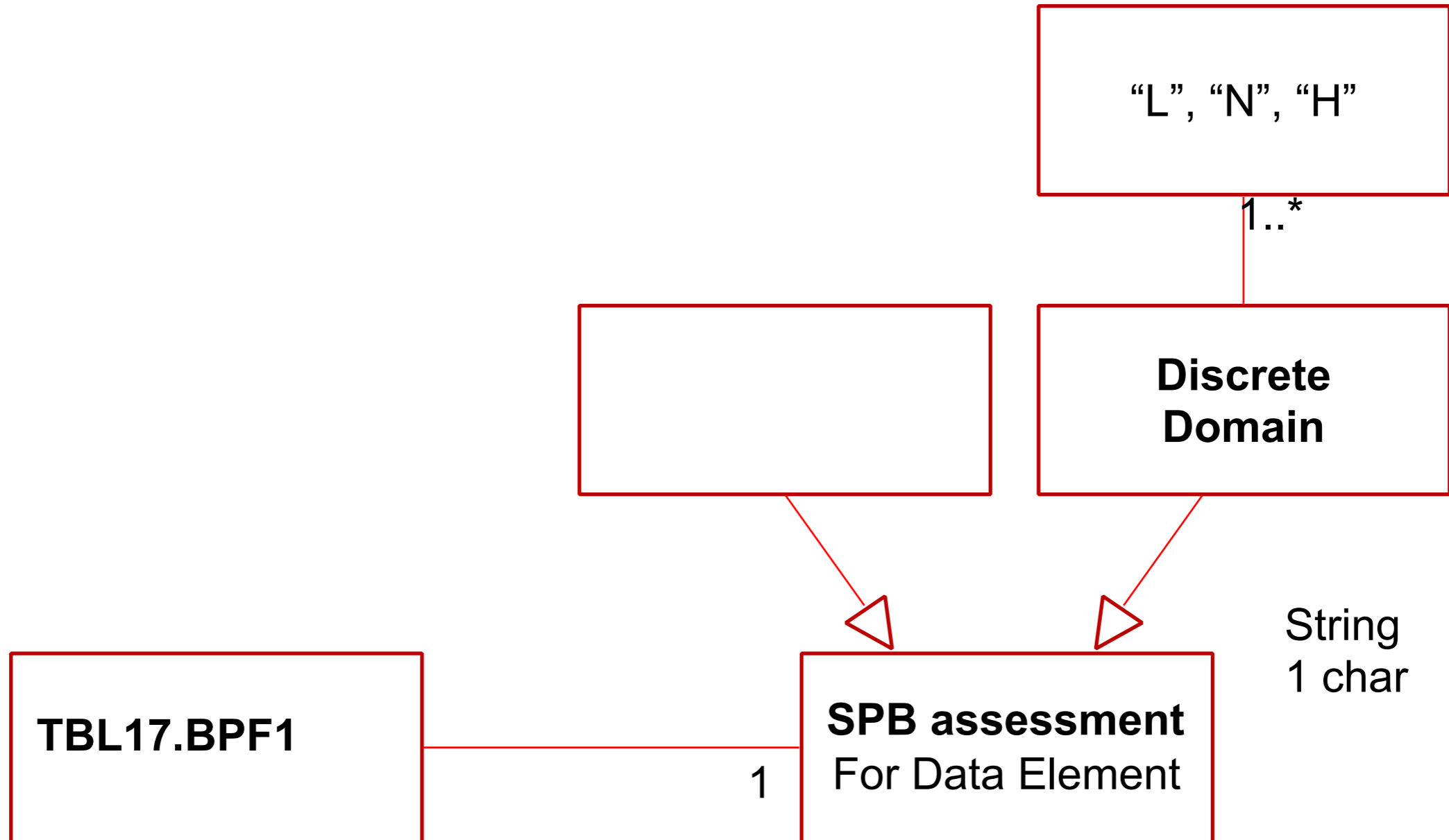
Describing Data



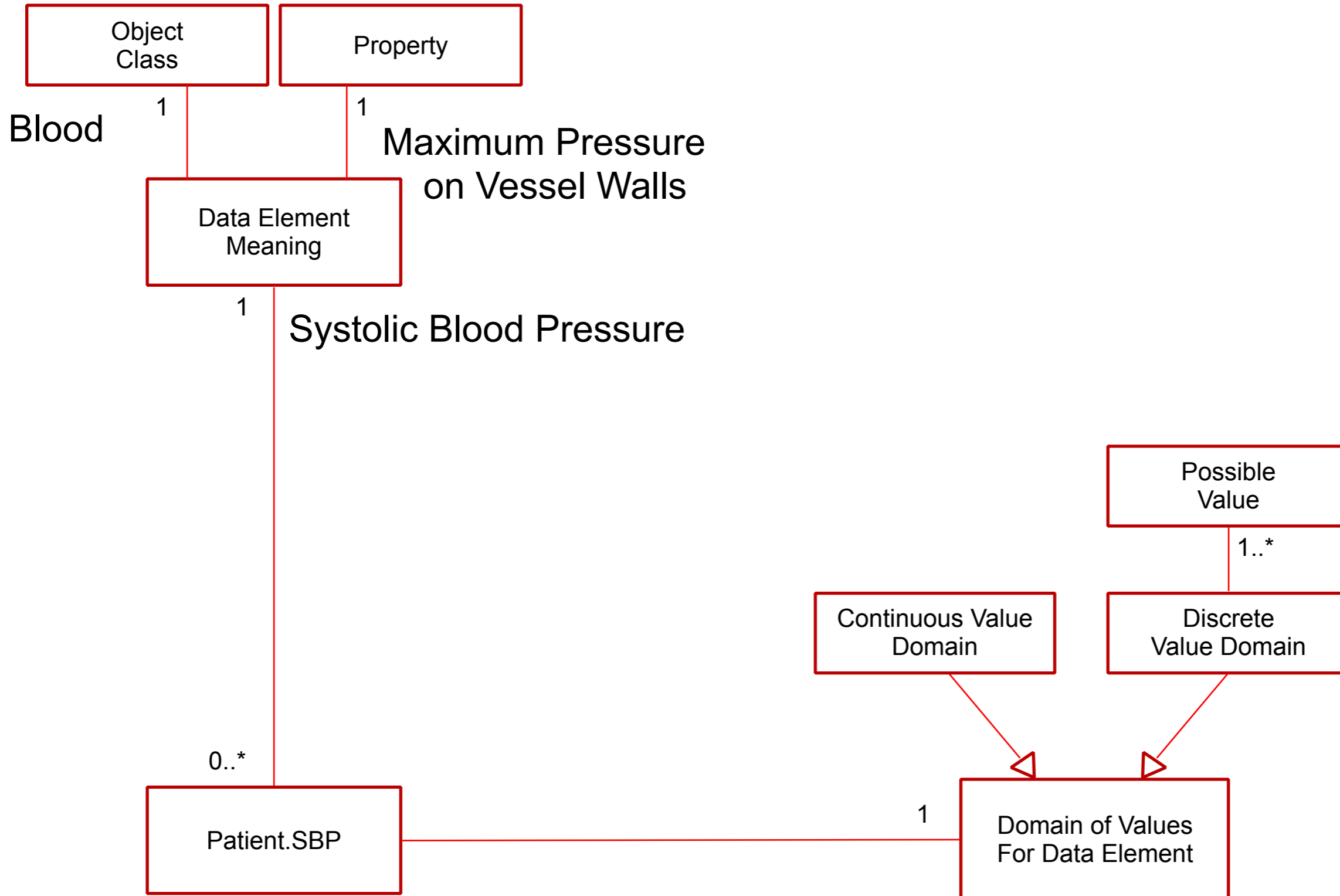
Describing Data Example 1



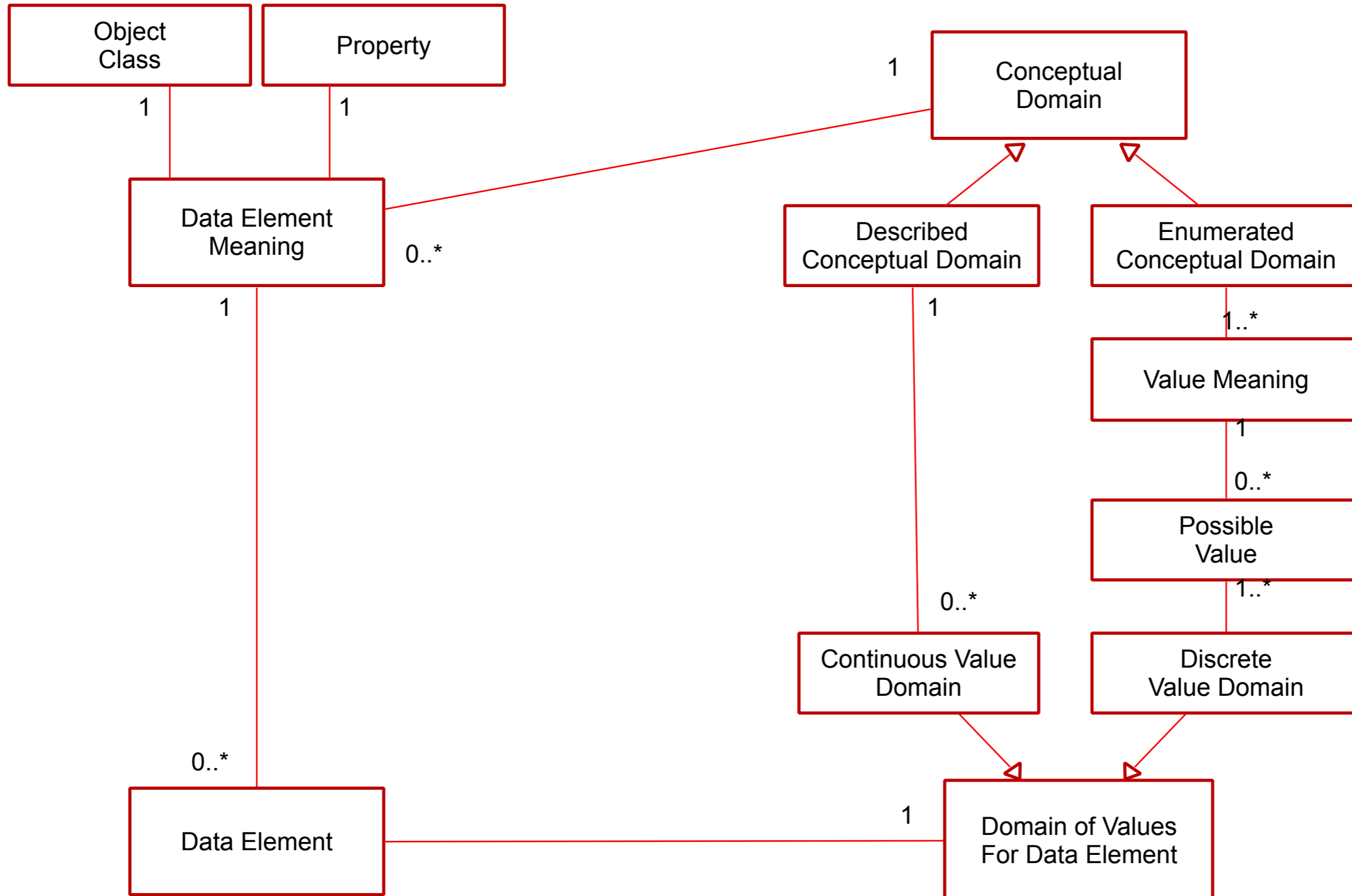
Describing Data Example 2



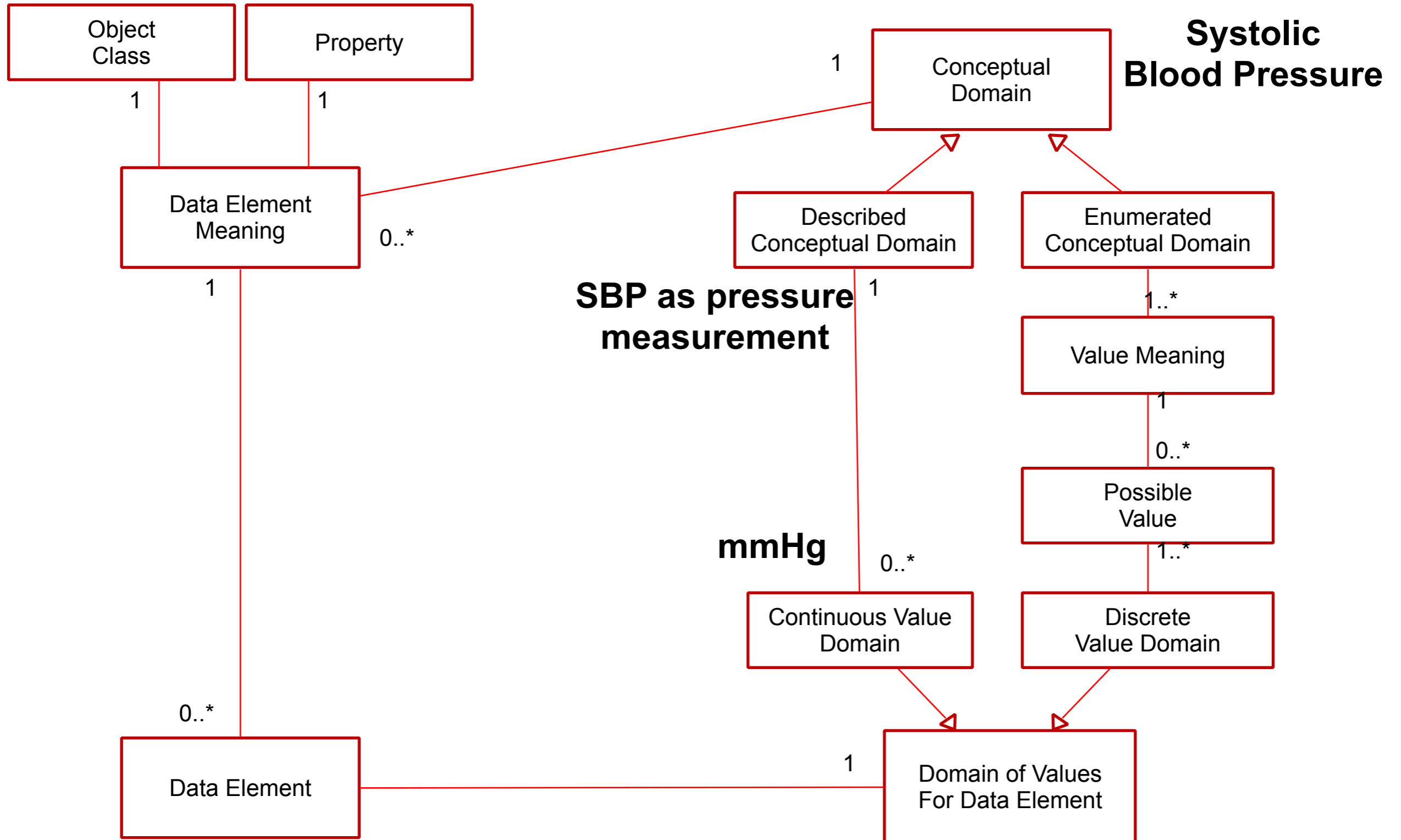
Adding Meaning



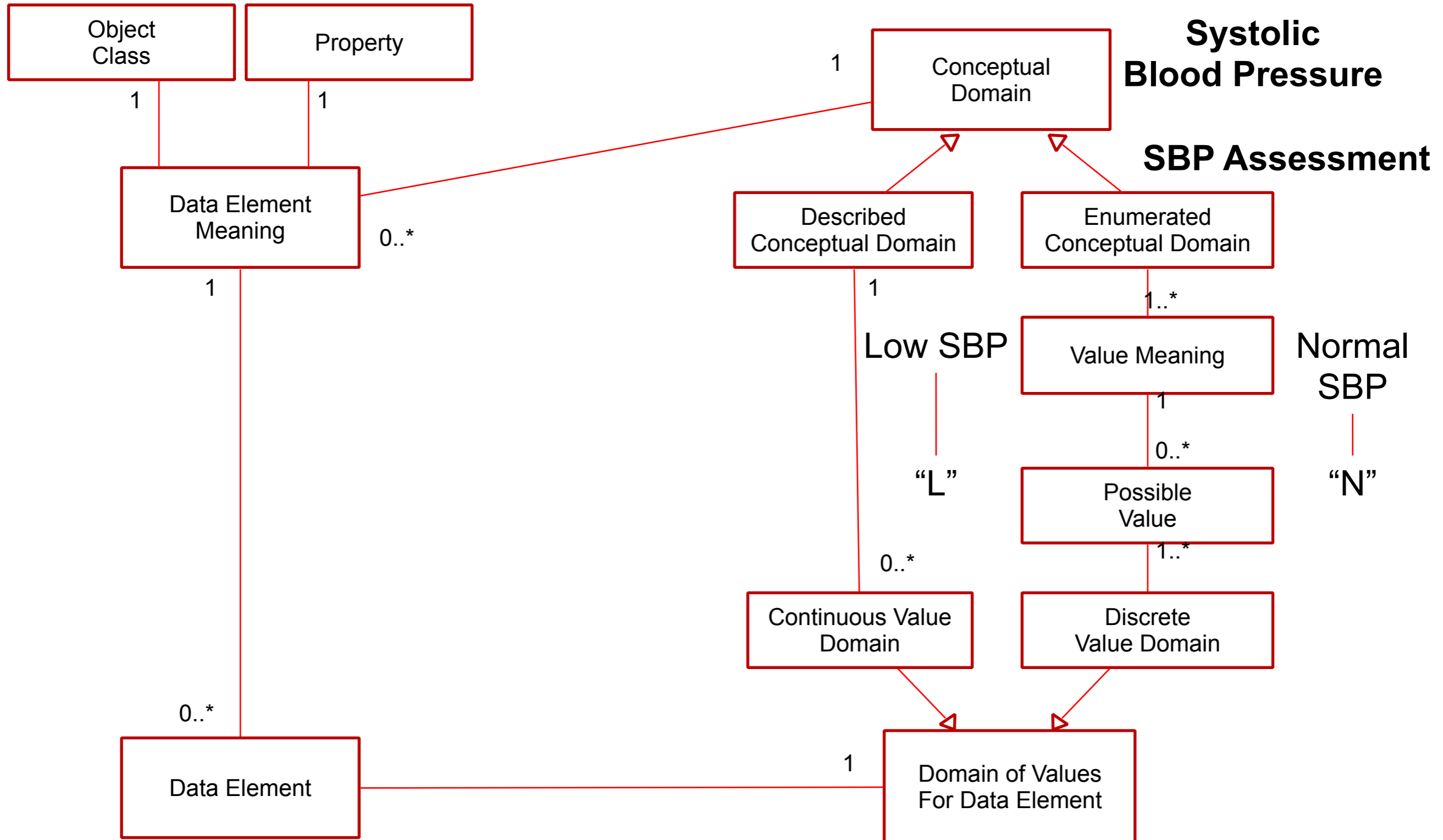
Adding Meaning



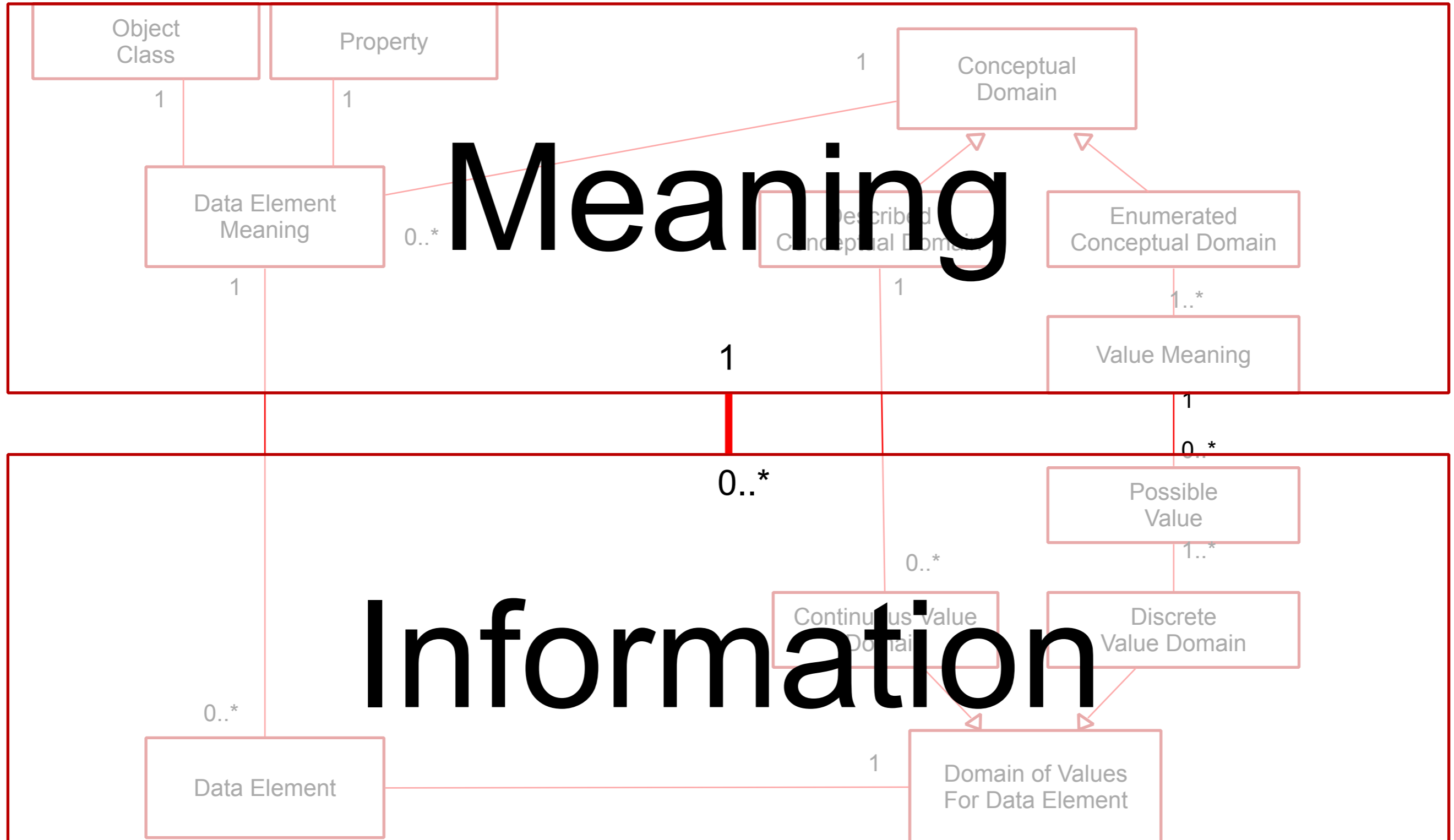
Adding Meaning



Adding Meaning



Information and Meaning



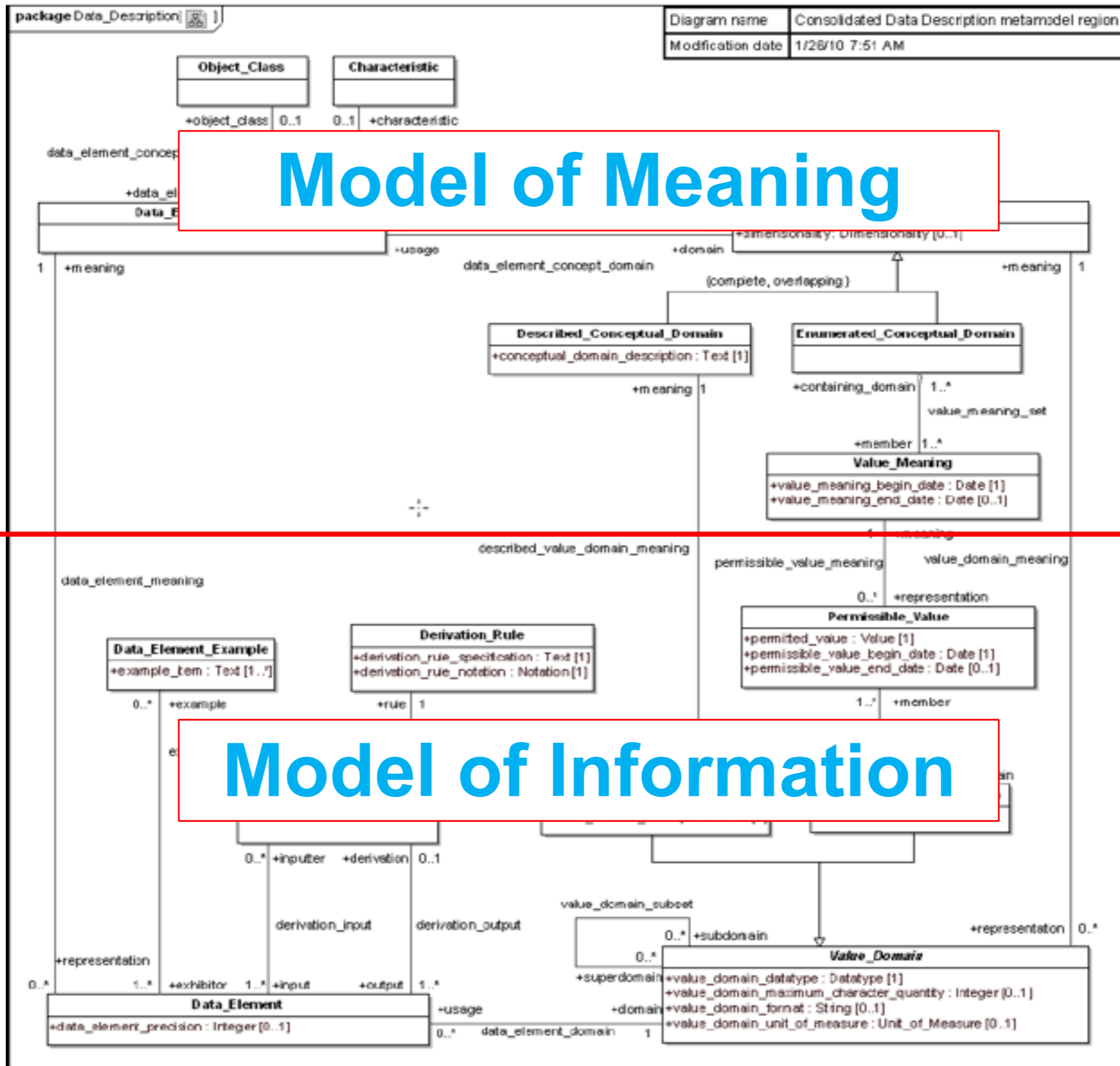


Figure 11-6 — Consolidated Data Description metamodel

Common Misconceptions about 11179

11179 can be used to represent data models

- 11179 specifies a model for representing *metadata*
- It (necessarily) has a model of what the metadata is about...

... but this is not intended to (and cannot) replace UML / XML Schema / DDL / ER Diagrams, etc.

Common Misconceptions about 11179

11179 is no good, because it cannot represent data structures

- 11179 is used to represent *metadata* about *data elements* (“unit of data that is considered in context to be indivisible”)
- 11179 is not a data modeling language

11179 is no good because it doesn't use / cannot represent ISO 21090 data types

- 11179 does not *use* “healthcare-related datatypes suitable for use in a number of health-related information environments” in its descriptions
- 11179 can *describe* data elements of any type

The ISO 11179 standard

- **Standard on a “logical level”**

- UML in model is not part of standard
- No standard representational structure — ISO 11179 implementations are not necessarily interchangeable

- **Excellent thought model**

- Good input even if not directly applicable

- **Using 11179 as a guideline / reference**

- Saves a lot of (re-) work
- Provides a common vocabulary
- Provides a logical starting point for expansion and interchange

CTS2

The “evil standard”



CTS2

Common Terminology Services 2

- Joint OMG/HL7 Standard for Terminology Services
- Created through the HSSP process
 - HL7 created a set of requirements (CTS2 DTSU)
 - OMG *Ontology PSIG* issued RFP
 - OMG evaluated and published specification
 - HL7 ... ?

CTS2

- Standard based on Resource Oriented Architecture and targeted for REST implementation
 - Supports SOAP and POJO, but target is XML/JSON and HTTP
- Designed for federation
 - “HTML for terminology”
 - No need to (re-) implement the entire standard
- Designed for distribution
 - Non-centralized update model based on SVN/GIT
 - Push / Pull updates
 - Update staging

CTS2

Core Principles

A (version of) a code system **describes** “concepts” — it does not **contain** “concepts”

- A realist “stake in the ground” — the thing is not the description
- Acknowledges that descriptions change
 - Different Formats (XML / JSON / RDF)
 - Different Models (CTS2 / SNOMED CT / FHIR (?))
 - Different Versions of descriptions SNOMED CT 20140731 / SNOMED CT 20150131
- Acknowledges that multiple sources can carry (hopefully) complementary descriptions of the same thing (entity, resource)
 - US Edition of SNOMED CT vs. SNOMED CT International vs. BioPortal ...

CTS2

Core Principles (cont)

Terminology is an integral part of the semantic web

- **URI is the primary form of identification**
 - OIDs, DOI's UUID's, **CD**'s are secondary
- RDF and OWL compatibility are mandatory
- Complex representational structures (CD...) add complexity.

CTS2

A joint Object Management Group(OMG) / HL7 standard for:

- Read
- Query
- Interchange
- Federation

of *terminological resources*

CTS2 Resources

- Code System Catalog
- Code System Version Catalog
- Entity Description
- Association
- Value Set Catalog
- Value Set Definition
- Resolved Value Set
- Map Catalog
- Map Version
- Map Entry
- Concept Domain Catalog
- Concept Domain Binding
- Statement

CTS2

Key Points

- HL7 CTS2 DSTU is *not* the CTS2 standard... it is the *requirements* for the standard
- CTS2 is designed to be federated — mix and match
- CTS2 is designed to be extended — “descriptive” not “prescriptive”
- CTS2 and FHIR are remarkably (and not surprisingly) similar
 - Collection of resources
 - “Complex” — a lot of *optional* properties
 - HTTP Signatures w/ SOAP and POJO mapping
 - XML and JSON payloads ... RDF in the wings
 - Canonical RDF for CTS2 may be a bit more difficult, as it needs to take SKOS, OWL, RDF, Dublin Core, Foaf and other standards into account (Can't invent its own URI's)

CTS2

Key Points (cont)

- CTS2 Philosophy — *many* descriptions for the same entity
 - Different versions of the same code system
 - Different code systems
 - Different formats
- Entity ID is *not* description ID
 - <http://<service.org>/cts2/entitybyuri?uri=http://snomed.info/id/74400008> → redirect to appropriate description and format

ISO 11179 / CTS2 and Value Sets

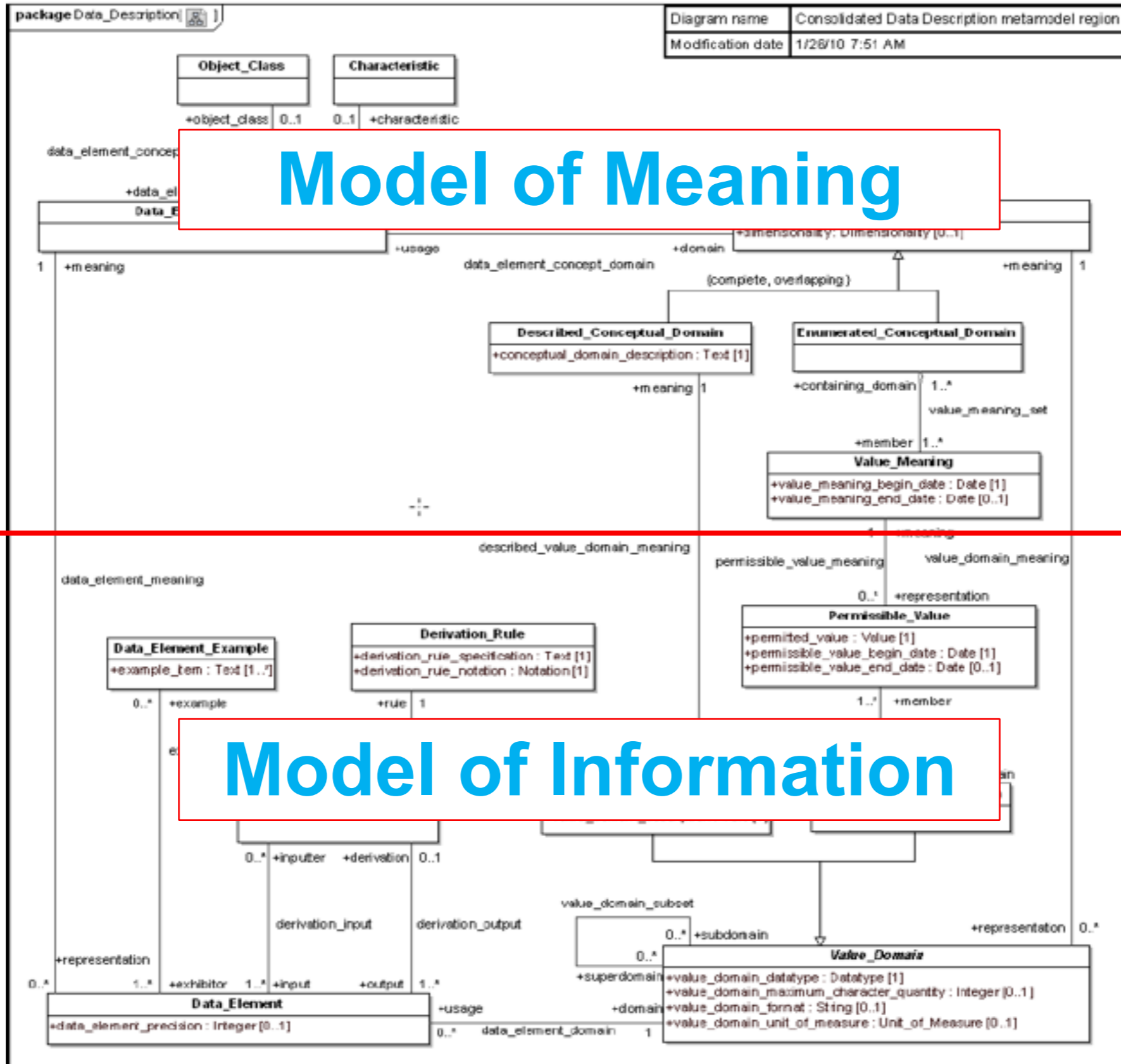
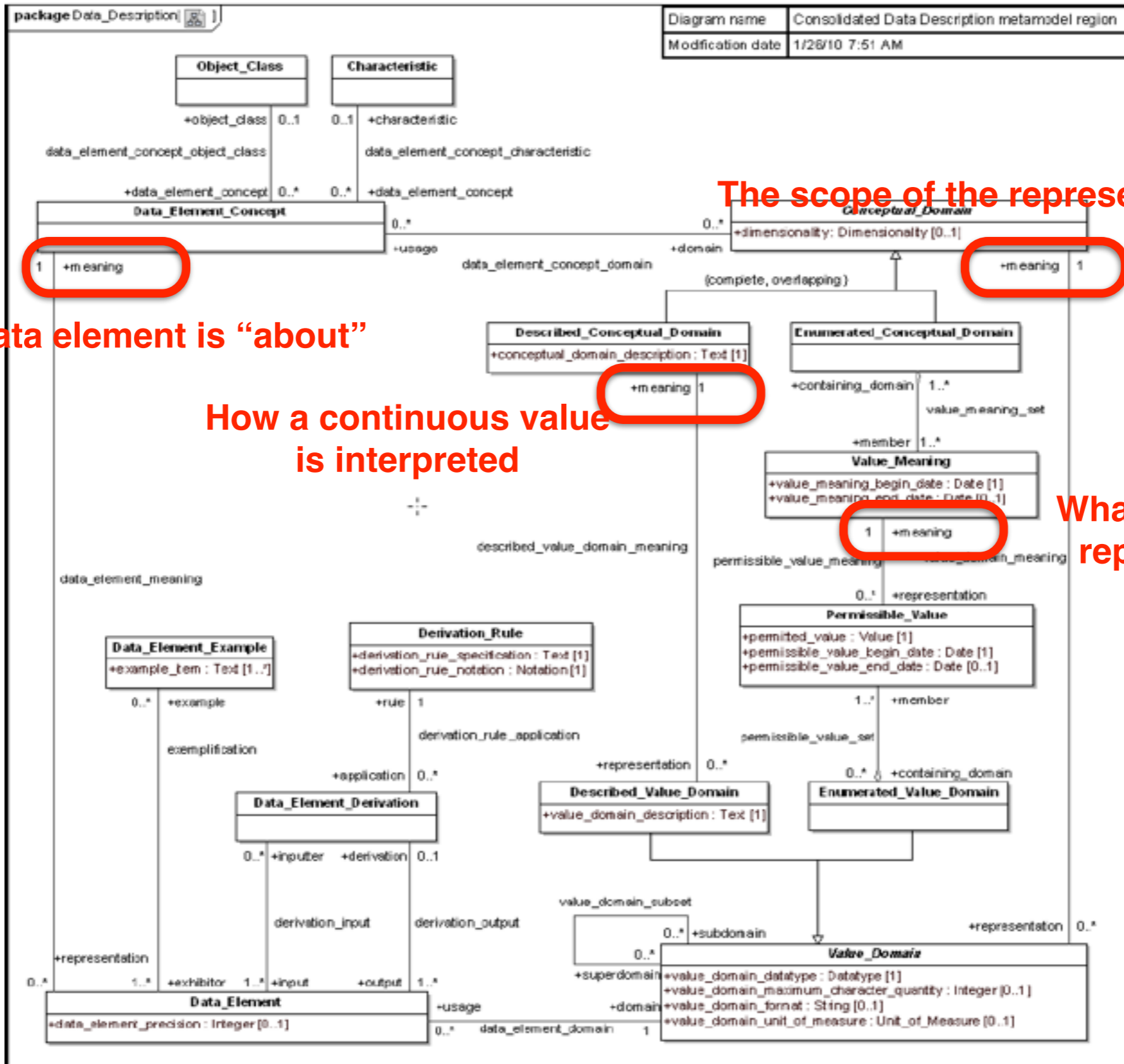


Figure 11-6 — Consolidated Data Description metamodel



The scope of the representation

What a data element is "about"

How a continuous value is interpreted

What a discrete value represents (codes)

Figure 11-6 — Consolidated Data Description metamodel

Permissible Values and Value Meanings

- A “permissible value” in a data record *references* an meaning
 - It is *not* a meaning or concept
 - It is *not* a concept description
 - It is text / number / code / URI that *references* an entity that, in turn, is *described* in one or more versions of one or more code systems

Permissible Values and Value Meanings

- Gender:
 - DB1 “1” —> Male, “2” —> Female, “9” —> unknown
 - DB2 “M” —> Male, “F” —> Female
 - DB3 “2.16.840.1.113883.6.1 / M” —> Male ...
 - RDF “<http://hl7.org/codesystem/admingenter/M>” —> Male

Value Meanings

- CTS2 representation
 - URI —> this is the only identity of the resource
 - Namespace/Name —> *a* unique namespace and code
 - Designation —> an optional chunk of text that shows the intent

Value Meanings

CTS2

```
</resolutionInfo>
<entry href="http://informatics.mayo.edu/py4cts2/entity/sctid:211009" uri="http://snomed.info/id/211009">
  <core:namespace>sctid</core:namespace>
  <core:name>211009</core:name>
  <core:designation>Noretmandrolone preparation (product)</core:designation>
</entry>
<entry href="http://informatics.mayo.edu/py4cts2/entity/sctid:302007" uri="http://snomed.info/id/302007">
  <core:namespace>sctid</core:namespace>
  <core:name>302007</core:name>
  <core:designation>Spiramycin (product)</core:designation>
</entry>
```

Namespace / Code

Identity

Designation

Resolved Value Set Minimal

```
      <core:codeSystem href="http://informatics
    </resolvedUsingCodeSystem>
  </resolutionInfo>
  <entry uri="http://snomed.info/id/211009"/>
<entry uri="http://snomed.info/id/302007"/>
<entry uri="http://snomed.info/id/449005"/>
<entry uri="http://snomed.info/id/544002"/>
<entry uri="http://snomed.info/id/669007"/>
<entry uri="http://snomed.info/id/796001"/>
<entry uri="http://snomed.info/id/847003"/>
<entry uri="http://snomed.info/id/922004"/>
<entry uri="http://snomed.info/id/1039008"/>
<entry uri="http://snomed.info/id/1148001"/>
<entry uri="http://snomed.info/id/1222004"/>
<entry uri="http://snomed.info/id/131300007"/>
```

Value Set “Binding”

- Value Set Catalog Entry — Who publishes it, what it is for, where is it used, copyright, etc.
- Value Set Definition — Rules for constructing the value set. (aka. “version”)
 - References code systems and/or other value sets
 - (optional) can reference code system versions
 - (optional) can reference value set definitions
- Resolved Value Set — resolution of specific value set definition against one or more specific code system versions
 - Code system version(s) and referenced value set definition(s) fixed
 - RESTful

Summary

ISO 11179

- A standard model of *metadata*
- Includes model of representing what data element / value domains “about”

CTS2

- RESTful Terminology Services for the Web
- Designed to bridge XML/RDF world
- URI based
- Includes model for terminology binding

