TECHNICAL SPECIFICATION

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Basic Semantics Register (BSR)

Registre sémantique de base (BSR)

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Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

Attention is drawn to the possibility that some of the elements of this Technical Specification may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 16668 was prepared by Technical Committee ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration*.

Annex D forms a normative part of this Technical Specification. Annexes A, B and C are for information only.

Introduction

The BSR is an official ISO register of data for use by designers, implementers and users of information systems in a manner which will allow systems development to move from a closed to an open multilingual environment, especially for use in domestic and international electronic communication including electronic commerce and electronic data interchange (EDI).

It is important to say, and to emphasize, the major part that the user community is expected to play in the BSR. The register is to serve the user community, contain its data and meet its priority needs in a global and common manner. It is not intended to be an academic exercise with a set of paper documents to be filed away. It is expected to be a database in the public domain growing in line with expanding user needs, managed in a secure manner and working in partnership with the worldwide user community.

The purpose of the BSR is to provide an internationally agreed register of multilingual data concepts with its technical infrastructure. This will provide storage, maintenance and distribution facilities for reference data about BSR semantic units and their links (bridges) with operational directories. The use of the term "Basic" in the BSR is to recognize that the BSR semantic units will be built from basic semantic components, which can be considered as building blocks. It should be noted that the term "directories" also includes repositories, and the single term directories will be used to include both throughout this Technical Specification. Its principal function is to provide data in multiple languages that has been developed in a consistent, unambiguous manner according to International Standards.

As a consequence of establishing the BSR, it will also be used to

— specify new entries or to respecify inadequate entries in existing directories, and hence upgrade the systems using the registered data,

— align and harmonize data among and between existing directories by providing the pivotal data for the cross-referencing of equivalent data in various directories which are maintained by different agencies,

— provide input based on the experience gained in the BSR for standards work in related standards areas, such as for Open-edi, and

— form the basis of the semantics for XML.

The main benefits to be obtained from the BSR will be as follows.

a) Cost Reduction

— faster and more cost-effective development of new information systems;

— reduced maintenance cost for existing information systems;

— fewer dictionaries to be maintained through harmonization and alignment.

b) Business Efficiency

— more effective business communication through clear definitions of business data and their standardized unique identifiers, hence fewer possibilities for misinterpretation;

— more effective multilingual communication.

The three main components of the BSR are the following.

— BSR semantic components (units of thought used in everyday life). They shall be identified by a unique code. They shall have a preferred name and synonyms as relevant in each language. These names will be used in the specification of BSR semantic units. Examples: Delivery, Actual, Latest, Person, PurchaseOrder, BillOfMaterial, Date, Name, Identifier, etc.

— BSR semantic units (the equivalence of semantically complete data element concepts, i.e. the property of an object class with full qualification). They are the basis for the specification of data elements in information systems. They shall be identified by a unique code. They shall have a preferred name and synonyms as relevant in each language. Examples: GoodsDelivery.Latest.Date; Sales.Information.Contact.Telephone. Number; Product.Bill Of Material.Reference.Identifier; Person.SocialSecurity.Number

— Bridges (the links between a BSR semantic unit and its equivalence in various directories).

The main users of the BSR are

— designers of applications where

— data interchange across regions, functions and between business partners is of prime importance, and

— business data management is required within an organization's own application systems portfolio and with its business partners,

— information-systems business systems engineers,

NOTE   Business systems engineers are the interface between the business community and the information-systems programmers, having knowledge of both the business and systems development.

— electronic message developers/implementers/users,

— builders of converters between communication standards.

— system information end users.

The first population of the BSR was made with EDI directories, but other needs for unambiguously defined semantics have raised; for example with XML or in the business modelling domain. The very simple structure of the BSR (BSR semantic units, composed of BSR semantic components) permits capturing the semantic of all kinds of "object" that must be "shared" by many people and organizations from different sectors, countries and cultures.

Basic Semantics Register (BSR)

1 Scope

This Technical Specification covering the BSR is intended to be an internationally agreed register of multilingual standard data from any business sector.

This Technical Specification describes rules and guidelines for developing, updating and maintaining the BSR.

Those rules and guidelines place emphasis on the key success factor, which is to work in strong partnership with end-user communities.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Technical Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Technical Specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 11179-1:1999, *Information technology — Specification and standardization of data elements — Part 1: Framework for the specification and standardization of data elements.*

ISO/IEC 11179-2, *Information technology — Specification and standardization of data elements — Part 2: Classification for data elements.*

ISO/IEC 11179-3:1994, *Information technology — Specification and standardization of data elements — Part 3: Basic attributes of data elements.*

ISO/IEC 11179-4:1995, *Information technology — Specification and standardization of data elements — Part 4: Rules and guidelines for the formulation of data definitions.*

ISO/IEC 11179-5:1995, *Information technology — Specification and standardization of data elements — Part 5: Naming and identification principles for data elements.*

ISO/IEC 11179-6:1997, *Information technology — Specification and standardization of data elements — Part 6: Registration of data elements.*

3 Terms and definitions

For the purposes of this Technical Specification, the following terms and definitions apply.

3.1
attribute
characteristic of an **object class** (3.14)

3.2
bridge
link between a **BSR semantic unit** (3.4) and its related unit(s) of information (equivalence) in a given directory

3.3
BSR semantic component
BSC
generic term comprising the components of BSR semantic units, including two types of BSR semantic component:
representation class (3.20) and **concept** (3.5)

3.4
BSR semantic unit
BSU
concept unambiguously defined, independently of any particular physical representation, and which is semantically complete

NOTE   The BSU is independent of the process or application in which it is used. It is constructed using BSR semantic components.

3.5
concept
unit of thought constituted through abstraction on the basis of characteristics common to a set of objects

[ISO/IEC 11179-1:1999]

3.6
data
representation (3.20) of facts, concepts, or instructions in a formalized manner, suitable for communication, interpretation, or processing by humans or by automatic means

NOTE   This definition refers to a group of facts taken as a unit, thus it is used with a singular verb.

[ISO/IEC 11179-1:1999]

3.7
data element concept
DEC
concept that can be represented in the form of a data element, described independently of any particular **representation** (3.20) source

[ISO/IEC 11179-1:1999]

3.8
data element directory
any systematic collection of data elements

NOTE   This includes EDI (3.10) directories.

3.9
definition
word or phrase expressing the essential nature of a person or thing or class of persons or things: an answer to the question "what is x?" or "what is an x?"; a statement of the meaning of a word or word group [Webster's Third New International Dictionary of the English Language Unabridged, 1986]. Statement that expresses the essential nature of a data element and permits its differentiation from all other data elements

[ISO/IEC 11179-1:1999]

3.10
electronic data interchange
EDI
automated exchange of predefined and structured **data** (3.6), for business purposes between information systems of two or more parties

3.11
generic concept
concept that is considered to be collective for the set of **specific concepts** (3.23) which are contained within it

EXAMPLE   Communication Channel is the generic concept for the set of specific concepts such as Telephone, Fax, e-mail, etc.

3.12
metadata
data (3.6) that defines and describes other data

[ISO/IEC 11179-1:1999]

3.13
name
primary means of identification of objects and concepts for humans. A single or multiword designation assigned to a data element

[ISO/IEC 11179-1:1999]

3.14
object class
A set of objects. A set of ideas, abstractions, or things in the real world that can be identified with explicit boundaries and meaning and whose properties and behaviour follow the same rules

[ISO/IEC 11179-1:1999]

3.15
(Open-edi) semantic component (ISO/IEC 14662)
unit of information unambiguously defined in the context of the business goal of the business transaction

3.16
qualifier
term that specifies and/or limits a broader concept

3.17
register
set of files (paper, electronic, or a combination) containing the assigned data elements and the associated information

[ISO/IEC 11179-1:1999]

3.18
registration identifier
one or more characters or symbols used to identify a data element, data representation, **representation class** (3.21), or **object class** (3.14)

3.19
repository
synonym for a set of **registers** (3.17)

3.20
representation
combination of a value domain, data type, and, if necessary, a unit of measure or a character set

[ISO/IEC 11179-1:1999]

3.21
representation class
RC
human perception of a single characteristic of an **object class** (3.14) in the real world

3.22
semantics
the branch of linguistic science which deals with the meaning of words (Webster)

[ISO/IEC 11179-1:1999]

3.23
specific concept
BSR semantic component (3.3) that refers to a particular **concept** (3.5)

3.24
term
designation of a defined **BSR semantic component** (3.3) in a specific language by a linguistic expression

NOTE   A term may consist of one or more words (i.e. a simple single-word term, or a complex multi-word term) or may even contain symbols.

4   BSR content

4.1   BSR semantic components (BSC)

There are two types of BSR semantic component in the BSR. These are **Representation Class** and **Concept (Concept** may be considered as **Specific** or **Generic Concepts)**. These may be considered as being the equivalence of Objects or Entities. Definitions of these types are included in clause 2 of this Technical Specification.

4.1.1   Representation Class (RC)

A **Representation Class** is the root component of a BSR semantic unit and describes what the BSR semantic unit is about. It is the way in which the property is represented. According to ISO/IEC 11179-1, a property is the "a peculiarity common to all members of an object class". A representation class is "a component of the BSR semantic unit which expresses the property of an object class". As a BSU is the equivalent of a data element concept with its representation class included, it is important to identify the set of representation classes so that the BSUs will be the basis for the development of data elements in information systems.

In practice, it has been found necessary to have a set of representation classes that is consistent for use between information systems and business users. The aim of this set is to cover the identified needs with a minimum set of recommended representation classes. Each representation class shall be identified by a unique code. It shall have a preferred name and synonyms as relevant in each language. These synonyms might be used in practice, see below for examples in the use of Number versus Identifier. The representation classes proposed are felt to provide a wide enough field to enable users to find an adequate solution for their needs of categorization.

Informative annex B provides the set of representation classes that have been found necessary for managing this categorization. It should be noted that if, in the future some additional representation classes are considered necessary, the list will be extended. At present, this list is considered sufficient to satisfy the current and anticipated needs. This conclusion is based on what a number of major companies have adopted in practice and found to be realistic, and on what the BSR Production Team have found to be required to date.

4.1.2   Concept (CT)

In the BSR the term **Concept** is the second category of BSR semantic component. Examples include: Communication Channel, Telephone, Fax, Delivery, Earliest, etc. This has by far the largest number of entries per

category of BSR semantic component. Concepts will thus include terms identifying Object Classes and Qualifiers as defined in ISO/IEC 11179-1. A separate categorization identifying this differentiation will be introduced to enable migration to an object-oriented approach which will be necessary when the decision is made as to the type of database to be used for the operating system for the BSR.

The **Concept** may be a **Generic Concept** or a **Specific Concept**. A **Generic Concept** is one which provides a means to manage the commonality of the **Specific Concepts** within the generic nature of the **Generic Concept**.

EXAMPLE   Telephone, Fax, e-mail, etc. are specific concepts of the generic concept, Communication Channel.

The specific or generic aspect of concepts implies a particular relationship (broader/narrower) between BSR semantic units using them.

4.1.3   Specification of BSR semantic components

BSUs are built from the relationship between **BSR semantic components** qualified as required to make the BSU semantically complete. So there is a need for the BSR to establish a list of **BSR semantic components**. This list should include all the **BSR semantic component** types (representation class and concept), with definitions and names in multiple languages.

Some concepts will be used to qualify other concepts as described by JTC 1/SC 32 in ISO/IEC 11179-5.

Once this list of BSR semantic components has been agreed upon, they shall be the basis for the specification of BSR semantic units.

4.1.3.1   Definition

A **BSR semantic component** shall be defined in a manner that ensures that its meaning is clear and unambiguous. The rules and guidelines for developing definitions in ISO/IEC 11179-4 shall be used as the basis for this work. These are shown in detail in 6.2.

4.1.3.2   Naming

It is important to recognize that some **BSR semantic components** will have different names, even within a language, based on the business context in which they are used. A generally used name in a language will be chosen as the preferred name, and any other names for the same **BSR semantic component** will be recorded as synonyms, with the context in which they are used also being recorded. Note that different spellings for the same **BSR semantic component** in language variations such as American or Australian English versus English English, will be considered as synonyms.

For the English language, the Oxford English Dictionary, as recommended by ISO, shall be used as the base. French French shall be the basis for the French language with Canadian, Belgian, Swiss French, etc. variations considered as synonyms. Similarly any regional variations within a country will be considered as synonyms. Equivalent decisions will be made for other languages.

In principle, if there is a definition and name used in practice that is widely used, such as in INCOTERMS 1990, that shall be the definition and name used in the BSR. For more general terms, a standard national language dictionary will be used, adapted as required to meet the needs of the data specification in relation to its use in applications systems development and data communication.

Each language may have specific naming conventions. If a naming process exists for a given language, it will assure that there is a certain discipline in this process, with the end result not left to whims, fancies or hazard. Naming conventions for English and other languages, if they exist, are given in normative annex D.

Those naming conventions shall take into account International Standards prepared by TC 37 and TC 46 (see the bibliography).

4.2 BSR semantic units (BSU)

4.2.1 General

BSR semantic units are complete specifications of data concepts independent of the process/application in which they can be used. BSUs are the basis for the data to be interchanged in any information system between computers.

A BSU is constructed from **BSR semantic components** as follows.

The root component is a **Representation Class** such as Code, Date, Name, etc.

To this root component, one adds Concepts such as Telephone, Fax, Delivery, Earliest, etc.

NOTE   A BSU may be composed of only concepts, without a representation class. (A BSU may also be reduced to only one concept.)

4.2.2 Specification of BSR semantic units

From the definition of a BSU, "a **concept** unambiguously defined, independently of any particular physical **representation**, and which is semantically complete", it is clear that a BSU must be equated with a complete semantic specification of the **data** that is to be interchanged or to be modelled.

A BSU may be linked by a bridge to representations specified in an International Standard, or which are internationally accepted, where they exist. If agreements can be made with the owner of the directory and/or standard representation, the values will also be included in the BSR. Provision will be made to include these values in the design of the BSR database, with the values being added once the agreement has been made with the registration authority/maintenance agency concerned.

JTC 1/SC 32/WG 2, in ISO 11179-1 which provides standards for the specification of data elements, defines a "**data element concept**" as "a concept that can be represented in the form of a data element, described independently of any particular representation". This data element concept is also shown to be the union between an Object Class and a Property in the Object Oriented terminology. Alternatively, in the Entity/Relationship terminology, it is an Attribute of an Entity. The **data element** is the "unit of data for which the definition, identification, representation and permissible values are specified by means of a set of attributes" (ISO/IEC 11179-1), i.e. a representation of the data element concept suitable for communication or processing by automatic means. However, in relation to the BSR, representation is understood to mean the physical representation. The BSU will therefore be the union of an Object class with a Property, with whatever "qualifiers" are needed to make it semantically complete, and its representation class. The link between these concepts and the BSR is shown as follows:

Level 1   **Object Class**

Level 2   **Object Class + Property = Data Element Concept**

Level 3   **Data Element Concept + Representation Class = BSU**

Level 4   **BSU + Value Domain = Data Element**

The relationship of the above with the bridging concept is shown diagrammatically in Figure 1.

BSR
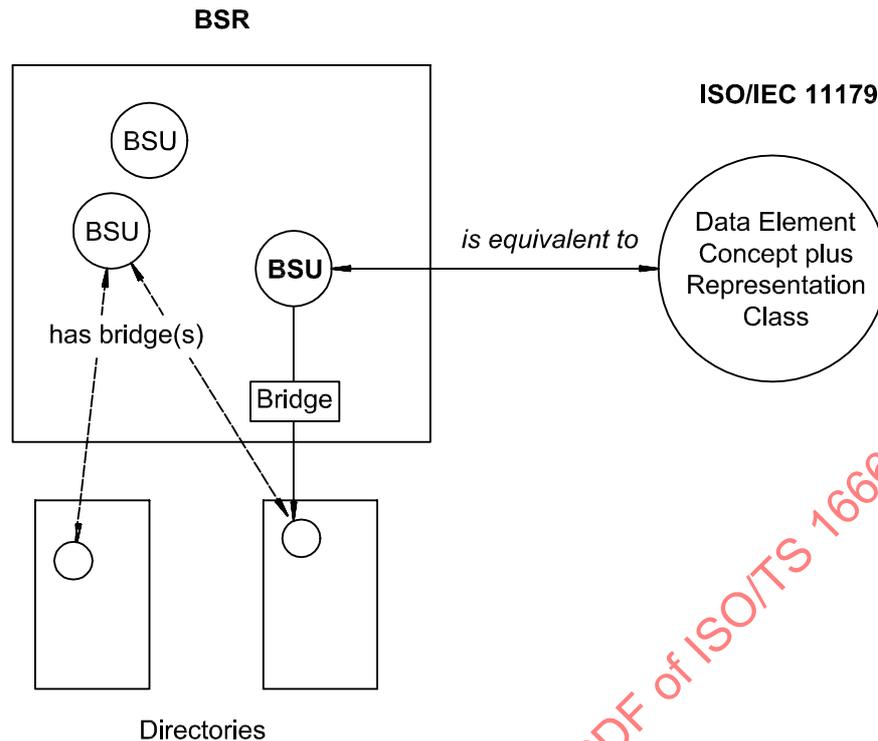
Figure 1 — Bridging and concept relationship

4.2.2.1 Function and specification of a BSU

The primary function of a BSU is to provide an internationally agreed specification of interchange data.

The secondary function of a BSU is to be a pivot allowing the representation of information in one directory to be equated to its representation in another.

A BSU has an identification and a definition. The identification is achieved through a language-independent code. For each language, a name is developed from the definition to aid in human comprehension. ISO/IEC 11179-4 and ISO/IEC 11179-5 are used for defining and naming.

4.2.2.1.1 Definition

A **BSR semantic unit** shall be defined in a manner that ensures that its meaning is clear and unambiguous. The rules and guidelines for developing definitions are shown in detail in 6.2.

4.2.2.1.2 Naming

Same remarks as for BSR semantic component naming, see 4.1.3.2 and normative annex D.

4.2.2.2 Generic relationship between BSUs

When defining a BSU, it is useful to position it within one or more existing BSUs and to define the type of relation.

Within the BSR, a BSU is recorded at the level where it is relevant for communication, and where, in general, it can be bridged to an entry in a directory. BSUs can be used to define other BSUs (re-usability) and they are linked by a generic/specific relationship.

A generic relation exists when two concepts share an identical set of characteristics but one of them, the subordinate concept, has at least one additional, delimiting characteristic (TC 37, Draft guide, see the bibliography). It is important to underline that BSUs which are linked through the generic relation type must be of the same nature. A BSU and its subordinate or more specific BSU relates to the same concept.

EXAMPLE   An example of a generic relationship will be concepts of "DateAndTime", defined as: A particular point in the progression of time. This has the narrower concept of "date", which itself has narrower concepts of "Birth.Date", "Delivery.Date", "Start.Date", etc. These are then further specified to BSUs such as Person.Birth.Date; Goods.Delivery.Date; Child.Delivery.Date; Exhibition.Start.Date; etc.

4.3   Bridge

A Bridge is a means to show how a BSU has been represented in a given directory for interchange purposes.

A Bridge will also provide the means to cross-reference or map between equivalent unit(s) of information in two or more directories. By using a unique BSU as the pivot, the bridge allows linkage from one unit of information in a directory to its equivalent unit of information in another directory. A bridge is not a direct link between two different directories.

The bridge between a BSU and its related unit(s) of information in a directory is relevant for both directions; from the BSU to the bridge and from the bridge to the BSU.

The unit of information is often a code, a data element, or a combination of a generic data element and a qualifier, but it can also be any higher structure recorded by the directory and controlled by the directory syntax. However, the objective is to identify the bridge with sufficient information so as to make the relationship clear in as simple a manner as possible, and not to try and mirror the full syntactical construction of a directory.

4.3.1   Concept equivalence of a Bridge

Due to the nature of directories, unit(s) of information selected from more than one directory may vary in the extent to which they represent the same concept. These variations may be regarded as exact equivalence of the concept or as various degrees of partial or inexact equivalence or at the extreme situation as non-equivalent.

The Concept equivalence of a Bridge is defined as the degree of equivalence of the concepts linked by that Bridge, i.e. the degree of equivalence of the concept defined by the BSU with the concept defined by the related unit(s) of information in the reference directory.

A Bridge between a BSU and its related unit(s) of information in a directory may have one of the following degrees of concept equivalence (by analogy with ISO 5964).

a)   Exact equivalence: The reference directory contains a concept, represented as unit(s) of information, which is identical in meaning and scope to the BSU.

b)   Inexact equivalence: The reference directory contains a concept, represented as unit(s) of information, which expresses the same general concept as the BSU although the meanings of these concepts are not precisely identical.

c)   Partial equivalence: The BSU cannot be matched by an exactly equivalent concept in the reference directory, but a bridging can be defined by selecting a BSU with a broader or narrower meaning. This may be the case when the values in a code list, such as within an EDI directory, contain values which cover more than one concept.

For Bridges to be useful, only exact equivalence should be established.

However, as some bridges are not 100 % equivalent, added notes with the bridge information will provide information as to the actual relationship.

Bridge usage indication: In the case where there is more than one bridge from the BSU to a particular directory equivalent, an indication of the preferred use may be made.

Whilst recognizing that applications such as UN/EDIFACT may implement the same attribute in different sections of a message (header, detail, summary), these implementations will not result in separate BSUs. Each implementation will be recorded as a separate bridge. This usually applies where one can carry information at the header or line item levels in a message. Where the concept is only relevant in relation to the line item, this fact shall be recorded both in the specification of the BSU and the bridge.

4.4 Additional information

Additional information is associated with BSCs and BSUs, such as administrative information for life-cycle management, origins of BSCs and BSUs, their relationship and the different context of use. Administrative information is also recorded for bridges.

5 Attributes in the BSR

In order to define the interface between ISO/IEC 11179-3 and the BSR, it is essential to identify the attributes, as specified in ISO/IEC 11179-3, that are relevant for the BSR.

Table 1 identifies the relevance of attributes as specified in ISO/IEC 11179-3 for the BSR.

Table 2 identifies the specification attributes for the BSR components.

An example of specification attributes for BSR components is available in informative annex C.

Table 1 — Relevance of ISO/IEC 11179-3 attributes for the BSR

Attribute category	Name of data element attribute	Relevance to the BSR
ISO/IEC 11179-3	ISO/IEC 11179-3	
Identifying	Name	BSR semantic component + BSR semantic unit
	Identifier	BSR semantic component + BSR semantic unit and Bridge
	Version	BSR semantic component + BSR semantic unit and Bridge
	Registration authority	By default BSR
	Synonymous name	BSR semantic component + BSR semantic unit
	Context	BSR semantic component + BSR semantic unit
Definitional	Definition	BSR semantic component + BSR semantic unit
Relational	Classification scheme	Not included at this time, but might become relevant
	Keyword(s)	BSR semantic component + BSR semantic unit
	Related data reference	Not relevant
	Type of relationship	Broader/narrower BSR semantic component and BSR semantic unit
		Bridge concept equivalence
		Standards reference
Representational	Representation category	Due to the request to include internationally adopted code sets in the BSR, this set of representation attributes will be relevant for some BSR semantic units
	Form of representation	
	Data type of data element values	
	Maximum size of data element values	
	Minimum size of data element values	
	Layout of representation	
	Permissible data element values	
Administrative	Responsible organization	Open
	Registration status	BSR semantic component + BSR semantic unit and Bridge
	Submitting organization	BSR semantic component + BSR semantic unit and Bridge
	Comments	BSR semantic component + BSR semantic unit and Bridge

Table 2 — Specification attributes for BSR components

Specification attributes for >	Semantic component	Semantic unit	Bridge
> Identifying attributes			
Name (BSU)	yes	yes	
Language code	yes	yes	
Type	yes	yes	
Version Number	yes	yes	yes
Bridge Comments			yes
Bridge environment applicability			yes
> Definitional attributes			
Definition	yes	yes	
Comments	yes	yes	
Name context	yes	yes	
Synonym (name)	yes	yes	
Synonym (name) context	yes	yes	
Keyword	yes		
> Relationship attributes			
Broader Code		yes	
Narrower Code		yes	
Relation to BSU Identification Code	yes		
[BSU] Associated Standard Reference		yes	
[BSU] Associated Standard Selection Reason		yes	
> Representational attributes			
Field size — maximum and minimum		yes	
Character set type		yes	
Permissible value domain values		yes	
> Concept equivalence attributes			
Bridge Data Concept Equivalence			yes
Bridge Implementation Equivalence			yes
Bridge Directory Use Indicator			yes
Bridge Sequence Number			yes

Table 2 — *(continued)*

> Administrative attributes			
[BSU] Source Agency Reference		yes	
[BSU] Source Document Reference		yes	
[BSU] Source Document Language Code		yes	
Bridging Agency Reference			yes
Bridging Agency Directory			yes
Bridging Agency Directory Version Identifier			yes
Bridging Agency Directory Data Name			yes
Life-cycle Status	yes	yes	yes
Life-cycle Status Date	yes	yes	yes
> directory (X12 + UN/EDIFACT) structure identification attributes			
Segment Tag			yes
Composite Tag			yes
Data Element Tag			yes
Code Value			yes

6 Rules and guidelines for BSUs, BSCs and Bridges

NOTE   Informative annex B defines the process to be followed for the production, review, approval and registration of **BSR semantic components, BSR semantic units and Bridges**.

6.1 Rules and guidelines for the development of BSR semantic units and BSR semantic components

These rules should enable the building of BSR semantic units from the basic attribute level up to the complex one. The initial emphasis should be on developing these BSR semantic units at the basic level, e.g. Country.Code; Location.Street.Name; Location.Country.Code; Location.City.Name; etc.

The following rules shall be applied for identifying a BSU.

— BSUs initially will be derived from the analysis of

— data representations in existing directories down to and including the most detailed level, and

— existing entries in concept repositories

NOTE   In addition, as new information systems are developed and data is specified according to these rules and guidelines, that new data will be eligible for inclusion in the BSR.

From the above it can be seen that, as one will analyse down to the most detailed level (i.e. a code value of a data element in UN/EDIFACT) BSUs must be defined to support that level of detail, as it is at that level that the data is semantically complete and relevant for interchange.

The notion of "most detailed level" for **BSR semantic units** (which are often compound concepts) and for **BSR semantic components** are defined as follows:

a) The most detailed level for **BSUs** is the complete semantic specification (narrow BSU) which defines a data element concept e.g.: "PurchaseOrder.Contact.Telephone.Number".

b) The most detailed level for BSR semantic components is the list of elementary concepts contained in the BSUs. In the example a), there are four different **BSR semantic components**: PurchaseOrder, Contact, Telephone and Number. Each one can be used in many BSUs.

The following guidelines are applied for identifying a BSU.

— A BSU shall be identified based on an analysis of a specific user need.

— The analysis shall identify the **data element concept** of the studied entry abstracted to its most specific form.

— If, during the analysis of a **data element concept**, a "generic" **data element concept** is identified, then the corresponding "generic" **BSU** will also be defined.

— At the highest level of abstraction, one will identify entities/object classes. These are not BSUs. No bridges will be built to/from them, but they will be considered as **BSR semantic component** entries.

— The definition of a **BSU** shall not contain reference to its physical representation.

NOTE   Associated comments or notes along with the definition, the standard reference, or the bridge may point to the relevant public standard, which itself will contain information on the representation. However, as the BSR is seen as an international multilingual data register, it is intended that the BSR be designed to include the standard physical representations, as and when any copyright issues have been resolved, to provide a one-stop shopping service to the end-user community.

6.2   Rules and guidelines for the definition of BSR semantic components and BSR semantic units

This has been updated, based on the recommendations of the Paris workshop in December 1995 which proposed a combination of the rules and guidelines as specified in ISO/IEC 11179-4 into one grouping.

The definition of a BSR semantic component and a BSR semantic unit shall

a) state what the concept is, not what it is not, in a precise, unambiguous and exclusive manner. This may require indication of the context, domain, or subject area.

b) be unique (within any data dictionary in which it appears).

c) be stated in the singular.

d) only contain those abbreviations and acronyms that are spelt out in a table of abbreviations and acronyms, i.e. accepted internationally.

e) be expressed without embedding definitions of other underlying concepts and describe only one concept.

f) be related to the definitions of any superordinate (broader) or subordinate (narrower) concepts, i.e. use the same terminology and consistent logical structure for related definitions.

g) be brief, i.e. a concise definition in one sentence that includes the essential characteristic of the concept. Additional information such as embedding rationale, functional usage, domain information, or procedural information, should be given in comments or notes.

h) use the same part of speech in the definition as in the term (verbal phrase for a verb, nounal phrase for a noun, etc.), i.e. no gerunds (no verb form acting as a noun and vice versa).

i)   not write definitions where a concept is defined by another, which in turn is defined by the first (external circular definition).

j)   use the relevant list of BSR semantic component entries for defining BSUs.

k)   be in the multiple languages of the BSR.

6.3   Rules and guidelines for the development of Bridges

Whilst recognizing that applications such as UN/EDIFACT may implement the same attribute in different sections of a message (header, detail, summary), these differences will not necessarily result in separate BSR semantic units. As required, these different implementations will be handled as multiple bridge specifications for the same BSU.

The following **rules** shall be applied for developing a Bridge.

⎯   Every bridge shall identify the conceptual equivalency of a **BSR semantic unit** in a directory.

⎯   Every bridge shall recognize, when applicable, any required implementation conventions or implementation guidelines.

⎯   Each bridge shall be uniquely identified.

⎯   When there are multiple alternative options for a bridge from a **BSR semantic unit** to a directory entry, a preferred way may be specified, if this is relevant or possible.

⎯   Development of the bridge is the responsibility of the appropriate directory agency (bridging agency) working in cooperation with the BSR Production Team/BSR Operating Agency.

⎯   When defining bridges, each potential bridge from a **BSR semantic unit** to a directory equivalence shall be considered from the three following viewpoints:

  ⎯   comparison;

  ⎯   conversion/migration;

  ⎯   new design.

6.3.1   Syntax for recording the Bridge

For example, the syntax (relevant for both UN/EDIFACT and ASC X12 data) to be used for recording bridge detail is as follows.

For each major syntactical component in a message, i.e. segment, segment level, data composite, the components will be separated by a **"+"**.

To join sections that are composed of the lower level syntactical components within a bridge, data element or code value the colon **":"** will be used.

EXAMPLE   BGM+C002:1001/220+DTM+C507:2005/137:2380:2379/101 or 102 for the bridge to the UN/EDIFACT equivalence for the BSU named as PurchaseOrder.Issue.Date.

NOTE   The current BSR also contains bridge syntax data from STEP and GILS data.

Annex A
(informative)

BSR operating and registration process

A.1 Introduction

The purpose of this annex is to define the process to be followed for the production, review, approval and registration of **BSR semantic components, BSR semantic units** and **Bridges** for the Basic Semantic Repository (BSR). This annex is given as an example and it will be replaced by the detailed procedures corresponding to the BSR tool that has been chosen. The new version will be published concurrently to the BSR tool availability.

NOTE   Although the process described in A.1 addresses existing directory data, the principles of the process are equally applicable in the case of new systems development. In this case, the task will be for the application developers to examine the business processes involved for their application, and then to identify the data needed to support them. Here a small group, as with most applications development work in practice, carries out this analysis but, for inclusion in the BSR, the broad external review will still be required. The process described in A.2 covers both the existing directory analysis, development of the content and review. With external systems, it will be the review phase only that will be relevant.

A.2 The overall process

Based on the experience gained in the trial production work, the following broad lines are considered practical for the identification, development, review and registration of **BSR semantic components, BSR semantic units** and **bridges**.

a)   **Task 1**

For the basic production work, it has been found practical to have a small multi-discipline group of people analysing existing directory data and to extract the **BSR semantic components** found in that directory. These **BSR semantic components** should have definitions developed for them and preferred names proposed. This exercise will also identify synonyms used in practice. These should be recorded as synonyms of the preferred name. These fully specified **BSR semantic components** will then be the basis for the development of **BSR semantic units**. Once these **BSR semantic components** have been extracted, they should be capable of being consistently used across multiple subject areas. However, if, in developing **BSR semantic units**, it is found necessary to upgrade the definitions and names, or to add new **BSR semantic components**, then this will be done. It is anticipated that, with thorough analysis in the first place, the need for revisiting the **BSR semantic component** specification should be minor.

b)   **Task 2**

Again, the same small multi-discipline group, see the fourth paragraph of item e) below, should analyse the directory for the identification and development of **BSR semantic units** for the subject area under consideration. They should prepare definitions for the **BSR semantic units** and develop names for them based on the definitions. The definitional and naming work should be based on the **BSR semantic component** specifications already defined under Task 1 above.

NOTE   Tasks 1 and 2 are carried out in a fully integrated and interactive manner and are not totally separate in nature.

c)   **Task 3**

Whilst going through the **BSR semantic unit** analysis work, it was found necessary to consider the detail in the directory data down to the lowest level of detail, to code values in many cases. Thus, one sees the syntactic detail in the directory and it was found realistic to record the basic **bridge** information as a regular activity at this time. However, when one goes to other directories, it will be necessary to work directly with the directory maintenance

agency to ensure that the equivalence in that directory is recorded, and that any missing **BSR semantic units** and the **BSR semantic components** behind them be identified and specified. It will also be necessary to review the initial directory draft bridges with its maintenance agency to ensure correctness.

d) **Task 4**

Because the basic development work was prepared by a small team, it has not been subject to a rigorous review. This shall be done by sharing the draft production work on **BSR semantic components and BSR semantic units** with a broad set of reviewers from different directories and industry sectors. This review shall send its comments back to the initial small production team for upgrading as deemed necessary.

e) **Task 5**

As an ongoing part of the whole process, the content will be registered, in line with the administrative attributes as described in informative annex C, by the registration authority. The Production Team will handle this function prior to the establishment of the registration authority.

Versions of the **BSR semantic components and BSR semantic units** shall be produced in the three initial languages, English, French and German by the production team. Other languages may be added based on the initial versions, as countries provide the resources for the preparation and maintenance of their versions.

The multi-discipline team should be composed of a mix of people with experience in systems development, terminology, data management techniques and the subject area under analysis, and have a multilingual background. A group of five to seven people per subject area with the mix of expertise as in the previous paragraph, are considered optimal for this phase of the work.

It is important that the same group be responsible for the development of **BSR semantic components and BSR semantic units** covering the same subject area to ensure continuity.

Because of the structure of the work as described in Tasks 1 to 4 above, it will be necessary and essential that the process be considered iterative from task to task, with effective feedback at each stage, to ensure that the final output is a stable quality product.

It is essential that there is continuity of the people on the basic production team to ensure continuity, and that will require that resources are committed for the necessary time frame in line with the approved programme and schedule of work. This continuity should be centred around the subject area under consideration. The subject area experts are the only ones with the necessary knowledge in their subject area, whereas the terminology and data management experts can be subject-area independent. Their task is to ensure that the **BSR semantic components and BSR semantic units** are specified in the same manner across all subject areas.

A.2.1 Skill sets for the development and review of the BSR content

From C.1.1, and the recognition that the prime need is to have data specifications that are relevant for communication between computers, as well as having to be effective in a mutilingual environment for human understanding, Table A.1 identifies the mix of skills required. A mix of these skills, as indicated in C.1.1, is the ideal for the effective progressing of the BSR.

Table A.1 — Skill/knowledge for BSR development and review

Skill/knowledge	BSR semantic component development (Note 1)	BSR semantic unit development (Note 1)	BSR semantic component and BSR semantic unit review	Bridge specification
Systems development (Note 2)	Yes	Yes	Yes	Yes
Terminology	Yes	Yes	Yes	
Linguistics	Yes	Yes	Yes	
Subject area	Yes	Yes	Yes – from multiple subject areas	Yes – per directory
Directory structure		Yes		Yes
NOTE 1 BSR semantic component and BSR semantic unit development in this table includes analysis of the subject area and specification of the content according to the rules defined in clause 6.				
NOTE 2 Systems development expertise includes experience in the application of data management principles and the specification of application requirements for systems development.				

A.2.2 Relationships between the BSR and agencies responsible for directories

As the BSR is foreseen to be a central multilingual registry for data, and that to be successful a close relation with the user community is seen to be essential, it is important to define the inter-relationships between the BSR and the owners of the data, i.e. the agencies responsible for existing directories and those developing applications for electronic data communication.

This will require that the BSR work in partnership with the data owners to develop the data content in a manner that ensures commonality of the data specified according to a single standard, that which is based on ISO/IEC 11179 adapted as in this document.

A proposed manner of working is as follows.

The data owners, being the subject area experts, should participate in the BSR production work, when it addresses their subject area, by providing resources to work on that subject area data. Even though there may be an existing directory covering the subject, it has probably been developed using the agencies' own proprietary data specification standards versus the International Standard used for the BSR. This is particularly true in the situation where there is data that is common across subject areas but has different specifications. Here a common specification would be beneficial to all concerned. In this situation having a specification that is based on a standard can be reviewed across sectors, and then, after approval, can be universally accepted. By recording the bridge information, it will be possible to cross-reference between directories as an intermediate solution to having common data specifications that can be adopted by everyone. In all cases, each agency would be responsible for their data, but they would agree to cooperate for the common good, in accepting that what is common will have one specification, and that that which is specific to them would be specified using the ISO standard specification rules.

From the above description, two ways of involvement are envisaged for directory agencies:

— direct participation in data specification for a subject area with the BSR;

— review of common data used across subject areas.

It will be necessary to formalize the relationship with each agency individually. Initial agencies for consideration could include: ISO/TC 46 (Bibliographic data); ISO/TC 68 (Financial data); ISO/TC 154 (Trade data); ISO/TC 184 (Product/STEP data); ISO/TC 215 and CEN/TC 251 (Health care data); etc.

A.3 Role of the Registration Authority (RA) for the BSR

A.3.1 Introduction

From an examination of the requirements for a Maintenance Agency or a Registration Authority for managing the content of the Basic Semantics Register (BSR), it would seem that a registration authority would be most appropriate. In this case, the rules for the BSR shall be the International Standard with the content being in the register. The sections in the ISO/IEC Directives, Part 1 dealing with this are annexes M and N (normative) respectively.

A.3.2 General presentation

The registration authority role would be to

— record and register data according to the rules set out in this Technical Specification,

— manage the hardware and software system containing the BSR data, ensuring that it is made available for the development and review community to carry out their data specification tasks, and to the end-user community for the use of the approved data,

— provide support for developers and end-users in a way that will provide an effective environment recognizing not only simple query capability, but be capable of being extended to meet changing needs as the technology develops.

A more detailed description is given in A.3.2.1 to A.3.2.3.

A.3.2.1 Requirements for a Registration Authority for the BSR

The detailed requirements for a registration authority are as follows.

A technical committee or subcommittee developing an International Standard that will require a registration authority shall inform the Chief Executive Officer at an early stage in order to permit any necessary negotiations and to allow the Technical Management Board to take a decision in advance of the publication of the International Standard.

— The Technical Management Board designates registration authorities in connection with International Standards on the proposal of the technical committee concerned.

— Registration authorities should be qualified and internationally acceptable bodies; if there is no such organization available, such tasks may be conferred upon the office of the CEO by decision of the Technical Management Board.

— Registration authorities should be required to indicate clearly in their operations that they have been designated by ISO or IEC (for example, by including appropriate wording in the letterhead of the designated body).

— Registration functions undertaken by the registration authority under the provisions of the relevant International Standard shall require no financial contribution from ISO or IEC or their members. This would not preclude, however, the charging for services provided by the registration authority if duly authorized by Council.

A.3.2.2   Requirements of the registration authority

— To register requests.

— To follow the registration procedure including the necessary contacts, correspondence, resolution of issues, etc.

— To maintain the registry.

— To provide support to users querying the registry as well as on general user questions.

— To publish the standard electronically. In addition to publish paper versions at a frequency to be agreed in the negotiations.

— To maintain and support the operational registry including the database and associated software.

NOTE   This latter point will necessitate the RA to keep up to date with technological advances and changing user needs so as to be able to provide improvements to the system in line with those advances and changes.

A.3.2.3   Process to be followed for approving the body to act as the RA

— This process shall be initiated at the latest at the Committee Draft (CD) stage of the standard on the BSR Rules.

Step 1. The identified body should provide a letter stating that they would like to undertake the role of being the registration authority for the BSR according to Technical Specification ISO 16668 on the Rules, Guidelines and Methodology for the BSR, to the secretariat of the technical committee having the responsibility for the standard, with a copy to S. Clivio, ISO/CS.

This letter should identify any financial implications, see last point of RA requirements (A.3.2.1).

Step 2. The responsible technical committee shall prepare a resolution approving the giving of the registration authority responsibility to the identified body.

Step 3. The resolution from the technical committee and the letter from the proposed registration authority shall be submitted to the Technical Management Board for approval in line with the ISO/IEC Directives, Part 1.

A.4   Registration process

After approval this process shall be published as part of the standard on the BSR Rules.

Step 1. The data to be registered shall come from a sponsoring body, e.g. a technical committee (TC) or a subcommittee (SC), an ISO member body, a recognized consortium, an industry body, another international organization such as IEC, ITU, UN/ECE, etc.

Step 2. The RA shall control whether the request as submitted is in line with the rules (which shall be a Technical Specification). If they are not in line then the request shall be returned to the sponsoring body with remarks as to the reasons for rejection and, as relevant, what would need to be done to make the request acceptable.

Step 3. The RA shall check if the requested entry is already included in the BSR. This could be with a different name or definition. If it is already there then the RA shall advise the sponsoring body and the review board. No further action is then required of the RA, except to potentially record a synonymous name.

Step 4. If the request is in line with the rules and is found to be a new entry, then the RA shall register the entry with a unique identifier and give it the status "recorded or draft".

Step 5. The RA shall send the draft **electronically** to the identified review board, who shall either approve it as is, or provide comments identifying what would be required for approval.

This review board shall be composed of recognized experts in the subject area having business systems and subject expertise. The review process shall have a maximum review period of five working days from receipt of the review request.

Step 6. The RA shall resolve the review board comments with the sponsoring body and the review board, and once all of this has been satisfactorily resolved, the status of the entry shall be changed to "certified or approved".

Any proposed changes to an existing approved entry shall follow the same process.

Annex B
(informative)

Representation classes

This annex provides the set of representation classes. It should be noted that if, in the future, some additional representation classes are considered necessary, the list will be extended. (At this time, another term has to be added to the present list, it was found during the work on STEP/EDIFACT analysis).

Hereafter are class names and their definition.

Amount
A number of monetary units.

NOTE   It is normally specified with a type of currency.

Code
Words, letters, figures or symbols used to represent others for brevity or secrecy.

NOTE 1   Codes can include both internal (private) and external (public) codesets.

NOTE 2   Within the BSR, the use of the property Code will be limited to those BSUs that have an associated codeset.

Example of a codeset: ISO 3166 Country 2A code plus name.

Date
A particular day of a calendar year. Ref.: ISO 8601:1988.

NOTE   This will be implemented with the use of a specific date format and a date value in that format.

DateAndTime
A particular point in the progression of time.

Additional information: This may incorporate, dependent on the level of precision, the concept of date – a particular day in a calendar year, time in a particular day, etc.

Identifier
A character string identifying an object and distinguishing it from all other objects.

NOTE   The word Number is often used in practice instead of the more precise term of identifier. e.g. PurchaseOrder.Number, SocialSecurity.Number, Telephone.Number.

Indicator
A two value attribute indicating a condition such as: on/off, true/false, yes/no, 0/1, etc.

Name
 A word or phrase that constitutes the distinctive designation of a person, place, thing or concept.

Number
An arithmetical expression representing a particular value.

NOTE   Its use will be limited to those BSUs that express a sequence or a member of a series, such as Serial.Number.

Percent
A rate expressed in hundredths between two values that have the same unit of measure.

Quantity

A number of non-monetary units.

NOTE   These will normally be specified with a unit of measure.

Rate

A quantity or amount measured with respect to another measured quantity or amount. e.g. US dollars/hour, US dollars/French franc, miles/gallon.

Text

A series of sentences describing a person, object or event.

NOTE   This can be applied both for definitions, which are generally one or two sentences, and for longer textual passages.

Time

The particular clock time of a day. Ref.: ISO 8601:1988.

NOTE   This will be implemented with the use of a specific time format and a time value in that format.

Value

A numeric quantity that is assigned or is determined by calculation or measurement.

NOTE   For financial or monetary values, the property term Amount is to be used.

Annex C
(informative)

Examples of specification attributes for BSR semantic components, BSR semantic units and bridges

C.1 BSR semantic component list: specification attributes

C.1.1 Identifying attributes

Identification code
A code identifying an individual BSR semantic component. This code is common for all language versions.

Version Number
A number identifying a particular specification of a BSR semantic component in a series of evolving specifications within the BSR.

BSR semantic component Type Identifier
An acronym identifying the type of BSR semantic component, CT (Concept), RC (Representation Class).

NOTE   Object class might also be recorded here, but it should be recognized that an object class in one context might be a qualifier in another.

Name
The terms/words used to name a BSR semantic component in a given language. This will be considered as the **Preferred name.**

Language code
A code identifying the language in which the BSR semantic component is specified (defined and named).

C.1.2 Definitional attributes

Definition
The text defining the BSR semantic component.

Comments
Text that is used in addition to the definition of the BSR semantic component which provides more information, including any comments as to the context in which the BSR semantic component is used.

Synonym
A BSR semantic component name that can be used as an alternative for another BSR semantic component name, but which is not to be considered as the preferred BSR semantic component name for general use.

Non-preferred names may be synonyms or specific to a particular environment (industry or sector specific name). Their inclusion is to aid in searching for BSR semantic component entries providing the same functionality but which may have a different name, as a means to control duplication, as well as to provide a common name for adoption, when alternatives exist.

Preferred names are those that should be adopted for use in all relevant environments.

Synonym context
The environment, subject area or context in which the synonym is used.

NOTE   The above two attributes shall normally be used together as a pair.

Keyword
A word of dominance or significance.

Keyword(s) will be the name of a BSR semantic component and any synonyms. They will be used for indexing and access purposes.

C.1.3 Relationship attributes

Related BSU Code
Code(s) identifying a BSU (or BSUs) in which the BSR semantic component is used.

C.1.4 Administrative attributes

Life-cycle Status
The name (or code) identifying the status of a BSR semantic component at a particular point in its life-cycle. Values to be used as referenced in ISO/IEC 11179-6 are: Recorded; Certified; Standardized; Phased-out and Retired.

Life-cycle Status Date
The calendar date on which a BSR semantic component was assigned a specific life-cycle status.

C.2 BSR semantic unit list: specification attributes

C.2.1 Identifying attributes

BSU Identifier
A code identifying an individual BSU. This code is common for all language versions.

Version Number
A number identifying a particular specification of a BSU in a series of evolving specifications within the BSR.

BSU Name
The terms/words used to name a BSU in a given language.

BSU Language code
A code identifying the language in which the BSU is specified (defined and named).

C.2.2 Definitional attributes

Definition
The text defining the BSU.

Comments
Text that is used in addition to the definition of the BSU which provides more information.

Name context
The environment, subject area or context in which a BSU name is used.

Synonym
A name that can be used as an alternative name for a BSU name, but which is not to considered as the preferred BSU name for general use.