ISO/TC 211 N ????

2010-06-22

Number of pages: 53

ISO/TC 211
Geographic information/Geomatics

ISO reference number: 19160

Title: **Draft Review summary of project 19160, Addressing**

Source: ISO/TC 211/WG 7/PT 19160

Expected action: For information

Type of document: Review Summary

Hyperlink: http://www.isotc211.org/protdoc/211n????/

ISO/TC 211 Secretariat

Standards Norway
Strandveien 18
P.O. Box 242
NO-1326 Lysaker, Norway

Telephone: + 47 67 83 86 71
Telefax: + 47 67 83 86 01

E-mail: bjs@standard.no

URL: http://www.isotc211.org/

Contents

Revision history

Date	Description
22 June 2010	Add the watermark Reference EURADIN reports in the Introduction and bibliography Accept Morten Lind's feedback, mainly on the INSPIRE review Add justifications for the inclusion of standards in the review in Table 1, Address standards that were reviewed Move conceptual model etc. to section 7 Add results of the review of address terms and concepts in section 5.1 Add Annex B, which has the details of the review of address terms and concepts
13 April 2010	Add reviews by the three teams
25 March 2010	Skeleton document

Introduction

Addresses are one of the most common ways of describing a location. Addressing systems vary from country to country: in many Euro-centric countries reference to a road network in the address is common, while addresses in countries such as Japan comprise a hierarchy of administrative areas without reference to a thoroughfare. Addresses are used for a wide variety of purposes: postal delivery, emergency response, customer relationship management, land administration, utility planning and maintenance, etc.

Sometimes a geographic overview of addresses at a large scale is required, e.g. land administration and utility planning and maintenance. For mail delivery or emergency response planning, accurately identifying individual delivery points in a suburb or street is priority. In a customer analysis, individual delivery points are sometimes completely discarded and only the place name in the address is of relevance, while for mail delivery and customer analysis addresses tend to also include names of parties and are constrained by the formatting rules (address label). Standardization of such formatting rules has a great impact on the efficiency of address label rendition (writing) and recognition (reading) and therefore on the overall efficiency of the delivery process.

Addresses lie between geographic information, electronic business and postal systems, amongst others, and therefore quite a few stakeholders are involved in address standardization. Figure 1 illustrates the variety of stakeholders involved in addressing. Stakeholders, including the ISO-UPU contact committee and ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration*, were kept informed of the ISO 19160 project before and during the project. The list of member bodies and liaison organizations that nominated experts for the project is included in Annex D.

Figure 1. Addresses

The benefits of address standardization are well-documented, including benefits to the economy, society and governance (Barr 2007, Coetzee & Cooper 2007a, Lind 2008, Nicholson 2007, EURADIN 2009)). These benefits are not restricted to interoperability of existing address data in the developed world, but also provide guidelines to developing countries that still have to develop addressing systems. Thus, participation and perspectives from both developed and developing countries is important.

1 Scope

This review summary is a report of the work done as part of the ISO 19160, *Addressing*, stage zero project, which served to enable formal collaboration among addressing stakeholders in order to reach the two objectives stated in the project's proposal (ISO/TC 211 document number N 2737):

Objective 1: Investigate and formulate requirements in relation to addressing.

Objective 2: Make recommendations on whether standards should be developed and if so, how this should be done.

Thus, to confirm: the objective of this project is NOT to write an address standard, but rather to review existing address standards in order to identify international addressing standardization requirements and to make recommendations on how these should be developed.

2 Symbols and abbreviated terms

AFNOR	l'Association Française de Normalisation
AS/NZS	Standards Australia and Standards New Zealand
BSI	British Standards Institute
CEN	European Committee for Standardization / Comité Européen de Normalisation
INSPIRE	Infrastructure for Spatial Information in Europe
ISO/TC 154	ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration in collaboration with UN/CEFACT*
IETF	Internet Engineering Task Force
ISO/TC 211	ISO/TC 211, *Geographic information/Geomatics*
OASIS	Organization for Advancement of Structured Information Standards
SABS	South African Bureau of Standards
TWG	Thematic Working Group
UPU	Universal Postal Union
US FGDC	United States Federal Geographic Data Committee

To be completed

3 Overview of this review summary

Section 4 describes the approach that was followed to achieve the two objectives of the scope of this project. In section 5 the results of the review of existing standards are presented. Section 6 presents the gap analysis and identifies requirements that are already addressed by existing standards and those that are not. Section 7 contains a conceptual model…we added this to the ToC in Quebec, but in retrospect, is this within the scope of the project? Section 8 contains the recommendations that describe how ISO standards for the requirements that were identified in both the review and the gap analysis, should be developed. Finally, a conclusion is presented in section 9 .

Annex A provides background on address usage and address data. Annex C contains a lists address standards, as well as the scope of those address standards that were reviewed for the project. Annex D shows the member bodies and liaison organizations represented on the project team.

4 Approach

4.1 Approach to achieving the first objective

In order to investigate requirements in relation to addressing, the project team *reviewed* a number of existing national and international standards. The standards to be reviewed were selected so as to represent different addressing contexts and uses. Refer to Table 1 for the list of standards that were reviewed, as well as a justification for the inclusion of the standard in the review. The requirements according to which the standards were reviewed were grouped into three categories: Address terms and concepts; Address encoding, rendering and aliases; and Address data quality. The approaches followed to review each category of requirements are described in sections 4.1.1, 4.1.2 and 4.1.3 respectively. The results of the review are presented in section 5 of this document.

From the results of the review, a *gap analysis* was done in order to identify those requirements that were not met by existing standards. The result of the gap analysis is presented in section 6 of this document.

The approach enabled the project team to identify requirements that have not yet been addressed in existing address standards. It also ensures that existing standards are taken into account and, where possible, re-used so that work is not duplicated.

Table 1. Address standards that were reviewed

Standard	Abbreviation used in this document	Publisher	Publication Date	Level	Justifiation
ISO 19112:2003, *Spatial referencing by geographic identifiers*	ISO 19112	ISO/TC 211	2003	International	International standard for spatial reference systems using geographic identifiers, such as gazetteers.
ISO/TS 15000-5, *Electronic Business Extensible Markup Language (ebXML) - Part 5: ebXML Core Components Technical Specification*, Version 2.01 (ebCCTS)	ISO/TC 15000-5	ISO/TC 154	2005	International	International standard for terminology and core components in electronic business and administration.i Includes, for example, a number of different address profiles, each specifying a number of address related fields that should be used together on a form such as an invoice.
OASIS CIQ v3.0 Approved Committee Specifications CS02	OASIS CIQ	OASIS	2008	International	International address standard, especially interesting for its XML schema.
UPU S42, *International postal address components and templates*	UPU S42	UPU	2006	International	International address standard with specific focus on postal mail. A number of countries have already submitted postal address templates that specify how an address should be written on a mail piece.
UPU S53, *Exchange of Name and Address Data*	UPU S53	UPU	2009	International	International address standard with specific focus on postal mail.
AS/NZS 4819:2003, *Geographic information – rural and urban addressing*	AS/NZS 4819	AS/NZS	2003	International (Australia and New Zealand)	Regional address standard, especially interesting for the its rural addressing scheme.
INSPIRE *D2.8.I.5 Data Specification on Addresses – Guidelines*.	INSPIRE	INSPIRE TWG Addresses	2010	International (Europe)	Regional address standard that specifies how public authorities of EU member states must make their address data available. Therefore expected to have a significant impact as a data exchange standard within the EU.
AFNOR XP Z10-011, *Specifications postales – Adresse postale*	AFNOR	AFNOR	1997	National (France)	National postal address standard from a developed country.

SANS 1883-1, *Geographic information – Address*	SANS 1883-1	SABS	2009	National (South Africa)	National address standard from a developing country with a wide variety of address types, including free text address types for informal settlements and rural areas.
BS 7666-0:2006, *Spatial datasets for geographical referencing - Part 0: General model for gazetteers and spatial referencing*	BS 7666	BSI	2006	National (UK)	National address standard from a developed country, based on ISO 19112 above.
Draft U.S. Thoroughfare, Landmark, and Postal Address Data Standard	US FGDC	US FGDC	2010	National (USA)	National address standard from a developed country with a wide variety of address types and a separate part for address data quality.

4.1.1 Approach to the review of address terms and concepts

Addressing requirements that were reviewed:

1. Scope of the standard
2. Terminology
3. Classifications of addresses (address types)
4. Identification of possible components of an address
5. Conceptual model (relationship between components)

The results of the review of the above five requirements are described in section 5.1, while details of the review are provided in Annex B.

4.1.2 Approach to the review of address encoding, rendering and aliases

Addressing requirements that were reviewed:

1. Transfer and exchange of address data
2. Address rendering (print/write/display) of address data
3. Multilingual addresses and management of address aliases

Each requirement is treated in a separate section that comprises an introduction, standard specific sub-sections and a conclusion. Only those standards are listed that are of relevance to a requirement. The conclusion summarizes findings and formulates recommendations about possible needs for a new standard covering a requirement.

4.1.3 Approach to the review of address data quality

Addressing requirements that were reviewed:

- Definitive address datasets (reference dataset)
- Quality management
- Life cycle
- Metadata for addresses

Add description of how the review was done – same as 4.1.2?

4.1.4 Approach to the review of address assignment schemes

To be done?

4.2 Approach to achieving the second objective

The outcome of this objective is to recommend which route to follow for which standardization requirement or group of standardization requirements, as identified by the first objective above. Potential routes for proceeding with an international address standard within ISO were identified in the initiative that led to this project (ISO/TC 211 WG 7 2008). Are there additional routes that we should now consider? The requirements resulting from the first objective are grouped into packages, each of which can be implemented as a single project. Depending on the content of the package, expected duration of the project, stakeholders that would be involved and users of the resulting standards, a route that should be followed for its implementation is assigned to each package. To be completed after the review and gap analysis have done

5 Results of the review of existing address standards

5.1 Address terms and concepts

5.1.1 Scope

The review of the scope statements reveals interesting information about the content and purpose of the reviewed address standards. However, it should not be seen as a review of the standards as such, since for example, postal or mail items are not mentioned in the scope statement of SANS 1883-1, but the standard does specify five postal address types that are in use by the South African Post Office.

All standards mention addresses in their scope statement, except for the two address-related standards that were included in the review, ISO 19112 and ISO/TS 15000-5. While only a few standards refer to postal or mail items and delivery in their scope statements (AFNOR, UPU S42, Draft US FGDC), most of them include some aspect of addresses for postal delivery in some way or other in the standard. A common theme in the scope statements is the definition of address elements and components, along with how these should be combined to form addresses. In some cases (where applicable) an XML schema is included. While exchange, transfer, interoperability and harmonization are not mentioned in all scope statements, it can be assumed standards in general support interoperability and that this is a goal of all the reviewed standards. A few standards refer to the management of address data in files and address databases (AFNOR, ISO 19112, INSPIRE, US FGDC). Two standards mention address data quality in their scope statements (INSPIRE and US FGDC); a single standard refers to address allocation (AS/NZS 4819).

The complete scope statements of the reviewed address standards are provided in Annex B.

5.1.2 Terminology

Most of the reviewed address standards define an address. INSPIRE and BS 7666 specifically define an addressable object, i.e. the object with which the address is associated. In the other standards, whatever the address is associated with is implied in the address definitions. Below are the definitions for the term 'address' from the reviewed address standards, as well as the addressable object as defined in these standards. The complete list of terms defined in each of the reviewed address standards can be found in Annex B.

address

- set of information which, for a postal item, allows the unambiguous determination of an actual or potential delivery point, usually combined with the specification of an addressee and/or a mailee [AFNOR]
  NOTE: the term is defined as 'postal address'.
- means of identifying a location (company's or private individual's address) [AFNOR]
- the conventional means of describing, labelling or identifying an address site [AS/NZS 4819]
- means of referencing an object for the purposes of identification and location [BS 7666]
- location of properties based upon address identifiers, usually road name, house number, postal code [INSPIRE]
- the location at which a particular organization or person may be found or reached [ISO/TS 15000-5]
- a physical location or a mail delivery point [OASIS CIQ]
- an unambiguous specification of a point of service delivery [SANS 1883-1]
- specifies a location by reference to a thoroughfare or a landmark; or it specifies a point of postal delivery [US FGDC]
- set of information which, for a postal item, allows the unambiguous determination of an actual or potential delivery point, usually combined with the specification of an addressee and/or a mailee [UPU S42]
  NOTE: 'address' is an alias for 'postal address'.

addressable object

- a real world object that has a fixed location and which may be identified and referenced by means of one or more addresses [BS 7666]

- spatial object type which can have instances to which it is meaningful to associate addresses in the context of the INSPIRE scope [INSPIRE]

whatever an address is associated, as implied in the address definition

- location [AFNOR]
- address site [AS/NZS 4819]
- location (identifiable geographic place) [ISO 19112]
- organization or person [ISO/TS 15000-5]
- physical location or mail delivery point [OASIS CIQ]
- point of service delivery [SANS 1883-1]
- actual or potential delivery point [UPU S42]
- location or point of postal delivery [US FGDC]

5.1.3 Classifications of addresses (address types)

Address classification is a common theme in the reviewed address standards. The following different methods of classification were found:

- Addresses are classified according to their *content*, i.e. the components that make up the address. Examples are the street address and intersection address types (SANS 1883-1), the address classes in US FGDC and the profiles for an invoice address, residential address, etc. in ISO/TS 15000-5.

- Addresses are classified according to where they are *used*, e.g. urban and rural addresses (AS/NZS 4819 and OASIS CIQ).

- Addresses are classified according to *whatever they are associated with*, e.g. Airport, Business, CaravanPark, etc. in the AddressTypeList of OASIS CIQ.

In some standards addresses are not classified at all, but rather the standard allows the specification of valid combinations of components, i.e. address types (ISO 19112, INSPIRE and UPU S42).

5.1.4 Address components

Addresses are made up of a range of components or elements of various types. Components used for reviewed address standards include, but are not limited to, the following:

Add references to relevant standards. Suggestions to include/exclude components?

- Country – the formal name of a recognized country (INSPIRE, SANS 1883-1);
- Region of national administrative area name – the name of a region or national administrative area within a country;
- Local administrative area name - the formal name of a local administrative area, for example a county;
- Locality name – the names of one or more recognized local areas;
- Block number – the identifier of a small area bounded by a set of streets or other dividers;
- Street or thoroughfare – the names of one or more streets or thoroughfares;
- Reference point – the name or description of a landmark point, for example the junction of two streets;
- Proximity – the relationship of the addressable object to a reference point, for example 200 metres along Main Street from the junction with Second Street;

- Property number or name – an alphanumeric identifier for the property assigned by some authority, and displayed on the property. This identifier will be unique within a street, block or small area. When numeric, these identifiers are usually ordered according to sequence in the street.
- Sub-unit name or number – a unique identifier of a sub-unit within a property;
- Postcode or zipcode – a code allocated to one or more delivery points by a postal authority, and often used as a reference object for other purposes.

Some of the reviewed address standards include components for the person or organization at the address, e.g. *party* in OASIS CIQ, *mailee* in UPU S42 or *recipient* and *addressee* in AFNOR. The scope of this review includes the address only, thus these components are not reviewed.

5.1.5 Conceptual model (relationship between components)

To be done – in the mean time, fill in information in Annex B

5.1.6 Conclusion

There is a wide range of standards in use around the world, reflected in the reviewed address standards. Given that these are well integrated into various operational processes and in some cases legally enforced, it is not likely that these can be changed in the foreseeable future.

However, addresses are being increasingly used to describe new geographic objects, while some countries are trying to rationalise their addressing systems or create a new one. Thus the possible scope of one or more International Standards for addressing could include:

- a 'standard for local address standards', based upon international best practice;
- a set of harmonized terms and definitions; and/ort
- a 'universal' conceptual model that enables interoperability between the models described in different address standards.

5.2 Address encoding, rendering and aliases

Note: For now, recommendations should be considered as the opinion of the project leader based on the review.

5.2.1 Transfer and exchange of address data

5.2.1.1 Introduction

Standards facilitate exchange of address data usually by:

- definition of encoding i.e. format of the data file or message
- specification of data content i.e. meaning of data components

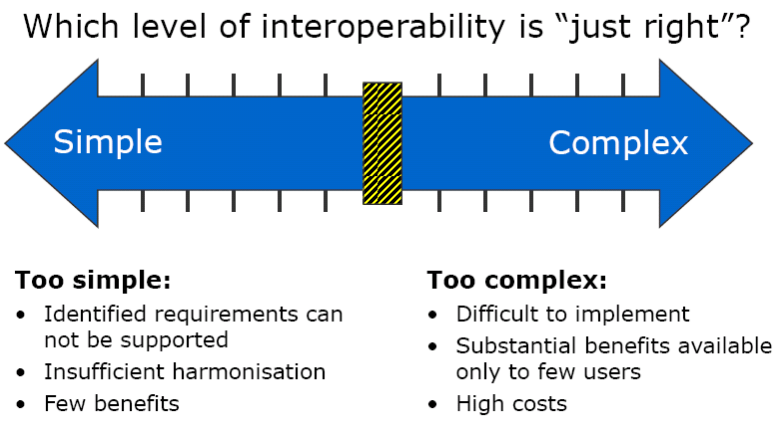

Figure 2. Optimal level of interoperability

Data specifications that are thought to support exchange standards face complexity trade-off. As considered by INSPIRE Drafting Team for Data Specifications: too detailed specifications are costly, difficult to implement and consequently only few users can really benefit, on the other hand too simple data specification lead to limited benefits and lack of support for important requirements.

Final shape of exchange standard is very often dependent on the set of exchange scenarios to be supported (what parties exchange what kind of data for what kind of usage)

As data content is covered in a separate section this review will be limited to answers for the following questions:

1. If and what **data specification** supports exchange?
2. What **encoding** is defined?
3. If/how the **complexity trade-off** is addressed?
4. What **exchange scenarios** are supported?

In addition to above, **special characteristics** of reviewed standards that are relevant to address data exchange will be described.

5.2.1.2 UPU S53

Data specification: S42 dictionary of elements is included as default but the standard is open for external dictionaries of elements.

Encoding: XML defined by XML Schemas

Complexity trade-off: can carry data split to elements, split to address lines or as entire address label. It also enables to transfer data on various levels of granularity. For example, thoroughfare can be transferred as entire string and also split into parts: type, name, qualifier, name prefix.

Exchange Scenarios: post to post, mailer to post, post to mailer, and mailer to mailer. A post-to-post scenario could include transmission of information concerning undeliverable addresses; a mailer-to-post scenario could involve transmission of electronic data pertaining to each piece in a mailing; a post-to-mailer scenario could consist in the dissemination of change of address information; a mailer-to-mailer scenario could send a name and address file to be incorporated with other similar files in a planned mailing

Special characteristics: In addition to exchange of name and address data S53 enables also transfer of rendering rules (S42 PATDL templates).

5.2.1.3 OASIS xNAL

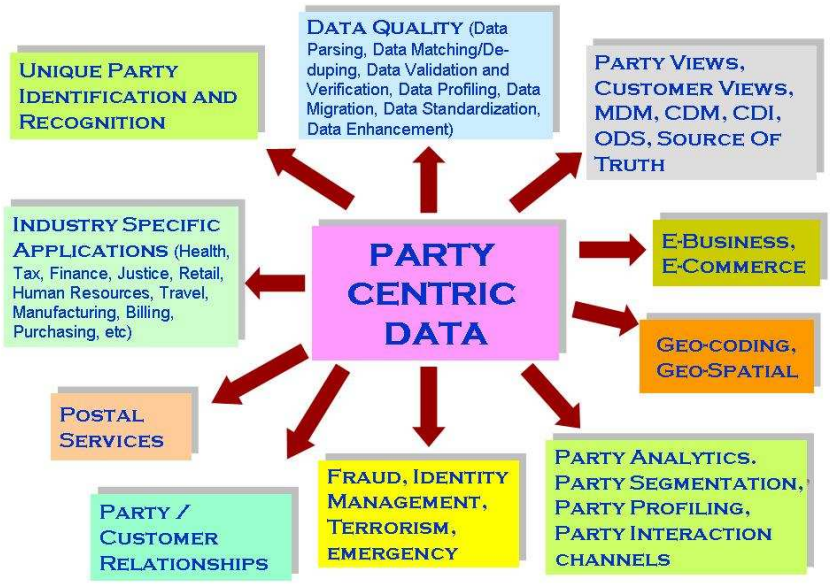

Figure 3. OASIS Party centric data

Data specification: xNAL defines its own logical data model. XML tags provide metadata, but do not define the semantics of the data. It result from awareness that address structure and its semantics vary from country to country and providing definitions may lead to specification that cannot carry address data from some cultures. Instead, xNAL gives users control to define the semantics of the data without changing the data model, at the same time ensuring that user customization does not break conformance to the specification.

Complexity trade-off: can carry data split to elements or as a free text,

Encoding: XML defined by XML Schema

Exchange Scenarios: supports wide range of exchange scenarios as on the figure below:

5.2.1.4 INSPIRE Directive

Data specification: The Data Specification on Addresses defines a generic UML-based application schema, including explanatory text and examples for each feature, attribute and association.

The general model is based on two feature types “address” and “address component”. For any address an address point is required, as a spatial representation of the location of the address.

For the address component, four generic subclasses are defined: “Administrative unit name, address area name, postal descriptor and thoroughfare name. In an implementation of the specification the each address component can be managed as a proper feature.

The specification also provides mechanisms to represent parent-child relationships between a main address and sub addresses and to represent relations between address components like e.g. “Street A is situated within City B”.

Encoding: GML Application Schema is default for all INSPIRE themes

Exchange Scenarios: The INSPIRE directive is the legal framework for the INSPIRE Data Specifications. According to the rules in the directive, any public authority in the EU that holds address data is obliged to make these data available in the common data format defined by the specification for addresses.

Complexity trade-off: Although Data specifications usually does not allow to exchange data on various granularity levels and specifically as free text, the complexity trade-off has been seriously considered by INSPIRE Working Groups as seen on picture from introduction and effort was made to find the right balance by not including features that are not essential and used in only limited number of cases.

Special characteristics: Outcomes relevant to the exchange of address data are not limited to the Data Specification on Addresses but are also contained in other Implementing Rules. It is unique by providing Legal Framework. As mentioned public bodies in the EU member states are obliged to make their address data available in the specified format and under conditions not restricting their use. This obligation is supported by specification of rules for Data and Service Sharing (access cannot restrict data use) and Network Services such as Download and Transformation Services, Discovery & View Services and envisioned Invoke Services.

5.2.1.5 South Africa - SANS 1883

The current scope of SANS 1883-2 states that the standard specifies how address records shall be stored in databases and how address data shall be transferred or exchanged between organizations. Geocoding, data cleaning and/or address verification are examples of where this transfer and exchange are required. The standard specifies how addresses complying with SANS 1883-1 shall be exchanged in various encoding formats.

While the scope above mentions various **encoding** formats, the SABS XML group is currently working on an **XML schema** based on SANS 1883-1. In other words, SANS 1883-2 could well be limited to an XML encoding only. The XML schema has not yet been made available to the public. Initial findings are that the semi-structured nature of XML is suitable for the EBNF that was used in SANS 1883-1 to define address elements and types.

How/if complexity trade-off has been addresses in SANS 1883?

5.2.1.6 Australia and New Zealand

AS/NZS 4819 and AS 4590:2006 – specify only data content by defining elements but not data encoding.

5.2.1.7 USA - Thoroughfare, Landmark and Postal Address Data Standard

Data specification: defined in the "Content and Classification" part of the standard and implemented in XML Schema.

Encoding: XML defined by XML Schema. Two packages of data are carried: "address data" and metadata.

Complexity trade-off: no evidence

Exchange Scenarios: not specified explicitly

Special characteristics: In addition the standard provides specification of processes that have to be implemented by data producers and consumers to export and import data.

5.2.1.8 Conclusion

- Most of exchange standards use XML as encoding.

- Some standards (INSPIRE and US) in addition to specifying encoding and data content provide also specification of processes or services needed to enable actual exchange.

- Three international exchange standards (OASIS, UPU, INSPIRE) exist and their scopes may overlap. It seems that exchange requirement is well covered by existing international standards and a lot of consideration is recommended before proposing a new one. Instead, more useful could be

development of guidelines on how users of existing international standards can exchange their data i.e. to provide interoperability between UPU, OASIS and INSPIRE.

- Complexity trade-off is addressed in some way by all international standards.

5.2.2 Address rendering (print/write/display)

5.2.2.1 Introduction

This requirement calls for description of rules on how addresses shall be formatted (rendered) on mail pieces to facilitate its processing by mail carriers. Address used for delivery appears on mail item as address label and even when it contains all pieces of information needed to identify delivery point it can still be treated as invalid when arrangement of components is inappropriate. Right order of elements for French address will not be correct for US and vice versa. Wrongly addressed mail may not be delivered and increases the costs of delivery. Therefore, mail carriers provide guidelines ('standards') on how the addresses shall be formatted on mail submitted for delivery. By adhering to these rules, mailers increase deliverability rate and reduce the cost of mail processing.

An important application of rendered addresses is for automated reading systems used for machine reading and sorting. One well-known aspect of this is optical character recognition; other aspects include algorithms for joined-script analysis and word recognition, necessary before the application of methods for address decomposition and address component recognition required for sorting. The algorithms require specifically defined address structures, which need to remain as consistent as possible in order to achieve highest read rates. This is mostly applicable to a country's domestic mail, so automatic reading systems can usually be adjusted to cater for a change for the specific country.

For some address types there can be more than one appropriate rendition that may depend on such parameters like language, user preference etc.

Geocoding (converting a text address to geographic coordinates) results are greatly improved if the order in which the address elements appear in the address is known

International mailers have to cope with a variety of address format rules coming from various countries, cultures and languages. Their work is much easier when information about various address formats is expressed in a unified and, possibly, computer readable way. This leads to standardized language(s) encoding address format information that would be readable for computers and humans.

5.2.2.2 INSPIRE

Not applicable; The INSPIRE Data Specification for Addresses does not cover address rendering.

5.2.2.3 South Africa - SANS 1883

The EBNF definitions for address types in SANS 1883-1 to some extent define the order in which address elements appear in an address. However, the standard does not specify how addresses shall be split into lines and it does not go into the details of specifying that in English addresses the number goes before the street name (333 Pretorius Street), while in Afrikaans addresses it is the other way round (Pretoriusstraat 333). The reality in South Africa is that in bulk mailing, addresses are rendered differently, depending on a customer's language preference. Rendering is not included in the scope of SANS 1883-1 and the rendering rules are provided by SAPO in S42 template.

5.2.2.4 Australia and New Zealand

AS/NZS 4819 and AS 4590 do not include rendering in their scopes. **AS 4590** contains informative Annex E providing formatting rules from Australia Post in specifying for each element its position in formatted address. For example the position of the place name is defined as follows:

Requirement:

Considered an essential element of an address.

Position within address:

The placename is the first item located in the last line of the address, together with the State abbreviation and postcode.

Format/presentation:

This information must be printed in upper case, with no punctuation. Generally, the placename is not to be abbreviated, however certain elements of the placename may be abbreviated based on common acceptance, i.e. MT for Mount and ST for Saint.

Moreover it provides examples of formatted addresses for various address types with identification of address elements as on figure below.

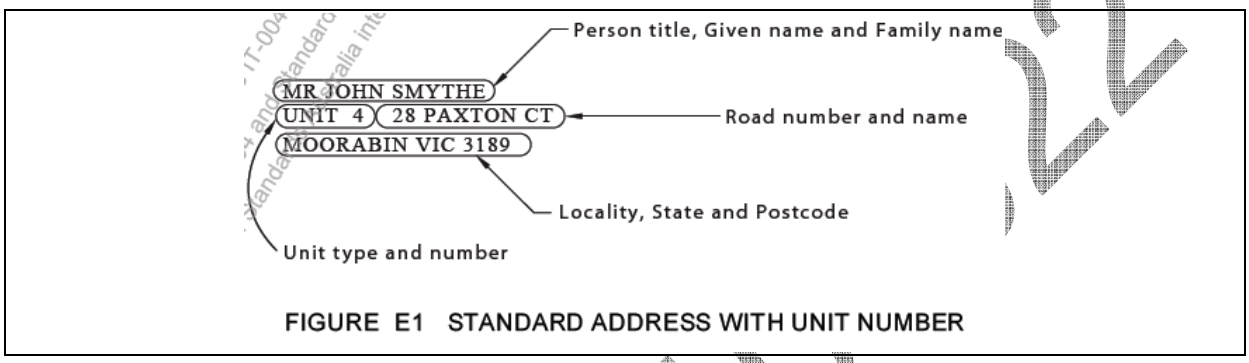

Figure 4. Standard address with unit number

Similarly, **New Zealand Post Standard** provides formatting rules by specifying for each element its position and illustrating various nuances with examples.

Rural addresses

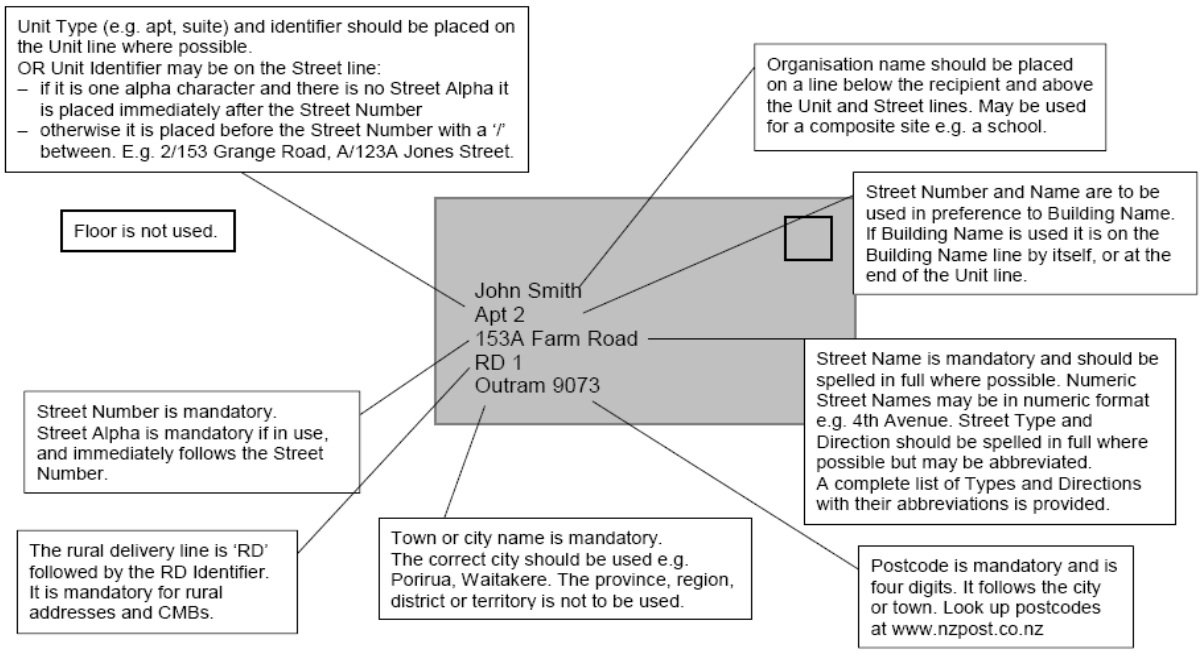

Figure 5. Rural addresses

It should be noted that in both cases formatting rules are expressed basing on separately defined elements. They assume some classification of addresses and refer to some rules of abbreviation.

5.2.2.5 USA - Thoroughfare, Landmark and Postal Address Data Standard

The standard is aligned with the USPS Publication 28, “Postal Addressing Standard.” that describes USPS address formats. They specify the order of elements in the two last lines of address. Variations of “delivery address line” are provided for USPS addresses (PO Box, General Delivery, Rural Route and Highway Contract) as well as Puerto Rico address that contains additional address line and elements for specifying address area called urbanization. Significant consideration is given to dictionaries of standardized abbreviations.

5.2.2.6 France - Z10-011 - Title: Postal specifications - Postal address

- Chapter 5 ‘Address transcription’ carries formatting rules expressed in human language by defining the content of 6 named address lines. The split into lines is provided in form of decision table depending on address type and presence or absence of some elements. French address elements are defined before specification of formatting rules. Strict rules on address size (no more than 6 lines and no more than 38 characters) are supported by comprehensive dictionaries of standardized abbreviations.

5.2.2.7 UPU S42

UPU S42 supports address rendering in two ways. Firstly, in Part A, it provides languages (human and computer readable) for expression of address formats together with definitions of postal address elements. Secondly, in Part B, it provides country specific address templates expressed in languages and elements defined in Part A.

S42 defines two languages for expressing address renditions: a computer readable Postal Address Template Definition Language (PATDL) and a human readable Natural Language Template Notation (NLT).

PATDL is defined by an XML Schema. It allows encoding of address line composition from elements and specification of conditions (triggers) on which a line is or is not to be rendered. Specification of address lines includes also rules for delimiting (for example requirement for a dash between door and street number).

Example:

In typical address template one will find definition of street and PO Box lines with a condition that the street line shall be rendered when element “thoroughfare” is populated and the PO Box line shall be rendered when element “delivery service identifier” is populated. Logic encoded in PATDL will look as follows:

```
<lineSelect>
     <isPopulated>U40.19</isPopulated>
     <lineName lineNumber="009">post office box</lineName>
     <isPopulated>U40.21</isPopulated>
     <lineName lineNumber="009">thoroughfare with plot</lineName>
```

It reads as:

If element U40.19 (“delivery service identifier”) is populated than render the “post office box” line.
If element U40.21 (“thoroughfare”) is populated than render the “thoroughfare with plot” line.

The thoroughfare line will be specified as follows.

```
    <lineData>
     <lineName lineNumber="009">thoroughfare with plot</lineName>
     <lineComponent>
             <elementData>
                     <elementId>U40.21</elementId>
                     <elementDef>thoroughfare</elementDef>
                     <requiredIfSelected>Y</requiredIfSelected>
                     <fldJustify>L</fldJustify>
                     <posStart>001</posStart>
             </elementData>
             <elementData>
                     <elementId>U40.24</elementId>
                     <elementDef>street number or plot</elementDef>
```

```
                    <fldJustify>L</fldJustify>
                    <posStart>001</posStart>
                </elementData>
            </lineComponent>
        </lineData>
```

The same rules encoded in NLT will be:

```
<
! case 1 for post office box address !
<  [\(40.19 delivery service identifier) \] >
<  [\(40.21 thoroughfare) [40.24 street number or plot]\] >
>
Test for the choice block, first condition is (40.19)
Test for the choice block, second condition is (40.19)
```

Please note that for the sake of example this address line in very simple and does not include details like street type, directional, door etc.

In addition to basic address rendering rules PATDL can also encode user preferences, rules for splitting lines when they appear too long, behaviors when data errors are found and other pieces of information useful in automatic rendering of addresses.

Important feature of PATDL is that it is opened for external dictionaries of elements. Although address templates provided in S42b are composed from elements defined in S42a, PATDL does not require it and templates can be built on the base of any set of address elements, including national elements, OASIS, INSPIRE etc.

Templates provided in Part B are based on national formatting guidelines from postal operators and are developed in cooperation with national address experts. S42b also describes generic design and mapping conventions. S42b is modified from time to time to reflect new countries added to the list. The rendering of addresses needs to be kept up to date with any changes in S42b in order to remain as effective as possible.

5.2.2.8 Conclusion

Address rendering standards are important for mailers and mail carriers to streamline mail production and processing.

Rendering rules are usually formulated on the base of: defined elements, classification of address types and classification of address lines. National rendition standards provide very often dictionaries (look-up tables) of abbreviations that are needed to limit the length of address lines so that it can fit into address window or meet limitations imposed by a standard (ex. French 38 characters per line).

The rendering standards are usually defined by postal operators on national level. UPU S42 provides means to keep all national information in single format and covers well this requirement on international level.

5.2.3 Managing aliases and multilingual addresses

5.2.3.1 Introduction

Addresses and address components exist in multiple forms. Address data sets must store this alternates together with their attributes and keep appropriate relationships between them. This calls for standardization of data structures, terminology and classification for managing multiple addresses of the same addressable object or aliases of the same address component. There are various kinds of aliases (resulting from diversity of languages, writing systems, local variations, specific service requirements, etc.). Usually one address form is considered as principal\recommended and other as secondary. However, there are cases where multiple address forms are treated as equivalent like in the case of multilingual areas in Belgium and Switzerland. Support for managing address aliases may be placed in the conceptual data model. (This part of report should be linked to the part about conceptual data model provided by Team 1)

Standards provide also dictionaries of valid abbreviations of some address components (street types, administrative units, etc) that create separate category of aliases important for address rendition.

Some address data sets (US Zip+4, Royal Mail Alias Product, New Zealand PAF) provide aliases for specific address components that are valid only within some area defined by another address component (postcode) or address. For example Royal Mail Alias Product provides names of traditional, administrative and postal counties that have overlapping territories and names are referred via postcodes.

Some addresses can be related by a party name. For example, Po Box address vs. street address of the same company.

5.2.3.2 UPU S53

UPU S53 supports aliases by defining data structure that can store them. This data structure is provided in element “item” and its child element “representation”. “Item” stores various name and address representations of the same object that are linked via “ItemIdentifier”. Various aliases of the same address can be carried in various representations.

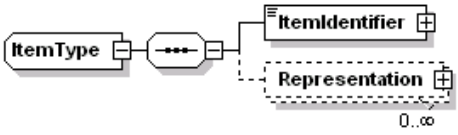

Figure 6. Title?

5.2.3.3 INSPIRE Address Specification

The INSPIRE Data Specification for Addresses does not systematically support a comprehensive concept of address aliases.

The specification includes a support for representation of alias addresses or address components that have their origin in different languages.

This is done by means of the generic INSPIRE data type “Geographical name”, that supports the concept where the proper noun related to a specific feature could be represented in different languages and scripts. The Geographical name data type is used in all name-based attributes of an address or address component e.g.: apartment, building, or site name, thoroughfare name, address area name, administrative unit name, postal name, and thoroughfare name.

It is also possible to represent address aliases by using the specification’s attribute “status” by using the value of “alternative”. According to the definition this status represents an address that is in common use, but is different from the master address determined by the official body that allocates addresses or by the dataset custodian.

Finally, outside the address application schema, several “alias” address instances or components referring to the same addressable object, could be linked via the generic INSPIRE identifier (inspireid).

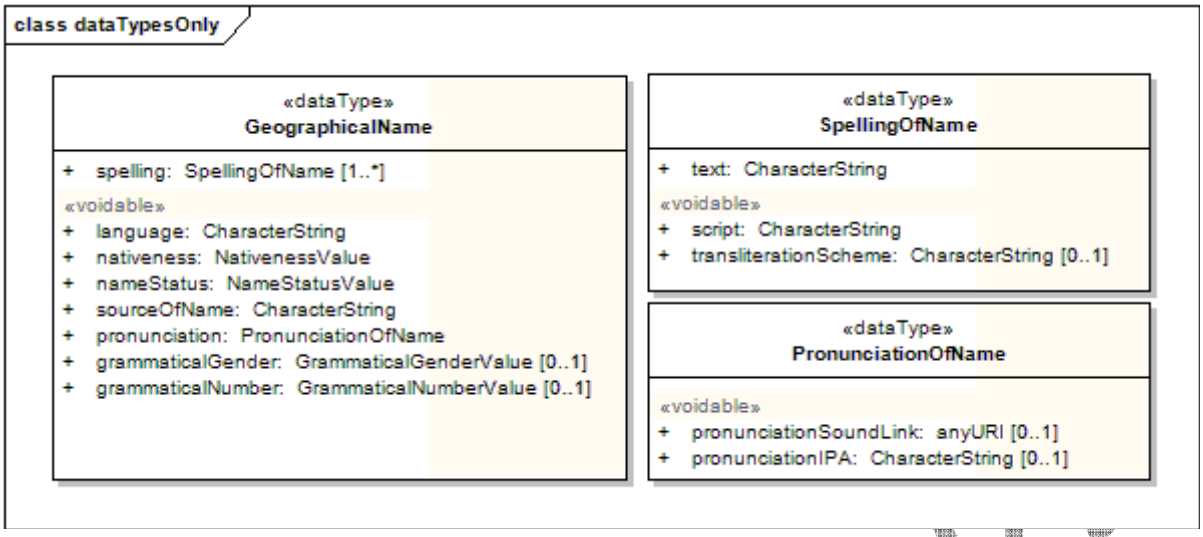

Figure 7. From INSPIRE – Data Specification on Geographical names

5.2.3.4 South Africa - SANS 1883-1

SANS 1883-1 defines a mandatory attribute 'language', which is the ISO 639-1 two-letter code that indicates which one of the official languages should be used for the street name type (e.g. Street or Road), street name modifier (e.g. Extension) and the street name directional (e.g. South or Western). The language attribute is set to 'EN' by default.

It is interesting to note that many of the African languages do not have an equivalent for most of the street name types, such as 'Street', and therefore the English word is used.

SANS 1883-3 states that the different language versions for a particular address should be stored in multiple address records'. In a relational table it would look something like this for the eleven official languages of South Africa:

lkpStreetType		
PK	**pkStreetTypeID**	**int**
	sStreetType	**varchar(64)**
	sStreetType_Afrikaans	varchar(64)
	sStreetType_English	varchar(64)
	sStreetType_IsiZulu	varchar(64)
	sStreetType_IsiXhosa	varchar(64)
	sStreetType_SiSwati	varchar(64)
	sStreetType_Ndebele	varchar(64)
	sStreetType_SouthernSotho	varchar(64)
	sStreetType_NorthernSotho	varchar(64)
	sStreetType_Tsonga	varchar(64)
	sStreetType_SeTswana	varchar(64)
	sStreetType_Venda	varchar(64)

Figure 8. SANS 1883 – Title?

5.2.3.5 Australia and New Zealand

AS/NZS 4819 requires that one form of address should be treated as principal and other as aliases. It points out that valid aliases may idenify alternative accesses to address site (mailing, front door, large truck). The standard provides some cases when other valid aliases may occur, like section of highway overlapping with local road, corner address with multiple accesses etc. Invalid aliases are those with incorrect spellings of components. A number of various examples is provided to help custodians of addresses to categorize address forms as principal, valid alias and invalid alias.

5.2.3.6 USA - Thoroughfare, Landmark and Postal Address Data Standard

Address alias management is not covered as separate issue.

It notes that:

- If aliases or abbreviated versions of address components are needed for a specialized purpose such as mailing or emergency dispatch, the variants can be created in views or export routines.
- The Related Address ID element can be used to link address alias to its official form.

Moreover, each address should have status assigned that qualifies. Status can take one of the following values:

1. Official
The address or name as designated by the Address Authority.
2. Alternate or Alias
An alternate or alias to the official address or name that is also in official or popular use. The Related Address ID can be used to link an alternate or alias to the Address ID of the official address. There are two types of alternate or alias names, official and unofficial, each of which has subtypes.
2.1 Official Alternate or Alias: *These are alternate names designated by an official Address Authority. Subtypes include, but are not limited to:*
* Official Renaming Action of the *Address Authority*
An Address Authority may replace one address or name with another, e.g. by renaming or renumbering. The prior, older address should be retained as an alias, to provide for conversion to the new address. .
* Alternates Established by an *Address Authority*
An Address Authority may establish a name or number to be used in addition to the official address or name. For example, a state highway designation (State Highway 7) may be given to a locally-named road, or a memorial name may be applied to an existing street by posting an additional sign, while the local or original name and addresses continue to be recognized as official.
2.2 Unofficial Alternate or Alias: *These are addresses or names that are used by the public or by an individual, but are not recognized as official by the Address Authority: Some examples include, but are not limited to:*
* Alternates Established by Colloquial Use in a Community
An address or name that is in popular use but is not the official name or an official alternate or alias.
* Unofficial Alternates Frequently Encountered
In data processing, entry errors occur. Such errors if frequently encountered may be corrected by a direct match of the error and a substitution of a correct name.
* Unofficial Alternates In Use by an Agency or Entity
For data processing efficiency, entities often create alternate names or abbreviations for internal use. These must be changed to the official form for public use and transmittal to external users.
* Posted or Vanity Address
An address that is posted, but is not recognized by the Address Authority (e.g. a vanity address on a building).
3. Verified Invalid
An address that has been verified as being invalid, but which keeps appearing in address lists. Different from Unofficial Alternate Names in that these addresses are known not to exist.

5.2.3.7 ISO 19112 – data model contains element 'alternative geographic identifier'

The data model includes one or more optional 'alternative geographic identifier' element(s) as part of a location instance. The data type of this element is a CharacterString and the domain of allowable values is free text, a number or a code. Thus the 'alternative geographic identifier' could be used for alternative identifiers or names (aliases) in different languages.

5.2.3.8 Others

The following standards support aliases only in the form of dictionary abbreviations: **France - Z10-011, New Zealand Post Standard, AS 4590:2006**

5.2.3.9 Conclusion

Managing address aliases is a daily task of people working with address data. Many standards support this requirement although it seems that they do not provide data structures for representing all relationships between various address forms. It may be however questioned if providing all such structures is really something that should be provided by an international standard. This issue should be discussed in more details.

5.3 Address data quality

5.3.1 Definitive address datasets (reference dataset)

5.3.1.1 United States Thoroughfare, Landmark, and Postal Address Data Standard

Addresses in the United States are not assigned at the national level; any nationwide dataset is an aggregate of addresses from county or local municipalities. The US Postal Service and the US Census Bureau both have nationwide address lists and are referenced in the standard but are not definitive address datasets. How the USPS and the Census Bureau maintain their datasets and the measure of completeness is not applicable. Custodians of the address datasets reside at the local municipality level.

5.3.1.2 SANS 1883

Custodians for address data still have to be assigned in South Africa. The South African Geographic Names Councils is responsible for ensuring one name per feature and they have delegated the mandate of assigning unique street names and addresses to the municipalities (local authorities). The South African Post Office is responsible for postal addresses. How the custodians maintain the address dataset is not applicable. A ballpark estimate of completeness by Coetzee & Cooper (2007b) is that only 50% of the countries addresses are stored in an address database (not necessarily all in the same database).

5.3.1.3 INSPIRE

The main purpose of the INSPIRE Data Specification on Addresses is required to facilitate the interoperability of address information between the Member States. The specification therefore targets any address dataset and custodian and does not explicitly promote the concept of having one definitive reference address dataset or base in each country, region or city.

This is however the case in regard to the INSPIRE directive that forms the legal framework around the data specifications. A number of the principles behind the directive relates to the concepts and benefits of a practice in the member states of having a single source of reference data.

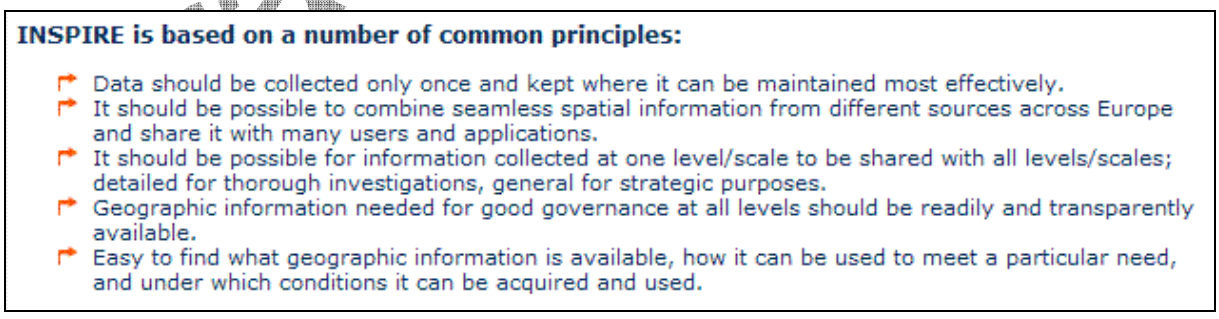

Figure 9. INSPIRE principles from INSPIRE home page

The INSPIRE implementing rules that will be mandatory for the EU member states, is expected to encourage directly towards a best practice according to the principle of one definitive address dataset.

E.g. the requirement to provide access to address datasets and services according to the implementing rules will be easier and less costly for the member states to comply with if public bodies only hold a single reference dataset.

5.3.1.4 Australia/New Zealand 4819

This standard provides requirements and guidelines that should be used in creation and maintenance of the reference data sets. It does not identify a specific custodian, but states local governments shall maintain responsibility for addressing. The standard lists a number of feature types that should be considered as types of addressable objects and requires that all of them shall have addresses assigned and registered accordingly.

5.3.1.5 OASIS

There is no reference dataset associated with this standard. The purpose of this standard is for 'defining, representing, interoperating, and managing' party centric information, including addresses. The focus is representing an address data in a standard manner without losing its content and quality and for exchange of the same through XML. The xAL specification does not depend or is not prescribed to work on any address dataset. It has been tested to work on many address data for all countries. For example Google Maps/Google Earth user's xAL for representing address data globally.

5.3.1.6 UPU S42

UPU S42-Not applicable

5.3.1.7 AFNOR

French Standard- Not applicable

5.3.1.8 ISO/TS 15000-5

ISO 15000-5-Not applicable

5.3.1.9 ISO 19112

Likely there are many reference datasets associated with this standard. Custodians of the datasets vary, depending on the type of gazetteer.

5.3.2 Quality Management

5.3.2.1 USA-Thoroughfare, Landmark, and Postal Address Standard

This standard defines data quality and provides ways to measure each element, attribute, and classification. Five core elements of quality are included in the standard: attribute (thematic) accuracy, logical consistency, completeness, positional accuracy, and temporal accuracy, all with specific regards to an address quality measure.

(Reference 7.8 Appendix H (Informative): Quality Measures By Data Quality in the standard)

5.3.2.2 SANS 1883

SANS 1883- Not Applicable.

5.3.2.3 ISO 15000-5

ISO 15000-5 – Not Applicable

5.3.2.4 ISO 19112

ISO 19112- Not addressed in the standard. By implication other ISO/TC 211 standards on quality would apply.

5.3.2.5 UPU S42

UPU S42- Not applicable

5.3.2.6 AFNOR

French Standard- Not applicable

5.3.2.7 OASIS

Data quality is managed in the standard through the *DataQuality* attribute whereby users can define the quality of the address data "at the time" when the address data is represented in xAL. For example, if the address data is free format text and is not structured, the quality of the address data is "poor". Improvement to the quality of the address data represented in xAL is outside the scope of xAL.

But: 'This specification does not mandate any data verification rules or requirements to address the quality of address data represented in xAL. It is entirely up to the data exchange participants to establish them.' (3.8.2 and 3.8.3 in the specification)

And: 'CIQ specifications are not a quality enhancing process as commonly understood or akin to a certificate of test results against some objective specification.' (from the General Introduction and Overview)

The data quality sections for the name (xNL) and the address (xAL) are identical (the data quality section for the address, 4.8., refers the reader to the data quality section for the name, i.e. 3.8). Please note that xAL provides a metadata structure to represent any address data in a standard and consistent manner to enable the use of address data for various purposes. One of the biggest challenges in industry is consistent representation and use of address data to support various needs and this is what xAL is aiming to address.

The xAL schema allows for data quality information to be provided as part of the entity using an attribute *DataQuality* that can be set to either "*Valid*" or "*Invalid*" (default values), if such status is known. If the *DataQuality* attribute is omitted, it is presumed that the validity of the data is unknown. Users can customise the *DataQuality* code list to add more data quality attributes (e.g. confidence levels) if required.

The specification also makes provision to define partial data quality where some parts of the content are correct and some are not or unknown.

(Reference: 4.6 Data Quality and 3.8 Data Quality in the specification)

5.3.2.8 Australia/New Zealand 4819:2003:

The standard does not treat quality management, life cycle, and metadata as separate components, however it does deal with some of their aspects by the requirement to register positional accuracy of geocoding on an address level by means of either accuracy value (maximal distance from) or containment (yes/no), and temporal information about creation, deletion, or modification.

5.3.2.9 INSPIRE

This standard includes a description of data quality elements and sub-elements as well as the associated basic data quality measures to be used to describe data related to the spatial data theme *Addresses.* Additionally, recommendations on minimum data quality are included for specific elements.

Data quality information can be described at level of spatial object (feature), spatial object type (feature type), dataset or dataset series. Data quality information at spatial object level is modelled directly in the application schema. Data quality elements include completeness, positional accuracy, logical consistency, temporal accuracy, and thematic accuracy.

Table 2. Quality elements

Data Quality Element	Data Quality Sub Element	Scope(s)
Completeness	Commission	dataset
Completeness	Omission	dataset
Positional accuracy	Absolute of external accuracy	dataset
Logical consistency	Conceptual consistency	spatial object type
Logical consistency	Domain consistency	spatial object type
Temporal accuracy	Temporal consistency	spatial object type
Thematic accuracy	Non-qualitative attribute correctness	spatial object type

5.3.3 Life cycle

5.3.3.1 USA-Thoroughfare, Landmark, and Postal Address Standard

The status of the life cycle specifically for an address is referenced in the standard. Associated with it are: Lifecycle status (potential, proposed, active, retired). Additionally, it contains start date, end date, and future date.

5.3.3.2 SANS1883

This standard covers the life cycle, and a lifecycle stage is defined as an attribute of an address of type Enumeration. The different life cycle stages are:

0: *UnknownStage*: The life cycle stage is unknown.
1: *Future*: The address has been planned as a point of service delivery but is not yet in use (before becoming Active).
2: *Active*: The address is available or in use as a point of service delivery, i.e. the address is in use.
3: *Retired*: The address was used at some stage but is not in use any longer, e.g. an address that is replaced by a subdivision or consolidation i.e. the address is not used anymore.

Also the metadata contains mandatory lifecycle information:

lifeCycleStage: The life cycle stage of the address. Mandatory.

status: Whether the address was assigned by the official address issuing body (official and official alternate), or an unofficial variant (unofficial). Mandatory.

5.3.3.3 Australia/New Zealand 4819:2003

This standard does include temporal information about creation, deletion, or modification.

5.3.3.4 OASIS

The address life cycle is covered in the address standard whereby one can define the current status of the address, i.e. whether it is currently in use, was in use in the past, or will be in use at some date in the future, planned, current or used, retired or historic, etc.

It is defined as a user customizable attribute where users can define the lifecycle and also the validity of the address.

The lifecycle stages are defined by the user, as an address can be used for various purposes and there is no assumption that an address standard should define all potential lifecycle of addresses as they are used for various purposes in the community. Users define the lifecycle in metadata through codelists in xAL. Users can define a lifecycle code list and can also control the use of the code list to support various applications (as each application might want to use only a snippet of the code list or want to add more to the general code list for lifecycle of address) by defining business rules through genericode/context value association standard that is also available as part of xAL.

5.3.3.5 INSPIRE

This standard does cover the lifecycle of addresses. It takes into consideration that although the lifecycle of an address sometimes will broadly mirror the life-cycle of the addressable object to which it relates, there are also many instances where an address or one of the components that make up an address may change in response to events unrelated to physical changes in the property.

Examples of such cases include:

- the municipal authority may create an address for a property that has not yet been built;
- a new occupier may wish an existing property to be known by a new name;
- the postal service may make a change to a postcode to reflect new delivery patterns;
- an error in the recording of an address component or attribute may need to be corrected.

The INSPIRE Data Specification application schema distinguishes between, two sets of life cycle attributes:

- attributes that relate to a spatial object and its version in the dataset (represented by the attributes beginLifespanVersion and endLifespanVersion)
- attributes that reflects the status and validity of the real world phenomena (represented by “status”, “validFrom” and “validTo”), for example of the address, the post code or the thoroughfare name.

The concept is illustrated in the following example:

C.1 Life-cycle of a thoroughfare name (created, changed and discontinued)

Event A:
01-02-2009: City Council approves the creation of a new street name "West Street"
03-02-2009: The new street name is recorded in the dataset

Id	Vers.	Thorough.Name	Status	validFrom	validTo	beginLife	endLife
9999	*1*	*West Street*	*current*	*01-02-2009*		*03-02-2009*	

Event B:
13-02-2009: City Council decides to change the street name to "Centre Street". The new name shall take effect from 01-03-2009
15-02-2009: The decision is recorded by updating the dataset

Id	Vers.	Thorough.Name	Status	validFrom	validTo	beginLife	endLife
9999	1	West Street	current	01-02-2009	*01-03-2009*	03-02-2009	*15-02-2009*
9999	*2*	*Centre Street*	*current*	*01-03-2009*		*15-02-2009*	

Event C:
20-04-2010: The city council approves a construction project which will result in the existing "Centre Street" being abandoned from 01-05-2010. From this date the street name will be historic.
25-04-2010: The decision is recorded by updating the dataset.

Id	Vers.	Thorough.Name	Status	validFrom	validTo	beginLife	endLife
9999	1	West Street	current	01-02-2009	01-03-2009	03-02-2009	15-02-2009
9999	2	Centre Street	current	01-03-2009	*01-05-2010*	15-02-2009	*25-04-2010*
9999	*3*	*Centre Street*	*retired*	*01-05-2010*		*25-04-2010*	

Figure 10. From INSPIRE DS Addresses, Annex C

5.3.4 Metadata

5.3.4.1 USA-Thoroughfare, Landmark, and Postal Address Standard

The standard mentions metadata extensively throughout the document and specifically states that the transfer of data always needs to be accompanied by copyright information, use restrictions, contact information, data lineage information, known data defects and a description of the geographic area that the data represents. The standard recommends using the Federal *Content Standard for Digital Geospatial Metadata*, which provides a uniform, consistent and well-known way to express those things amongst others.

5.3.4.2 SANS 1883

The standard contains metadata for addresses specifically. The following attributes for an address are included:

coordinateReferenceSystem: Coordinate reference system which is usually single but may be compound [ISO 19111]. Mandatory only if the location of the address is included.

descriptiveNote: Free text that describes how to identify the service delivery point accurately when one is there. Optional.

elevationLevel: Ordinal indicating the level above or below ground. Mandatory only if the address type contains a CompleteBuildingUnitIdentifier.

pointOfObservation: Relative position to the physical structures and/or other electronic data according to which the address point location was captured. Refers to the latitude and longitude. Mandatory.

custodian: The party that accepts accountability and responsibility for the data and ensures appropriate care and maintenance of the resource. Mandatory.

originator: The party who created the resource, i.e. a reference to the original source from where the resource provider obtained the data, and where the address was created. Mandatory.

resourceProvider: The party that supplies the resource, i.e. the organization that provides or distributes the address dataset. The organization could either be a source of original address data, a collator of address datasets, an organization that adds value to the addresses, or an agent acting as distributor on behalf of the custodian. Mandatory.

addressType: The type of the address as specified in section 6 of this standard. Mandatory.

lifeCycleStage: The life cycle stage of the address. Mandatory.

status: Whether the address was assigned by the official address issuing body (official and official alternate), or an unofficial variant (unofficial). Mandatory.

5.3.4.3 INSPIRE

The metadata in this standard have been defined according to INSPIRE Metadata Implementing Rules and ISO 19115 so they can be implemented according to ISO 19139 (this standard provides XML examples).

The metadata describing a spatial data set or a spatial data set series related to the theme *Addresses* comprise the metadata elements required by Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata) for spatial datasets and spatial dataset series as well as some additional specified metadata elements.

5.3.4.4 UPU S53

Supports some metadata in the structure called “rooster”. Rooster carries information about dictionary of elements effectively used in the carried dataset and some statistics of the dataset.

5.3.4.5 ISO 19112

Metadata is in the standard, but reference is also made to ISO 19115,

Geographic information – Metadata. Metadata is defined for location instances, specifically.

For a spatial reference system:

domainOfValidity: geographic area within which the reference system occurs. Mandatory.

overallOwner: authority with overall responsibility for the spatial reference system. Mandatory.

For a location type:

definition: the way in which location instances are defined. Mandatory.

territoryOfUse: geographic area within which the location type occurs. Mandatory.

owner: name of organization or class of organization able to create and destroy location instances. Mandatory

For a gazetteer:

scope: description of the location types contained in the gazetteer. Optional.

territoryOfUse: geographic domain covered by the gazetteer. Mandatory.

custodian: name of the organization responsible for maintenance of the gazetteer. Mandatory.

coordinateSystem: name of coordinate reference system used in the gazetteer for describing position. Optional.

For a location instance:

temporalExtent: date of creation of this version of the location instance. Optional.

geographicExtent: description of the location instance. Mandatory.

administrator: name of organization responsible for defining the characteristics of the location instance

5.3.4.6 OASIS

Metadata is not addressed (only *DataQuality* attribute, see above) as such, however, some of the code lists/enumeration could be regarded as providing metadata about an address (see examples below).

Metadata is not defined for addresses specifically, however, the specification is extensible: 'All elements in Name, Address and Party namespaces support extensibility by allowing for any number of attributes from a non-target namespace to be added.' (3.9 in the specification). Thus one could add any number of metadata items.

Below a few code lists/enumerations as examples.

AddressTypeList: Airport, Business, Caravan Park, Community Development, Educational Institution, Entertainment, Hospital, Location, Marina, Military Base, Overseas Military, Port, Primary, Recreational Park, Resort, Retirement Village, Rural, Secondary, Shopping Centre, Sporting Centre, Urban

AddressUsageList: Business, Billing, Communication, Contact, Mailing, Personal, Postal, Residential

AdministrativeAreaTypeList: City, State, Territory, Province

SubAdministrativeAreaTypeList: County, District, Province, Region

LocalityTypeList: Municipality, Post Town, Place, Suburb, Town, Village, Area, Zone

There are quite a few more, including code lists for country or locality names, types of delivery, types of post offices, etc.

5.3.4.7 ISO 15000-5

This standard contains metadata for registries of information. The metadata are for geographic data in general. The metadata included/described are for a registry class, including version, replacement, status, administrative, status, association, representation and descriptive information, as well as change history.

5.3.4.8 UPU S42

Not applicable

5.3.4.9 AFNOR

French Standard - Not applicable

5.3.4.10 AS/NZS 4819

The standard does not treat quality management, life cycle, and metadata as separate components, however it does deal with some of their aspects by the requirement to register positional accuracy of geocoding on an address level by means of either accuracy value (maximal distance from) or containment (yes/no), and temporal information about creation, deletion, or modification.

5.4 Address assignment schemes

To be done?

6 Gap analysis (qualify gaps)

To be done. Maybe rename this section to 'Addressing requirements'? Include tables fro meeting in Southampton?

7 Conceptual model

To be completed. From Quebec meeting notes: to formulate a conceptual model: meaning of address in different contexts

7.1 The nature of addresses

The first questions are:

- what is an address?
- for what is an address used?

Wikipedia defines an **address** as a collection of information, presented in a mostly fixed format, used for describing the location of a building, apartment, or other structure or a plot of land, generally using political boundaries and street names as references, along with other identifiers such as house or apartment numbers. Some addresses also contain special codes to aid routing of mail and packages, such as a ZIP code or post code. In the context of geographic information, an address is a descriptive identifier of a real-world object, which enables that object to be identified and located.

One of the most commonly used types of address is the postal address. This is essentially a set of routing instructions for postal delivery and contains a hierarchy of address components, which progressively refine the location of the delivery point. These components are usually humanly recognisable names or numbers of identifiable locations, from areas down to individual properties. They are often marked in the real world by name plates (e.g. street names) or numbers (e.g. property or house numbers). Some components such as post town, represent the organizational structure of the delivery organization rather than commonly used place names. The postal address only applies to mail delivery points.

The principle of the postal address can readily be expanded to cover other objects beyond postal delivery points. Thus an address can be applied to any object that is identifiable in the real world. An object that is capable of referencing in this way is termed an '**addressable object**'.

The concepts are shown in the following UML diagram.

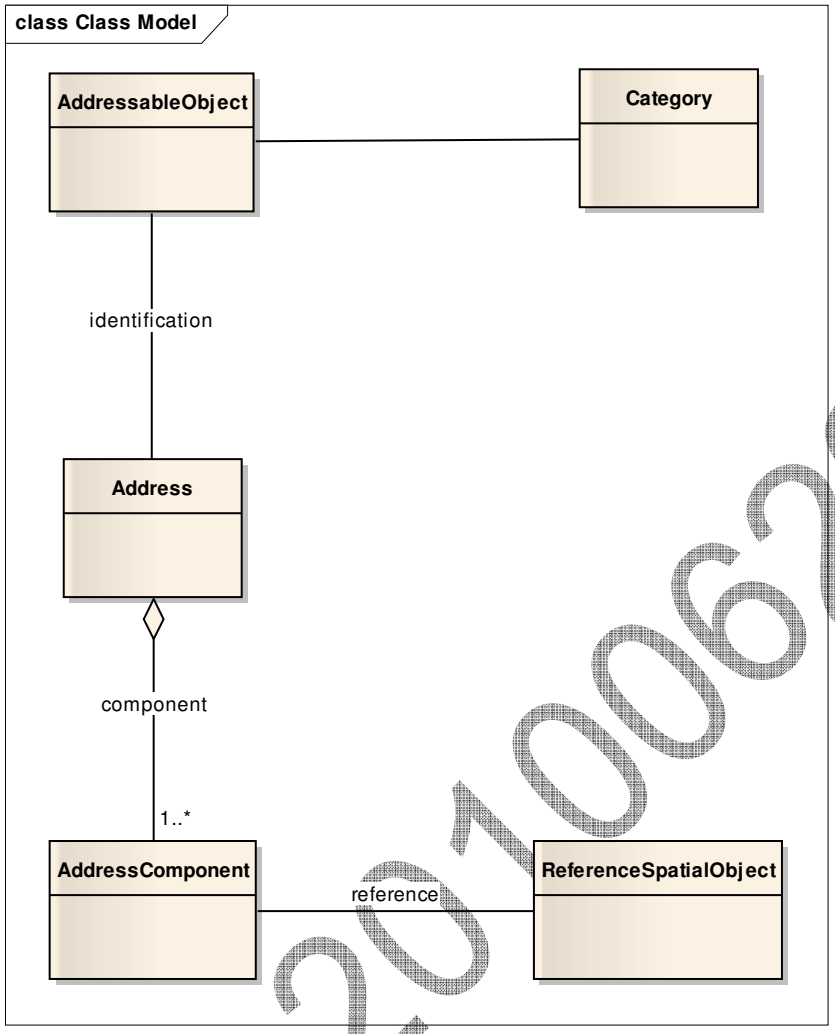

Figure 11. Address concepts

7.1.1.1 Addressable objects

An address is often used as a surrogate for things that are associated with that object, e.g. the human occupiers. It may also not be apparent exactly what it is that is being addressed, and the address may cover several different types of spatial object type. Thus different users of the address may have different perspectives of what the address represents, for example:

- the occupier regards it as their place of residence;
- a postal delivery person regards it as a delivery point;
- a supplier of another delivery service regards it as an access point;
- the land authority regards it as a plot of land;
- the surveyor regards it as physical object that can be depicted in their map records;
- the local authority regards it as an occupied premise;
- a supplier of utility services regards it as a place receiving their service;
- other people regard it as the contact point for the residents.

However, an address can be produced for other types of addressable object that do not have a postal address. This latter approach is used in standards, such as BS 7666, SANS 1883 and the Draft US FGDC standard.

Some classes of addressable objects are therefore as follows:

- residential buildings
- residential units within buildings
- business premises
- units within business premises
- public buildings
- units within public buildings
- monuments and landmarks
- public open spaces
- cadastral parcel
- service delivery point

An important aspect of an addressable object is its categorization.

7.2 Classifications of addresses (address types)

In the reviewed address standards, addresses generally fall into the following categories:

- Street or thoroughfare address – where the addressable object is referenced relative to a street, usually by means of a reference number or object name, for example 389 Chiswick High Road, London.
- Proximity address – where the addressable object is referenced by its position relative to a landmark, for example, 200m NW of the junction of Main Street and Cross Street.
- Geographic address – where the addressable object is referenced by name, number or description within to some named area; for example Tower Bridge, London.

Some postal addresses use Post Office Box numbers. These relate solely to a collection point at a Post Office, and are outside the scope of geographic information, and are therefore excluded from further consideration here.

8 Recommendations

Potential addressing standardization requirements:

Addressing standardization guidelines for countries that may need it.

9 Conclusion

To be done

Bibliography

Barr R (2007). How NOT to build a National Address Infrastructure - A cautionary tale from the UK, *45th Annual URISA Conference*, 20-23 August 2007, Washington DC, USA.

Coetzee S and Cooper AK (2007a). The value of addresses to the economy, society and governance – a South African perspective, *45th Annual URISA Conference*, 20-23 August 2007, Washington DC, USA.

Coetzee S and Cooper AK (2007b), *What is an address in South Africa?* South African Journal of Science (SAJS), 103(11/12), pp449-458, Nov/Dec 2007

Coetzee S, Cooper AK, Lind M (ed.) (2008). *ISO Workshop on address standards – Considering the issues related to an international address standard*, held under the auspices of WG7, Information Communities, of ISO/TC 211, Geographic information on 25 May 2008 Copenhagen, Denmark available online at http://www.isotc211.org/Address/Copenhagen_Address_Workshop/workshop.htm, accessed 1 March 2010.

EURADIN (2009). Reports published by the **EUR**opean **AD**dress **IN**frastructure (EURADIN) project, available at https://www.euradin.eu/Pages/Results.aspx

ISO/TC 211 WG 7 (2009). *Report on WG 7, Information Communities*, delivered at the 27th ISO/TC 211, *Geographic information/Geomatics* Plenary Meeting, Tsukuba, Japan, December 2008.

Lind M (2007). Benefits of common address data – experiences and assessments, *45th Annual URISA Conference*, 20-23 August 2007, Washington DC, USA.

Nicholson M (2007). The address: improving public service delivery, *45th Annual URISA Conference*, 20-23 August 2007, Washington DC, USA.

New Work Item Proposal for a stage 0 project: Addressing, (2009). ISO/TC 211 document number, N 2737, 2009.

Not yet referenced in the text:

Centre for Economics and Business Research (CEBR) (2006). *It makes life easier. A study to evaluate the benefit of the local and national land and property gazetteers*, Centre for Economics and Business Research Ltd, London, UK.

CODI report on situs addressing (UN ECA)

Farvacque-Vitkovic C, Godin L, Leroux H, Chavez R and Verdet F (2005). *Street Addressing and the Management of Cities*, Washington DC, US: The World Bank.

Akeno K, (2008). Japanese address system, *ISO Workshop on address standards – Considering the issues related to an international address standard*, held under the auspices of WG7, Information Communities, of ISO/TC 211, *Geographic information* on 25 May 2008 Copenhagen, Denmark available online at http://www.isotc211.org/Address/Copenhagen_Address_Workshop/workshop.htm, accessed 1 March 2010.

Levoleger K and Corbin C (Ed.) (2005). *Survey of European National Addressing as of May 2005, European Umbrella Organisation for Geographic Information (EUROGI)*, available online at http://eurog.vbnprep.com/POOLED/DOCUMENTS/a101730/EUROGI_Address_Survey_Resp_V3Final.pdf, accessed 28 March 2008.

Lind M. (2004). Reliable address data: developing a common address referencesystem. In *Compendium of SDI Best Practice*, Section 6.1. GINIE Report, October 2004, online at: www.ec-gis.org/ginie/, accessed 1 March 2010.

Vivas P and Lubenow J (2009), *Addressing and Postcode Manual*, Universal Postal Union, March 2009, available online at http://www.upu.int/post_code/en/addressing.shtml, accessed 1 March 2010.

Annex A

Background information on addresses

A.1 Information

This Annex contains some notes from the Quebec meeting. Needs some cleanup and probably additional information.

A.2 Address data

Address creators

Different parts of an address are usually assigned by different parties, e.g. local authority for street names, owners for building names, postal operators for PO box numbers and postcodes, local authority, postal operator or resident for address number

Examples of address data creators: Public authorities, Postal operators, Private companies, Utility providers

Address data cannot be better than the addresses that have been allocated according to an addressing system in the real world

Where does the address take us? To a structure? To a building or house? To a person?

Real world address, an address that is assigned to something (refer to addressable object in table above)

Concept of theoretical/virtual address → address ranges, for example

NB to address temporal aspect of an address (historic vs current, as well as a mobile addresses)

A location can have two addresses: Official address and Used address

Address refers to real world vs digital reference to location only

A.3 Address usage

Table 3. Address usage

Type of usage	Sector	Example	Address or data	Addressable object
Business Planning (risk analysis, customer profiling, etc)	Any business with customers Business to business	Bank accounts and loans Invoicing	Address data	Customer
Customer Relationship Management	Any business with customers Business to business	Marketing Customer profiling	Address data	Customer
Delivery services		Postal operator Courier	Address data and addresses	Postal delivery point *or* party (person or

		e-Business Standard mail Registered mail		organization)
Districting	Elections Census Statistics		Address data	Occupied property
Emergency response	ER organizations + government on any level	Ambulance Police Firemen	Address data and addresses	Location
Fraud detection	Insurance Finance	Election Tax evasion Social services	Address data	Person
Land administration		Property tax Urban and rural planning	Address data and situs address (physical)	Property (more than just the land parcel)
Land use planning			Address data and address	Property (more than just the land parcel)
Location-based services	Public services	Water well Public parks	Address data and address	Point of interest
Public administration	National and local governments and public services	Income tax Health Social services	Address data	Citizen Public facilities (location)
Risk assessment	Insurance Financial services		Address	Property (more than just the land parcel)
Routing (navigation, etc.)	Transport Logistics General public		Address data	Location mapping
Service delivery	Utilities (telecommunications, sewerage, waste removal, electricity, power, etc.)	Utility organization Local authority	Address data and addresses	Service delivery point Consumer
Statutory requirement to know where population is	Elections Census National registration	Voting ID Biometrical passports	Address data	Occupied property Citizen

A.4 Address standardization

The ISO Workshop on address standards held in May 2008 in Copenhagen considered the issues related to an international address standard (Coetzee *et al.* 2008) and these served, amongst others, as input to this project.

Maybe add a summary of the workshop, or just highlights relevant to the project…?

A.5 Address standardization requirements

Idea…. to cross-check whether our list of requirements for the review caters for everything:

Importance for addresses for society, economy and governance (as documented)

→ Complete the address usage table above

→ For each address usage, identify the standardization requirements that will ensure that the respective usage benefits society, economy and/or governance.

Annex B

Review of address terms and concepts

B.1 Scope

The scope statements of the standards that were reviewed are copied into the sections below. The parts of the scope statements that are important for the review are underlined. As a short overview, Table 4 shows the topics that are mentioned in the various scope statements. However, this should not be seen as a comparison of the standards as such, since for example, postal or mail items are not mentioned in the scope statement of SANS 1883-1, but the standard does specify five postal address types that are in use by the South African Post Office. The results of the review of these scope statements are provided in the main part of the review summary.

Table 4. Topics mentioned in the scope statements

	AFNOR	AS/NZ 4819	BS 7666	INSPIRE	ISO 19112	ISO/TS 15000-5	OASIS	SANS 1883-1	UPU S42	UPU S53	Draft US FGDC
Address											
Postal/mail items/delivery											
Model/schema, components/ elements											
Exchange/transfer/interoperability/ harmonization											
Address files and databases, address data management					□						
Address data quality											
Address allocation											

* A gazetteer can be considered to be a database

B.1.1 AFNOR

This document applies to computer file *exchange and transcription of an address onto paper for sending mail items*. The latter are given *as recommendations for the establishment and internal management of address files and databases*. This document only applies to *French addresses.* Reference should be made to the standards or practices in effect in foreign countries for handling inward mail.

B.1.2 AS/NZS 4819

This standard establishes *requirements and guidelines for a comprehensive rural and urban addressing system*. It outlines the various *elements of the system* and provides guidelines for the *application of those elements to a range of address site types in both urban and rural areas*. The elements found in this standard are applicable, where appropriate, to all address sites laying within the limits of either the urban or rural addressing system. These elements *can be used to allocate addresses*.

B.1.3 BS 7666

Rob, can we include the scope statement here?

B.1.4 INSPIRE

This document specifies a *harmonised data specification for the spatial data theme Addresses*. It provides the basis for the drafting of Implementing Rules according to Article 7 (1) of the INSPIRE Directive [Directive 2007/2/EC]. The entire data specification will be published as implementation guidelines accompanying these Implementing Rules.

The remainder of the document is structured to provide an overview, information on specification scope and data product identification in sections 2-4 before presentation of the *application schema* itself and associated narrative in section 5. Sections 6-7 provide information concerning *reference systems, data quality, metadata, delivery and portrayal*. The appendices provide a bibliography, abstract test suite, discussion of address component life cycles, and provide *guidance for member states on how to assign components of the address to classes in the schema*. The primary audience for this document is technical staff who will be responsible for implementation of the delivery application that will be used to provide data to the specification. The executive summary provides an introduction for managers responsible for the delivery process.

B.1.5 ISO 19112

This standard defines the *conceptual schema for spatial references based on geographic identifiers*. It establishes *a general model for spatial referencing using geographic identifiers, defines the components of a spatial reference system and defines the essential components of a gazetteer*. Spatial referencing by coordinates is addressed in ISO 19111. However, a mechanism for recording complementary coordinate references is included.

This standard enables producers of data to define spatial reference systems using geographic identifiers and assists users to understand the spatial references used in datasets. It *enables gazetteers to be constructed in a consistent manner* and supports the development of other standards in the field of geographic information. It is applicable to digital geographic data, and its principles may be extended to other forms of geographic data such as maps, charts and textual documents.

B.1.6 ISO/TS 15000-5

This Core Components Technical Specification can be employed wherever *business information is being shared or exchanged amongst and between enterprises, governmental agencies, and/or other organisations in an open and worldwide environment*. The Core Components User Community consists of business people, business document modelers and business data modelers, Business Process modelers, and application developers of different organisations that require interoperability of business information. This interoperability covers both interactive and batch exchanges of business data between applications through the use of Internet and Web based information exchanges as well as traditional Electronic Data Interchange (EDI) systems.

This specification will form the basis for standards development work of business analysts, business users and information technology specialists supplying the content of and implementing applications that will employ the UN/CEFACT Core Component Library (CCL). The Core Component Library will be stored in a UN/CEFACT repository and identified in an ebXML compliant registry.

Due to the evolving nature of the UN/CEFACT Core Component Library, the specification includes material that focuses on the business community doing further discovery and analysis work. Some of the contents of this specification are not typical of this type of technical document. However, they are critical for successful adoption and standardization in this area to move forward.

B.1.7 OASIS CIQ

The scope of CIQ Specifications is to provide *a metadata specification to represent party related data independent of applications and industry use of party data and that is global (limiting to party name,*

address, party centric attributes and party relationships) in a standard format, and does not deal with (out of scope):

- Transactional "customer/party information" such as recent purchases, payment history, etc.
- Message envelopes that carry CIQ payload
- Formatting of the CIQ represented data
- Privacy and security issues connected to exchanging and storing personal information
- Data exchange methods and procedures for party information
- Messaging protocol for exchange of party information
- Validation/verification of party information
- Formatting, labeling, or sorting of party information
- API specifications

The objective of the OASIS CIQ TC (formed in 2000) is to deliver *a set of XML Specifications for defining, representing, interoperating and managing* "PARTY (Person or Organisation) CENTRIC INFORMATION" that are truly open, vendor neutral, industry and application independent, and importantly "Global" (ability to represent international data formats such as different types of party names and addresses used in 241+ countries).

The CIQ family of specifications are designed to represent party data (e.g. name and address) independent of any culture, geographical location, application or industry at an abstract (simple representation of data - free text format) or detailed (complex representation, i.e. breaking the data into its atomic elements - structured format) level from a data integrity and quality perspective and therefore, is truly a "global" (International) specification for representing party information.

The CIQ TC develops XML industry specifications for the following Party entities. Party entities are defined as modular and reusable components (e.g. Party Name only, Party Address only) in the form of XML Schema (for each component). Users can choose the component to implement:

NAME
Name of a Party (person or an organisation).

OASIS CIQ specification that provides a standard format to represent the name of a party is "extensible Name Language (xNL)".

ADDRESS
A physical location or a mail delivery point.

OASIS CIQ specification that provides a standard format to represent an address/location is "extensible Address Language (xAL)".

PARTY
A Party could be of two types namely,

Party (person or organization) centric data consists of many attributes (e.g. Name, Address, email address, telephone, qualifications, occupation, identification details, etc) that are unique to a party. A Customer is of type Party.

OASIS CIQ specification that provides a standard format to represent party centric data is "extensible Party Information Language (xPIL)".

PARTY RELATIONSHIPS
Pairwise affiliation or association between two people, between two organisations, or between an organisation and a person

OASIS CIQ specification that provides a standard format to represent relationships between two or more parties including the roles of the parties involved in the relationship, is "extensible Party Relationships Language (xPRL)".

xPRL supports chains of interlocking pairwise party relationships, linked by common members.

B.1.8 SANS 1883-1

This standard specifies and defines the *data elements, as well as the address types that can be constructed from the data elements for South African addresses*. The standard further *defines terms & definitions* related to addresses in South Africa.

This standard is applicable to addresses covering the whole of South Africa.

The standard applies to addresses that describe the physical location of a point of service delivery, and that could be geo-referenced.

The standard includes definitions for *address types that are assigned by the official address* issuing body (such as the street address type), as well as *address types that are commonly in use* (such as the farm and informal address types).

B.1.9 UPU S42

This UPU standard provides a dictionary of the possible *components of postal addresses, together with examples of and constraints on their use*. The standard defines three hierarchical levels of postal address component:

- segments, such as addressee specification, which correspond to major logical portions of a postal address.
- constructs, such as organisation identification, which group elements within segments into units which are meaningful for human interpretation;
- elements, such as organisation name or legal status, which correspond to the lowest level of constructs, i.e., those which are not themselves made up of subordinate elements, though they may be sub-divided for technical purposes
- element sub-types, such as door type or door indicator, representing parts of conceptual elements, such as door, for database storage or to facilitate presentation, or representing multiple instances of conceptual elements for use in defining address element structures or templates

The standard further provides a methodology for the specification of postal address templates, which stipulate *how a postal address is to be written*, including the order in which postal address elements are to appear, required and optional elements, and the presentation or rendition of the elements, subject to constraints on the space available for that task. Languages suitable for human comprehension and computer processing of postal address templates are defined and described.

It also defines a number of useful *terms*, such as delivery address, forwarding address, mailee and mail originator. By providing a standard dictionary of postal address components, this standard is expected to greatly facilitate the formal description of actual address representations and the definition of procedures for mapping between them.

In practice, many address representations, whether in computer databases, in electronic messages or in printed or written form, combine several of the postal address components defined herein into single fields or lines. Considerable intelligence may be required in mapping between different representations, particularly where these are subject to a degree of ambiguity. This standard does *not* specify the length or value range of components.

UPU S42b describes the address templates for each country, i.e. the specific way an address is formatted in each country, indicating in particular the order in which the various elements appear. The address templates are supplemented by rendition instructions, specifying *how elements are to be rendered for printing*. This standard does not cover the topic of data protection. Users of the standard are nevertheless reminded that the storage and exchange of personal data are subject to legislation in many countries. The standard may be applied only to the extent that this is compliant with such legislation.

B.1.10 UPU S53

This document includes two W3C *XML Schemas*. The first is referred to as the S42 base schema and contains the S42 elements and element sub-types together with the codes that typically represent these elements in S42 templates, both in XML and in natural language. The second uses the S42 base schema and adds a number of complex types and other XML data constructs to describe name and address data sets. These data sets may use S42 elements and element sub-types along with extensions of these elements and element sub-types, composites that may optionally contain information about the elements and element sub-types that make them up, other special data types developed for this standard, and external data. The schemas in full are presented at Annexes A and B.

This document should not be used to transmit name and address data for which appropriate permissions and authorizations have not been obtained, and should not be used to send name and address data to any party not entitled to receive the data. As different jurisdictions have different legal restrictions and accepted business practices, judgments in these matters are the responsibility of the users of this standard.

B.1.11 US FGDC

This standard covers thoroughfare, landmark, and postal addresses within the United States, including its outlying territories and possessions. It was created to provide *one standard that meets the diverse address data management requirements for local address administration, postal and package delivery, emergency response (and navigation generally), administrative recordkeeping, and address data aggregation*. It was created to provide a systematic, consistent basis for recording all addresses in the United States. It defines the *elements needed to compose addresses and store them within relational databases and geographic information systems*. Additionally, it defines the attributes needed for address documentation, mapping, and quality testing, including address ID's, coordinates, and linear reference locations. It provides a complete taxonomy (systematic classification) of US addresses. The standard includes the idea of the address reference system, and defines its elements and attributes. Within the standard there are *tests and procedures for address data quality testing, error-trapping, and anomaly identification*.

The standard supports seamless exchange of address information, and fosters consistent implementation by defining XML models for every address element, attribute, and class, integrated into a single *XML Schema* Document.

B.2 Terminology

The following sections list the terms that are defined in each of the reviewed address standards. The definitions for some of these terms are provided as part of the results of the review in the main part of the review summary.

B.2.1 AFNOR

address, postal address, address block, CEDEX, address field, postcode, component, addressee, recipient, place name, specific distribution heading, basic word (street name), merge point, delivery point, special delivery point, geographical point, address structure, thoroughfare, address area

Note: The terms above are listed from the English translation.

B.2.2 AS/NZS 4819

address (rural and urban), address point, address site, alias address, address site name, centroid, complex site, cul-de-sac, custodian, datum point, discontinuous road, focal section, geocode, GNAF (Geocoded National Address File), jurisdiction, land parcel (also parcel or lot), locality, may, metadata, neighbourhood, numeral plate, principal address, private road, property, public road, redevelopment, right of way, rural address number, rural address number plate, shall, should, start point, suburb, terminal point, urban address number, utility, water access

B.2.3 BS 7666

Rob, can we get a list of the terms?

B.2.4 INSPIRE

addressable object, property, *postal address*

B.2.5 ISO 19112

feature, gazetteer, geographic identifier, location, spatial reference, spatial reference system

B.2.6 ISO/TS 15000-5

core component (CC), basic core component (BCC), association core component (ACC), core component type (CCT), aggregate core component, data type, business context, business information entity (BIE), basic business information entity (BBIE), association business information entity (ASBIE), aggregate business information entity

B.2.7 OASIS

address, name, party, party relationships,

B.2.8 SANS 1883-1

address, address type, cadastral property, erf, farm, geographical name, official address issuing body, point of service delivery, service, small holding

B.2.9 UPU S42

address, addressee, component, construct, delivery, delivery address, delivery point, element, forwarding address, mail originator, mail recipient, mail submitter, mailee, mailer, party, payer, *postal address*, postal address component, postal address construct, postal address element, postal address element sub-type, postal address segment, postal address structure, postal address template, poste restante, recipient, rendition instruction, return address, segment, syntactically correct postal address, valid postal address

B.2.10 UPU S53

active data dictionary, actual subset, address block, address line block, automatic identifier, composite, cross reference data, data element, delivery point identifier, external data, hash identifier, item, maximum subset, name and address data, name and address data set, representation, roster, standard line address block, subset notation, unique identifier

B.2.11 US FGDC

address

B.3 Classification of addresses (address types)

B.3.1 AFNOR

None

B.3.2 AS/NZS 4819

The standard describes two types of addresses, each including a different number of components:

- Rural address

- Urban address

B.3.3 BS 7666

???

B.3.4 INSPIRE

None?

B.3.5 ISO 19112

Not applicable

B.3.6 ISO/TS 15000-5

Get a list of the address profiles in the registry?

B.3.7 OASIS CIQ

The AddressTypeList has the following elements:

- Airport
- Business
- CaravanPark
- CommercialPark
- CommunityDevelopment
- EducationalInstitution
- Entertainment
- Hospital
- Location
- Marina
- MilitaryBase
- OverseasMilitary
- Port
- Primary
- RecreationalPark
- Resort
- RetirementVillage
- Rural
- Secondary
- ShoppingCentre
- SportingCentre
- Urban

B.3.8 SANS 1883-1

The following types of address, each constructed from a different combination of address elements, are defined.

- Building address
- Farm address
- Informal address
- Intersection address
- Landmark address
- SA Post Office box address
- SA Post Office poste restante address
- SA Post Office site address
- SA Post Office street address
- SA Post Office-type village address
- Site address
- Street address

B.3.9 UPU S42

The standard provides a methodology for the specification of postal address templates, which stipulate amongst other things the required and optional elements of an address, as well as the order in which postal address elements are to appear. Template languages, namely the Natural Language Template notation (NLT) and Postal Address Template Description Language (PATDL), are specified in the standard and can be used to describe postal address templates. Postal address templates from different countries are published in Part B of the standard.

A postal address template is comparable to an address type. Instead of specifying a number of address types, UPU S42 allows the specification of any number of address types.

B.3.10 UPU S53

Not applicable

B.3.11 US FGDC

The standard classifies addresses according to their syntax, that is, their data elements and the order in which the elements are arranged. There are four broad groups of address classes:

- Thoroughfare address classes
- Landmark address classes
- Postal delivery address classes
- General address classes

B.4 Address components

Please fill in for 'your standard' whether it defines address components or elements. Would be nice to have a list of components.

B.4.1 AFNOR

B.4.2 AS/NZS 4819

The following components are defined in the standard:

Sub-dwelling (flat/unit) number or identifier; Level number of sub-dwelling; Private road name; Utility name; Address site name; Rural address number; Single urban address number; Urban address

number range; Road name; Locality; State/territory (Australia); City (New Zealand); Nearest service town (New Zealand); Postcode; Country

B.4.3 BS 7666

B.4.4 INSPIRE

B.4.5 ISO 19112

B.4.6 ISO/TS 15000-5

B.4.7 OASIS CIQ

B.4.8 SANS 1883-1

The standard defines the following address data elements:

To be completed

B.4.9 UPU S42

B.4.10 UPU S53

B.4.11 US FGDC

B.5 Conceptual model

Please fill in for 'your standard', whether it describes relationships between components, and which tool or language is used to express and depict these relationships.

B.5.1 AFNOR

B.5.2 AS/NZS 4819

B.5.3 BS 7666

B.5.4 INSPIRE

B.5.5 ISO 19112

B.5.6 ISO/TS 15000-5

B.5.7 OASIS CIQ

B.5.8 SANS 1883-1

B.5.9 UPU S42

B.5.10 UPU S53

B.5.11 US FGDC

Annex C

Bibliography of address and address-related standards

C.1 Address standards

The tables below lists a number of address standards that were considered by the PT 19160 project team.

Table 5. Address standards (sorted by level, publisher)

Document	Publisher	Level	Reviewed
ISO/TS 15000-5 (3.8 MB), Electronic Business Extensible Markup Language (ebXML) - Part 5: ebXML Core Components Technical Specification, Version 2.01 (ebCCTS)	ISO/TC 154	International	Yes
ISO 19112:2003, *Spatial referencing by geographic identifiers*	ISO/TC 211	International	Yes
OASIS CIQ v3.0 Approved Committee Specifications CS02	OASIS	International	Yes
Exchange of name and address data (S53-1) XML schemas	UPU	International	Yes
International postal address components and templates - Part A: Conceptual hierarchy and template languages (S42a)	UPU	International	Yes
International postal address components and templates - Part B: Element mapping conventions, template design considerations, address templates and rendition instructions (S42b)	UPU	International	No
Spécifications postales - Adresse postale	AFNOR	National (France)	Yes
Address Standard by New Zealand Post	New Zealand Post	National (New Zealand)	No
SANS 1883-1, *Geographic information - Addresses*, Data format of addresses	SABS	National (South Africa)	Yes
SANS 1883-3, *Geographic information - Addresses*, Guidelines for address allocation and updates	SABS	National (South Africa)	No
BS 7666, the British address standard will not be made available.	BSI	National (UK)	Yes
US Draft Street Address Standard.	US FGDC	National (US)	Yes
AS 4590:2006, *Interchange of client information*	AS/NZS	Regional (Australia and New Zealand)	No
AS/NZS 4819:2003, *Geographic information - Rural and urban addressing* (in review, revision to be released for comment in 2010)	AS/NZS	Regional (Australia and New Zealand)	Yes

CEN/TR 14142-1:2010, Postal Services - Address databases - Part 1: Components of postal addresses (CEN Enquiry stage)	CEN	Regional (Europe)	No
CEN/TR 14142-2:2010, Postal Services - Address databases - Part 2: Element mapping conventions, template design considerations, address templates and rendition instructions	CEN	Regional (Europe)	No
D2.8.I.5 INSPIRE Data Specification on Addresses –– Guidelines	INSPIRE TWG on Addresses	Regional (Europe)	Yes

C.2 Address-related standards

Table 6. Address-related standards

Document	Publisher	Level	Reviewed
GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations	IETF	International	IETF
ISO/CD 19151, *Geographic information - Logical location identification scheme (previously u-Position)*	ISO/TC 211	International	No
ISO/WD 19155, *Geographic Information - Place Identifier (PI) Architecture*	ISO/TC 211	International	No

Make proper references?

Annex D

Member body and liaison representation

D.1 Member body representation

Member body	Nominated expert
Canada	Dr. Boris Gutkin
China	Ms. Li Li
Denmark	Mr. Morten Lind
France	Mr. Patrick Dousseaud
France	Mr. Emmanuel Mondon
Japan	Mr. Kazuhiko Akeno
Japan	Mr. Hidenori Fujimura
Japan	Mr. Koichi Hirata
Japan	Mr. Yo Iida
Japan	Mr Go Sato
Japan	Professor Teruko Usui
South Africa	Dr. Serena Coetzee (project leader)
South Africa	Mr. Antony Cooper
South Africa	Mr. Pierre Rossouw
South Africa	Mr. Marius van der Merwe
South Africa	Mr. Arjen van Zwieten
Thailand	Ms. Siripon Kamontum
UK	Mr. Carsten Roensdorf
UK	Dr. Rob Walker
USA	Ms. Randy Fusaro
USA	Ms. Karen Owens

D.2 Liaison representation

Member body	Nominated expert
UNGEGN	Mr. Brian Goodchild
UPU	Mr. Joe Lubenow
UPU	Mr. Piotr Piotrowski