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Title: Progression on Development of the New Standard "Identification, Mapping and IT-enablement of Standards for Widely Used Coded Value Domains".

Source: Project Editor, Jake Knoppers [E-mail:mpereira@istar.ca]

Date: 2000-05-29

Status: Status report on progress of development of ISO/IEC 18022 including results and resolutions from the recent SC32/WG2 16-19 May, 2000 meeting in New York City, NY, USA.

Action ID: FYI

Note: 1.Earlier drafts of this document existed as WG2 NYC 004 discussed at the New York City meeting of SC32/WG2. One result was a change in the title as already incorporated above. See Resolution WG2/6 which reads as follows:

*"SC32/WG2 resolves to change the name of its work item approved in JTC1 N5847 by removing the word "existing" and changing "encodable" to "coded", so that the title now reads "**Identification, Mapping, and IT-enablement of Standards for Widely Used Coded Value Domains**", and request its SC32 secretariat to take any necessary actions to achieve this".*

Note: 2. This document is being circulated to SC32/WG1 because of the close linkage of this NP to WG1 work in Open-edi standardization.

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1. INTRODUCTORY NOTES TO READERS OF THIS DOCUMENT.

1.1 This document reports on the progression of work on this new standardization project [ISO/IEC JTC1 Project Reference Number: 1.32.17.01.00.00]. The ISO/IEC standard number assigned to this NP is "18022". It integrates the results of some preliminary discussions from the SC32/WG1 and SC32/WG2 meetings held in Santa F⌐, NM, USA, January, 2000 as well as the SC32/WG2 meeting held in New York City, NY, USA, 16-19 May, 2000.

1.2 Work is progressing on the development of "18022". A working draft is expected to be ready for the October, 2000 Helsinki meeting.

1.3 The purpose of this document is to summarize agreement to date on the approach to be taken to actual development of the technical normative and informative elements of this new standard, i.e. as "construction principles". Those already agreed to at the SC32/WG2 Santa F⌐ meeting are noted in Section 2.7 below.

1.4 This new standard while hosted within SC32/WG2- Metadata has as its primary raison d'│tre the need to respond to demands for standards in support of e-commerce (e-business, etc). [See further below Section 2]. This means that at its core this standard is to be based, to the maximum degree possible, on existing and under development standards not only of SC32/WG2 but also SC32/WG1 Open-edi. This was stated in the NWI Proposal. [See document ISO/IEC JTC1/SC32 N0272]. In addition, the NWI proposal referenced other ISO/IEC, as well as ISO, standards relevant elements of which are to be integrated into this standard.

Initial work on this standard in the context of existing ISO/IEC and ISO standards identified several overall contextual issues on which guidance was sought by the Project Editor from SC32/WG2. They are presented in Sections 2 -> 7 below.

1.5 Reference documentation for this New Project includes

1998-05-13	SC32 N0147	Horizontal Issues and Encodable Value Domains in Electronic Commerce: Non-technical Summary and Real World Examples to supplement BT-EC Report
1999-05-13	SC32 N0272	Proposal for a New Work Item(NWI) for standardization work : Identification, Mapping and IT-enablement of Existing Standards for Widely Used Encodable Value Domains
1999-07-29	SC32 N0341	NP for Identification, Mapping and IT-enablement of existing standards for widely used encodable value domains [later issued as JTC1 N5846]
2000-01-30	SC32 N0462	Making Standards Work in Electronic Commerce and Among Jurisdictions: IT-enablement of Data Element-based Standards - Presentation at the Open Forum on Metadata Registries in Santa Fé
2000-02-18	SC32 N064	New Project Announcement – Information technology - Identification, Mapping and IT-enablement of Existing Standards for Widely Used Encodable Value Domains

2.   NEED FOR MORE PRECISE CLARIFICATION AND FOCUS OF TITLE AND SCOPE

2.1 The current title and scope of this NWI are the following:

Title: *Identification, mapping and IT-enablement of existing encodable value domains*

Scope: *ISO standardization in the field of identification, mapping and IT-enablement of existing encodable value domains resulting from common business practices which are rule-based. This work is to be done in conformity to existing requirements with a priority on those code sets used in several sectors of electronic commerce.*

2.2 This wording of title and scope of NWI was taken verbatim from recommendations for "high priority work items" for new standardization work of ISO/IEC JTC1 Business Team on E-Commerce(BT-EC) [See ISO/IEC JTC1 N5296]. This wording was also used in NWI proposal [See SC32 N0341]. Development work on this standard as well as discussions at the SC32/WG2 Santa Fe meeting indicated to need for a more tightly focussed and explicit text for "title" and "scope". Such text needs to be prepared for the SC32/WG2

Helsinki meeting based on the results of the SC32/WG2 meeting (which are presented below) and those of the scheduled June, 2000 meeting of SC32/WG1 (London, England).

2.2.1 "rule-based" and object class.

➢ Focus is on real world code sets which are already rule-based (explicitly or implicitly) and where the rule-base has a "source authority". For code sets originating through international standards, the relevant ISO, ISO/IEC committees normally function as the "source authority". [Note: The NWI on "jurisdictions" is to address "authority" in detail, i.e. categories, levels, types, etc., from global to local, by sectors, markets, etc.]

➢ Existing rule-bases governing code sets even if "explicitly stated" need higher levels of preciseness/granularity, unambiguity to facilitate computer-processability and electronic data interchange, i.e. IT-enablement.

➢ Standard to be linked to requirements of object-oriented methodology but text to be clearly stated independent of any modelling methodology. (UML is currently in use in SC32/WG1, SC32/WG2, ISO TC211, etc. Other modelling tools include EXPRESS-G, Petri Nets, Yourdan, etc. It is not unlikely that in the immediate future there will "new" modeling language or "NML").

Object class: a set of ideas, abstractions, or things in the real world that can be identified with explicit boundaries and meanings and whose properties and behaviour follow the same rules. [ISO/IEC 11179 & ISO/IEC 15452].

➢ A real world code set may be considered to be an "object class", i.e. meeting the requirements thereof. However, many real world code sets consist of one two or more object classes. They are enumerated lists containing permissible value whose properties and behaviours do not follow the same rules. For examples see SC32 N0147.

➢ The standard focuses on real world "rule-based" domains with explicit boundaries of the nature of "code sets" resulting from common business practices and used in business transactions.

➢ Rather than getting into "theological terminology" debates, it may be more productive to initially focus on key characteristics of "explicit boundaries" as an essential attribute or not of a "value domain".

➢ "explicit boundaries" to be stated as rules, what's in", , i.e. what properties and behaviours must a real world "X" have so that one can determine whether or not it is member of an IT-enabled object class? [Note: a real world "X" can be a member of multiple object classes, it all depends whether or not X has the properties and behaviours required through the rule set to determine whether it falls inside the explicitly stated boundary(ies) of the object class. {Note: explicit boundaries not fuzzy or conceptual].

2.2.2 Focus is on "**coded**" rather than "encoding"

➢ Focus is on code sets rather than "encoding". There is confusion about these two terms which at times are used as synonyms. Encoding links to data types and programming languages.

➢ This issue needs to be addressed. For now it may suffice to note that a "code set" may in the real world and its implementations have associated with it one or more encodings e.g. depending on localization and multilingual requirements).

➢ Most of the exisiting ISO standards have as title a common phraseology *"Codes for the representation of..."*

➢ **Needed clarification in title: change "encoding" to "coded"**

2.2.3   Not only for "existing" but also for "new"

➢ The source of "existing" in the present title is the JTC1 BT-EC Report (quoted in SC32 N0341). It noted that there are well over 150 ISO standards of a "Codes representing X" nature. In addition, there are many other other widely used and internationally recognized "Code set" standards and convention. [For examples, see SC32 N0147]. The BT-EC assumption was that these existing standards contain most, if not all, of the requirements which need to be integrated for their IT-enablement, as well as supporting localization and multilingualism requirements.

➢ This standard is to serve as a tool for the preparation of IT-enabled versions of existing standards.

➢ It was pointed out and agreed at the SC32/WG2 NYC meeting that this new standard could/should also be used by those building new sets of "Codes representing X".
➢ **Needed clarification in title: delete "existing"**

3. KEY OBJECTIVES (CAST AS DRAFT TERMS AND DEFINITIONS)

3.1 Information-technology(IT) enablement: *the transformation of current standards utilized in commerce, (e.g., code tables), from a manual to computational perspective so as to be able to support computational integrity.*

Computational integrity: *the expression of standards in a form that ensures precise description of behaviour and semantics in a manner that allows for automated processing to occur, and the managed evolution of such standards in a way that enables dynamic introduction by the next generation of information systems.*

3.2 Localization: *pertaining to or concerned with anything that is not global and is bound through specified sets of parameters of:*
(a)   a *linguistic nature including natural and special languages and associated multilingual requirements;*
(b)   *jurisdictional nature, i.e., legal, regulatory, geopolitical, etc.;*
(c)   *a sectorial nature, i.e., industry sector, scientific, professional, etc.;*
(d)   *(d)   a human rights nature, i.e., privacy, disabled/handicapped persons, etc.; and/or,*
(e)   *consumer behaviour requirements.*
Within and among "locales", interoperability and harmonization objectives also apply.

3.3 Multilingualism: *the ability to support not only character sets specific to a (natural) language (or family of languages) and associated rules but also localization requirements, i.e., use of a language from jurisdictional, sectorial and consumer marketplace perspectives*

3.4 Cross-sectorial

[Yet to be defined. Pertains to: the need to ensure common understandings among different industry sectors and disciplines and means to facilitate interoperability among them in EDI and e-business.]

3.5 Cultural adaptability

[One of three strategic directions of all ISO/IEC JTC1 standardization work. Not yet defined. Requires liaison work. Here IT-enablement , localization, multiligualism, cross-sectorial are key elements.]

Need for distinguishing between IT-interface requirements of Open-edi and the need to support (multiple) human interface equivalencies.

4 . IMPACT OF OBJECTIVES

4.1 Identification versus Designation

Use of unique, unambiguous , linguistically neutral and (computer-referencable) identifiers for code sets, members of code sets, concatenated/compound code identifiers must be "parseable" based on explicitly stated and computer processable rule-base, etc.

An Identifier may have associated with it, one or more designations, representations, such as names, symbols, etc.

4.2 Definition(specification) versus Description

Standard will use definitions (specifications) not descriptions

4.3 Differentiate between IT-interface and Human-Interface & Support both

Differentiate between (1) *IT-interface* requirements for electronic data interchange among heterogeneous computer systems of autonomous organizations; and (2) *Human interface* requirements, human perceivable/understandable linguistic equivalents and localization requirements.

The examples 4.3.1 and 4.3.2 provided below are extracted from SC32 N0147 which provides more detailed information. As does a slightly differently focussed available document JTC1 N5626 "Electronic Commerce and Cultural and LinguisticAdaptability: Practical Examples and Horizontal Issues".

4.3.1 Example 1: International Commerce - "e-potato"

Example 1 focuses on human understandable representation of what should be an IT-enabled global standard for international trade in goods based on the Harmonized System (HS) of the World Customs Organization (WCO). The WCO was known as the Cooperative Customs Council(CCC).
 Example here is "potato" (fresh or chilled) for which the HS code is "0701".

The HS of the CCC would have a "jurisdiction mapping, category, etc. ID for the HS (schema) and one for the WCO as the source authority (to come out of NWI on Jurisdictions, probably piggy-back on ISO/IEC 3166, 6523 and Vienna convention). Below "XX:WCO" represents the a unique ID for the "Source Authority" while "HS" represents the ID of the schema, rules, etc. for the "codes representing..X". Within this codes value domain "0701" is the "pivot" code.

The example demonstrates:

➢ a jurisdiction, in this case a country, having more than one language of use and thus multilingual equivalents
➢ differences in uses of the same natural language in various countries and thus different multilingual equivalences within a natural language

(Note: The "structure" of the example is illustrative. Eventually, all the attributes will be end up as
       columns in a database using a more formalized approach)

Common IT Interface	Country Code - Numeric Code & Short Name (en) Equivalent	Human Interface: Localization and Multilingual Equivalents within each jurisdiction
XX:WCO: HS: 0701	124 CANADA	(en): potato (fr): pomme de terre (ik): patiti
XX:WCO: HS: 0701	464 MEXICO	(es): papa
XX:WCO: HS: 0701	724 SPAIN	(es): patata
XX:WCO: HS: 0701	040 AUSTRIA	(de): erdapfel
XX:WCO: HS: 0701	276 GERMANY	(de): kartoffel
XX:WCO: HS: 0701	056 BELGIUM	(fr): pomme de terre (nl): aardappel
XX:WCO: HS: 0701	246 FINLAND	(fi): peruna (sv): potatis

4.3.2 Example of: Country Codes based on ISO 3166 level 1

This example demonstrates not only the six (6) ISO human interface linguistically equivalent expressions (of which two are also used as ISO alpha codes) to the single one (1) linguistically neutral common numeric code (the pivot) for each permitted instance in ISO 3166-1 , but also the "official" human interface linguistic equivalent in the source jurisdictions.

(Note: The "structure" of the example is illustrative. Eventually, all the attributes will be end up as columns in
database using a more formalized approach.)

Common IT Interface	Human Interface : Localization and Multilingual Equivalents			
ISO:3166:246	ISO Alpha-2:	FI	ISO Alpha-3:	FIN
ISO:3166:246	ISO Short Name(en):	Finland	ISO Long Name (en):	Republic of Finland
ISO:3166:246	ISO Short Name(fr):	Finlande	ISO Long Name (fr):	République de Finlande
ISO:3166:246	Local Short Name(fi):	Suomi	Local Long Name(fi):	Suomen tasavalta
ISO:3166:246	Local Short Name(sv):	Finland	Local Long Name(sv):	Republiken av Finland
ISO:3166:246	ISO Alpha-2:	BE	ISO Alpha-3:	BEL
ISO:3166:246	ISO Short Name(en):	Belgium	ISO Long Name (en):	Kingdom of Belgium
ISO:3166:246	ISO Short Name (fr):	Belgique	ISO Long Name (fr):	Royaume de Belgique
ISO:3166:246	Local Short Name(nl):	Belgie	Local Long Name(nl):	Koninkrijk van Belgie
ISO:3166:246	Local Short Name(fr):	Belgique	Local Long Name(fr):	Royaume de Belgique
ISO:3166:246	ISO Alpha-2:	TR	ISO Alpha-3:	TUR
ISO:3166:246	ISO Short Name(en):	Turkey	ISO Long Name (en):	Republic of Turkey
ISO:3166:246	ISO Short Name (fr):	Turquie	ISO Long Name (fr):	République turque
ISO:3166:246	Local Short Name(tr):	Turkiye	Local Long Name(tr):	Turkiye Cumhuriyeti

4.3.3 EXAMPLE BASED on ISO 3166 Level 2

Content Source Authority: Legislatures of the Provinces and Territories of Canada
Registration Authority: CGSB CAC TC46 & National Atlas of Canada
Standards Authority: CGSB 171 Standardization on Geomatics

This example demonstrates requirements for human interface linguistic equivalent terms (1) of a multilingual nature; (2) using non-Latin 1 character sets; and (3) supporting language that have two writing systems in a set of codes representing X.

On 1 April, 1999, the Nuvavut Territory was established through an Act of the Canadian Parliament, joining the existing provinces and territories. The establishment of Nunavut included the introduction of Inuktitut as an official legal language in this part of Canada. Nunavut has chosen "NU" as its two alpha code under ISO 3166-2:1998 Subdivisions (as well as for its Internet 2nd TLD ID). This required a change to the ISO 3166 Part 2 Subdivisions entry for Canada as well as in various Canadian standards. The example given here is that taken from the **Canadian National Standard for geographical metadata – <u>CAN/ CGSB 171-3 "Directory Information for Geo-Referenced Datasets".</u>**

Inuktitut is an oral language with a long history. In the 18th century, two writing systems became associated with the oral language. Oneone is syllabic based and the other (Roman) Latin-1 alphabet based. The names of the Canadian provinces and territories in Inuktitut are presented in these two writing systems. Note that the Inuktitut names using Latin-1 are the same as in English except for the Northwest Territories which is "Nunattiaq". Development of Col. (5) included determining appropriate character map reference based on ISO/IEC 10646-1:1993 *Information Technology -- Universal Multiple-Octet Coded Character Set (UCS) -- Part 1: Architecture and Basic Multilingual Plane* and its amendments up to Amendment 11:1997 Unified Canadian Aboriginal Syllabics, and the Unicode Standard Version 3.0.

IT Interface		Human Interface/Linguistic Equivalent Terms			
Table ID	Code	English (en)	French (fr)	Inukitut (ik)	
				Syllabic Equivalent	(Roman) Latin-1 Equivalent
(1)	(2)	(3)	(4)	(5)	(6)
171.3:03	AB	Alberta	Alberta	⊲ᑕˢᐸᑦ	Alberta
171.3:03	BC	British Columbia	Colombie-Britannique	ᐳᑎᑏˢ ᑲᑦᐿᐱ⊲	British Columbia
171.3:03	MB	Manitoba	Manitoba	ᒣᓇᑐᐸ	Manitoba
171.3:03	NB	New Brunswick	Nouveau-Brunswick	ᓂᐳ ᐳᔅᐊᐸᐟᐊᵇ	New Brunswick
171.3:03	NF	Newfoundland	Terre-Neuve	ᓂᐳᐸᐳᐊᓗᐊ	Newfoundland
171.3:03	NT	Northwest Territories	Territoires du Nord-Ouest	ᓄ ᑦᐟⰘᐊˢᵇ	Nunattiaq
171.3:03	NS	Nova Scotia	Nouvelle-Écosse	ᓂᑉ ᐟᑦᓂˢ	Nova Scotia
171.3:03	NU	Nunavut	Nunavut	ᓄᐳˢ	Nunavut
171.3:03	ON	Ontario	Ontario	⊲ᵃᑎᓄᐳ	Ontario
171.3:03	PE	Prince Edward Island	Île-du-Prince-Édouard	ᐳᓇᐟˢ ⊲ᑢⰘ⊲ˢᶜ ⊲ᐄᑦᐊᵃ	Prince Edward Island
171.3:03	QC	Quebec	Québec	ᑯ⊲ᐃᐟᵇ	Quebec
171.3:03	SK	Saskatchewan	Saskatchewan	ᔅᑲᑐᐿᐊ	Saskatchewan
171.3:03	YT	Yukon Territory	Territoire du Yukon	ᔪᑲᐊ	Yukon Territory

7. **Working Principles** (as taken from SC32/WG2, SAF N022)

➢ incorporate the three strategic directions of JTC1 which all standardization work must support, namely, portability, interoperability and cultural adaptability

➢ assist resolving the four horizontal standardization issues issues identified by the ISO/IEC JTC1 Business Team on Electronic Commerce, namely, IT-enablement, localization with multiligualism, cross-sectorial and cultural adaptability

➢ serve as an essential part of standardization work required in support of SC32/WG1 work on Open-edi with respect to ISO/IEC CD 15944-1 *Information Technology Business Agreement Semantic Descriptive Techniques – Part 1: Operational Aspects of Open-edi for Implementation.* [focus here is one linkages of "information bundle" and "semantic component" in Open-edi scenario specification to work on "data element" of ISO/IEC 11179-3. Further emphasis here is not just on information sharing but EDI in support of decision-making and commitment exchange.

➢ Focus on a category of "bounded value domains" from an "object class" perspective where the properties and behaviours are predefined and structured by a set of rules established by a source authority, i.e. organization.

➢ Prioritize on those sets of "codes representing X" which are widely used in several sectors particularly in e-commerce, e-business, e-administration, etc.

- Be a standard which will serve as a tool for IT-enablement, etc. of <u>existing</u> standards of a "Codes representing X" nature
- Be a standard which will serve as a tool for those building new sets of "Codes representing X"
- Utilize existing standards, concepts/definitions and associated terms when and wherever possible. (No polysemy)

8. Present world perspectives – What are we talking about?

- "schedules", a term used in statutes and pursuant regulations for enumerated lists of organizations, products, services, procedures, etc., to which a law (or parts of a law) applies;

- "schedules" or "auxiliary tables" in information science which one attaches in the appropriate place to a concept/term in a thesaurus (or subject indexing scheme);

- "domains" in entity relationship modelling where an "enumerated list" is often known as an entity type functioning as a "domain"'

- "object class" in object-oriented modelling;

- "reference tables" or "edit tables", "permitted value constraint tables", etc., in the various methodologies and approaches used for building IT-based applications;

- code sets, a term commonly used in business and EDI-based implementations[1]; and,

- "Look-Up and Authority File(LUAF) table, term/label used in Canada from a non-technical and business perspective. A "LUAF" is the name given to code sets, tables, etc., used in commerce which have been IT-enabled so as to facilitate their use in electronic commerce. The use of the term "LUAF" recognizes that some code sets are of the nature of "look-up" tables, while others not only serve this function but are also of an "authoritative" nature either generally, or within the context of a specified category of business transaction, an industry sector, etc. The use of the term "LUAF" is also neutral to whether such IT-enabled code sets represent <u>voluntary</u> or <u>mandatory</u> code sets.

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[1]See further for example, the EDICC Guidelines. These Guidelines contain or reference well over 43 different code sets. The ANSI X.12 standards for EDI utilize/reference over <u>450</u> code sets.

9. TERMS AND DEFINITIONS

9.1 To be incorporated for use in draft standard already identified as being relevant/appropriate

9.1.1 Taken from standards for which ISO/IEC JTC1/SC32 is responsible for
(yet to placed in "order". Next version will include text. Standard referenced in "[ ]")

Notes: 1. Have not yet had time to check between existing 11179-3 definitions for terms and whether for same term the new WD 11179-3 has a different definition. Further, time did not permit an analysis of which of the terms/definitions in WD 11179-3 are new, i.e. are not part of the present 11179-3.

2. Existing WD11179-3 version (WG2 N201, 2000-02-22) in Section 4 Definitions does not identify terms and definitions which are taken from other standards. Consequently some of the terms and definitions attributed to 11179-3 should have been attributed to their source standard.

3. This candidate list is not yet complete. SC32/WG2 members are asked to identify added candidate terms/definitions. It needs to be reviewed in light of TC37's ISO FDIS 704(revised) Terminology Work – Principles and Methods as well as TC37's ISO FDIS 12200 Computer applications in terminology – Machine-readable terminology interchange format (MARTIF) – Negotiated interchange. The latter was provided to SC32 by TC37 and has been circulated by SC32 as N0474.

attribute[11179-3]
business[14662]
business transaction[14662]
code element set[7826]
code value[7826]
conceptual domain [15452]
data (in a business transaction) [CD15944-1]
data element[11179-3]
data value domain[15452]
electronic data interchange[14662]
identification[CD15944-1]
identifier(in business transaction) [CD15944-1]
identifier(of registration authority) [11179-3, *need to link to 6523*]
individual[CD 15944-1]
information bundle[14662]
Open-edi[14662]
organization[6523]
organization part[6523]
organization person[CD15944-1]
permissible value[11179-3]
permissible value label[15452]
person [CD15944-1]
persona[CD15944-1]
process[CD15944-1]
property

public administration[CD15944-1]
registration authority[11179-3]
regulator[CD15944-1]
representation class[15452]
schema [11179-3]
semantic component[CD15944-1]
shareable data [11179-3]
third party[CD15944-1]
unambiguous[CD15944-1]
value meanin[15452]
value meaning identifier[15452]

9.1.2 Taken from other ISO, ISO/IEC standardization work

code,coding scheme[2382]
code element[2382]
concept[1087]
consensus[ISO/IEC Guide 2]
data[2382]
data (in organization of data) [2382-17]
data item [7826, 15452]
designation[1087]
entity[2382-17]
entity authentication[9798]
(entity) identification[2382-17]
formal description techniques(FDTs) [JTC1 directives]
identifier[1087]
information(in information processing) [2382]
instance relationship[2788]
list[2382]
metadata[2382]
name[1087]
object[1087]
standard[ISO/IEC JTC1 directives, ISO/IEC Guide 2]
[Note: Other JTC1 standards have yet to be reviewed. For example 11404 - "Programming
languages….Language-independent datatypes" for terms/definitions such as "datatype", "data subtype",etc.]

9.2 Added Terms and definitions already identified as needed.
[Note: There is a link here to the NWI on "Jurisdictions". See JTC1 N5846 "Identification and
Mapping of Various Categories of Jurisdictions"]

Authority
Source Authority
Registration Authority
Maintenance Authority

Distribution Authority
Address
Location
Personal information
Integrity
Domain
Real World Domain
Object Class Identifier
Behaviour
Interchange Data (as shareable data+)

10. Working Issue: What is a domain?

11179-3 has a definition for "value domain"

Value domain: *A set of permissible values. It provides representation, but has no implication as to what data element concept the values are associated with nor what the values mean.*

TR15452 has a definition for " conceptual domain"

Conceptual domain: *A set of possible valid value meanings of a data element expressed without representation.*

However, for "what is a "domain"? There a several definitions. For example in ISO/IEC 11179 *"domain: a set of possible values as an attribute"*. But how do I know whether a real world entity is part of a "set"?
For example in 2382-28 "*domain:a specified field of knowledge or expertise"*.

Search is underway through existing ISO/IEC and ISO standards for other definitions if any of "domain" (as well as for "set" – one assumes in the context of "set theory").

It is understood that a "domain" must have well-defined boundaries and these boundaries must be rule based.

It is useful to note here the definitions of "entity" and "object".

Entity: any concrete or abstract thing that exists, did exist, or might exist, including associations among these things.

Example: A person, object, event, idea, process, etc.

NOTE - An entity exists whether data about it are available or not.

Object: *any part of the perceivable or conceivable world*
        NOTE - Objects may also be material, (e.g., engine) or immaterial, (e.g., magnetism).

[Note: The definition of "object class" provided above should be understood in the context of "object oriented modeling methodology"]

In the real world, "authorities" determine what is a domain, decide on the rules governing its establishment, addition/deletion its "members" which can be pre-defined and enumerated or non-enumerated (for the latter an instantiation of the interworkings of the property(ies) and behavior(s) requirements in accordance with the "same rules").

"Authority" here is a generic term and independent of the nature of the "authority", acceptance by others of an "authority", etc. See further NWI on Jurisdictions).