Overview of an address and purpose of the workshop

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Abstract

Various countries around the world have address standards or are developing them. There are also address standards developed by international organizations for specific domains (such as postal delivery) and initiatives to develop regional address standards (particularly, within Europe). This workshop was conceived with the aim of discussing what an address actually is and exploring the possibility of developing an international address standard across the various domains that use addresses. This paper attempts to provide an overview of addresses and address standards, presenting a preliminary taxonomy of addresses.

1. Background to the workshop

There is a variety of addresses used for many purposes. Various countries around the world have address standards or are developing them. There are also address standards developed by international organizations for specific domains (such as postal delivery) and initiatives to develop regional address standards (particularly, within Europe). Coetzee et al (2008) assessed ten of these standards against a variety of criteria, such as the standard's status; its purpose; the availability of supporting material; whether the standard supports geo-referencing with coordinates, postal addresses and non-postal addresses; if the standard has a data model; and whether the standard includes metadata and descriptions of data quality. They found that most of these address standards:

- Included geo-referencing by coordinates;
- Described *all* kinds of addresses (as opposed to only postal addresses);
- Provided data models;
- Used UML to describe their data models; and
- Used XML as an encoding format.

They also found that some of the standards included metadata and some information on data quality, though they concluded that the trend is to use a separate standard for data quality (Coetzee et al 2008). They also compared the definitions of 'address' used in the standards, though not all ten standards included such a definition. These are presented below in Section 3. Coetzee *et al* (2008) also describe various economic, social and governance benefits of an address standard and assess the different routes to an address standard (*de facto*, industry consortia, inter-governmental agencies and open standards generating bodies). They conclude with several recommendations for an international address standard:

- It should not prescribe an universal addressing system, because each country has its own unique socio-cultural addressing system implemented through legislation, etc.
- It should cater for the different character sets and text ordering schemes around the world.
- It should be an abstract standard, providing a framework for describing address systems across the world.
- It should provide common terms and definitions of an address, address elements and related concepts (a vocabulary and ontology).
- It should aim to make the address reference data from the multitude of addressing systems

exchangeable.

- It should provide an overarching data model (or reference model) that enables the integration of address reference data from multiple source addressing systems.
- It should cater for geo-referencing addresses by coordinates.
- It should cater for all kinds of addresses (as opposed to only postal addresses).

Finally, Coetzee *et al* (2008) recommend that the process towards developing an international address standard should start with a document with limited scope that can be expanded at a later stage when the standard is revised. This is motivated by a study (NASA 2005) that found that standards that proceed incrementally have a much better chance of adoption.

This workshop was conceived by Coetzee and her fellow authors with the aim of discussing what an address actually is and exploring the possibility of developing an international address standard across the various domains that use addresses.

2. Outline of the workshop

The purpose of this workshop is to consider the issues related to the development of an international address standard. It brings together people involved in the development of address standards around the world, to give their perspectives on several key issues:

- What is an address? We think that it would be more useful for an international standard to consider addresses broadly, rather than to consider separately each domain for an address standard.
- What are the definitions of an address currently in the various address standards, whether in use or under development?
- What is the scope of current address standards?
- Why do we need a national, regional, domain or international address standards?
- Can we benefit from an international address standard?
- If so, is there enough reason to move ahead with an international address standard now?
- If yes, what should the scope (more or less) be and how do we proceed? We could start with a review document summarizing the issues and the options for way forward, which could be done as a Stage 0 Review Summary within ISO/TC 211.

This presentation will attempt to give an overview of an address. Thereafter, this workshop will provide various national and international perspectives on address standards:

- *Addressing the Needs of INSPIRE: The challenges of improving interoperability within the European Union*, Andrew Coote, INSIPRE Address Thematic Working Group.
- *A general approach to addressing*, Rob Walker, Rob Walker Consultancy, UK.
- *Ubiquitous public access and address standards*, Sang-Ki Hong, Anyang University, Korea (Convenor of ISO/TC211 WG 10, *Ubiquitous public access*).
- *Address data exchange in South Africa*, Serena Coetzee, University of Pretoria, South Africa.
- *AS/NZS 4819:2003: Geographic information – Rural and urban addressing and AS/NZS 4590:2006: Interchange of client information*, John Hockaday, Geoscience Australia.
- *A conceptual framework for the description of Place Identifiers*, Reese Plews and Shigekazu Kawano, JIPDEC/DPC, Tokyo, Japan.
- *Developing a Comprehensive Standard for US Address Data*, Carl Anderson, US Address Standard Working Group.
- *Universal Postal Union (UPU) – International Postal Addressing Standards*, Joe Lubenow, Address Management, Universal Postal Union (UPU).

- *Addresses as an infrastructure component: Danish experiences*, Morten Lind, KMS, Denmark.
- *ISO/TC211 perspective on an international address standard*, Olaf Østensen, Statens kartverk, Norway (Chair of ISO/TC211, *Geographic Information/Geomatics*).

3. Overview of an address

An address should be considered more broadly than just a set of directions for delivering post. An address is also used for a wide range of public and private service delivery, including goods delivery, connecting utilities, billing, emergency dispatch and household surveys. Addresses are also needed for opening bank accounts, buying on credit, securing an identity document, voting, obtaining employment, etc. An address can also give people a status (Coetzee & Cooper 2007a).

As mentioned above, Coetzee *et al* (2008) compared the definitions of 'address' used in several standards, which are (please note that some are free translations and/or informal definitions):

- *The conventional means of describing, labeling or identifying an address site; and an address site is an object, place or property* (AS/NZS 4819:2003).
- *A structured, textual description assigned as a common reference to a definite way of access to a building, a construction or developed or undeveloped plot of land* (Danish eGov Core Component Working Group 2006).
- *An unambiguous specification of a point of service delivery* (SANS/WD 1883-1 2007).
- *Means of referencing an object for the purposes of unique identification and location* (BS7666:2006).
- *An address specifies a location by reference to a thoroughfare, or a landmark; or it specifies a point of postal delivery* (Address Standard Working Group 2008).
- *Set of precise and complete information on the basis of which an item can be forwarded and delivered to the addressee without searching and without there being any doubt* (ISO 11180:1993). Please note that this definition was for a 'postal address', and that this standard was withdrawn in 2003.
- *A physical location or a mail delivery point* (OASIS 2007).
- *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, 2006).

All these definitions have one aspect in common, namely: a *location* (site, building, plot of land, point or addressee). All but one of them have another aspect in common, namely: a *reference* (label, description, identification, textual, specification or information). Several include *uniqueness* (definite, unambiguous, precise, without searching or without there being any doubt). Other aspects included are *common* (conventional), *structured*, *completeness*, and *service delivery* (access). One definition also points out that an address does not exist only when some form of service delivery takes place, but is needed for *potential* service delivery. Combining these together could give the following definition of an *address*:

A structured, unique, complete, common reference for
actual or potential service delivery to a location.

4. A preliminary taxonomy of addresses

It is probably useful to have a taxonomy of addresses in general, to identify which types of addresses are to be catered for by a particular address standard, and which are not. Such a taxonomy could classify addresses by their purpose (ie: their domain of use) or by the means of referencing used (eg: by coordinates or geographical identifiers). Table 1 presents an initial attempt at a taxonomy of addresses. For each type of address, an attempt has been made to identify whether or not the address is static and/or dynamic; whether the location inferred by the address is absolute or relative to some known point;

whether the address is expressed using coordinates (ISO 19111:2007) and/or geographical identifiers (ISO 19112:2003); the precision of the address; whether or not the address can be redirected to another location or address; and standards for the address type (whether draft or published). The table is undoubtedly missing key address types, but hopefully it presents a useful start to a taxonomy of addresses.

Table 1. Initial attempt at a taxonomy of addresses

						Coordinates	Geog IDs			
		Static	**Dynamic**	**Absolute**	**Relative**	**(ISO 19111)**	**(ISO 19112)**	**Precision**	**Redirectable**	**Standards**
Postal address	*Street delivery address*	Y	N	N	Y	N	Y	Fine	Y	UPU S42
	PO Box or Private Bag	Y	N			N	Y	Fine to Coarse	Y	UPU S42
	Post Restante	Y	N	N	Y	N	Y	Coarse	Y	UPU S42
Delivery address	*(for goods, etc)*									
	Street address	Y	N	N	Y	N	Y	Fine	N	
	Intersection address	Y	N	N	Y	N	Y	Fine	N	
	Landmark address	Y	N	N	Y	N	Y	Fine to Moderate	N	
	Building address	Y	N	N	Y	N	Y	Fine	N	
	Site address	Y	N	N	Y	N	Y	Fine to Coarse	N	
	Farm address	Y	N	N	Y	N	Y	Coarse	N	
	Informal address			N	Y	N	Y	Moderate		
	Street segment (identified by cross streets)	Y	N	N	Y	N	Y	Moderate	N	ISO 17572
Visiting address	*(for visiting people, etc)*									
	All the delivery addresses (ABOVE)									
Linear referencing	*?*				Y					ISO 19148
Coordinates	*Coordinate tuple in a coordinate reference system (CRS)*	Y	N	Y	N	Y	N	Very fine	N	ISO 19111
	Hierarchical tessellations (grids)	Y	N	Y	N	Y	N	very fine to coarse	N	
	?	Y	N	Y	N	Y	N	Fine	N	
U-Position			Y				Y			ISO 19151
Place Identifier							Y			

						Coordinates	Geog IDs			
		Static	**Dynamic**	**Absolute**	**Relative**	**(ISO 19111)**	**(ISO 19112)**	**Precision**	**Redirectable**	**Standards**
Tracking	*(for parcels, look-for-me, etc)*									
	GPS-enabled mobile phone	N	Y	Y	N	Y	N	Very fine		
	"Triangulation" of Mobile Measurement Reports	N	Y	Y	N	Y	N	Very fine		
	Cell IDs (mobile phones)	N	Y	N	Y	N	Y	Fine to coarse		
Geographical features	*Link ID or Node ID*	Y	N	N	Y	N	N	Fine		ISO 17572
Electronic or virtual address	*Landline telephone number*	Y	N	N	Y	N	N		Y	
	Landline facsimile number	Y	N	N	Y	N	N		Y	
	Mobile telephone number	N	Y	N	Y	N	N		Y	
	Internationalized Resource Identifier (IRI)									
	mailto (email address)	N	Y	N	Y	N	N		Y	
	http/https	Y	N	N	Y	N	N		Y	
	ftp	Y	N	N	Y	N	N		Y	
	news (USENET news)	N	Y	N	Y	N	N		Y	
	telnet	Y	N	N	Y	N	N		Y	
	file	Y	N	N	Y	N	N		Y	
	im (instant messaging)	N	Y	N	Y	N	N		Y	
Combination addresses	*?*									

5. Towards and international address standard

An international address standard could provide a tool set that could be drawn on for describing or building a national, regional or domain-specific address standard. These tools could include the common terms and definitions of an address, address elements and related concepts (as a vocabulary or an ontology); and/or a framework for describing an address system. This is illustrated in Figure 1. While such a standard will not enable directly the exchange of address data between addressing systems, it could be used to identify how the address systems correlate with one another, which could be used to develop an exchange mechanism. However, the purpose of such a 'limited' international address standard would be to provide the platform for developing more integrative standards. Further, such a standard would be less likely to generate resistance to it, as it would not attempt to impinge on the unique socio-cultural addressing systems in each country, and the legislation and regulations supporting the addressing system. Nevertheless, it would be very useful for those countries needing to develop or

revitalise their addressing systems.

An international address standard could be the superset of all other address standards, incorporating all their different concepts of addresses, address elements and related concepts. This is illustrated in Figure 2. Superficially, this might appear to be the best option, as it would 'satisfy' everyone. However, in practice it will invariably produced an unwieldy standard that is difficult to use – even to the extent of being a 'write-only' standard, that is, one that is easy to write to, but very difficult to read from as one has to cater for all the special cases. Unfortunately, there are some international standards that have adopted this approach.

Figure 1: An international address standard as a set of tools for describing other address standards

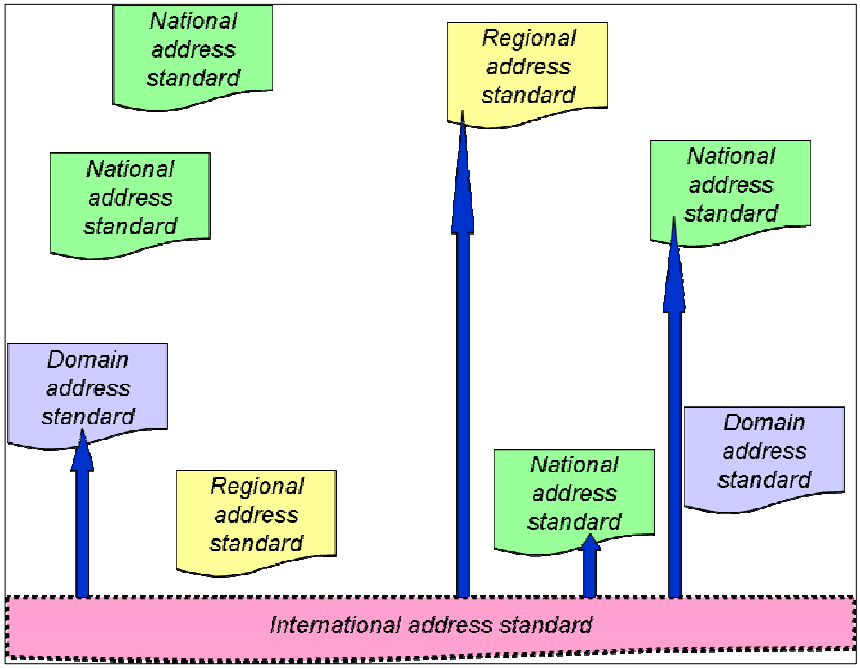
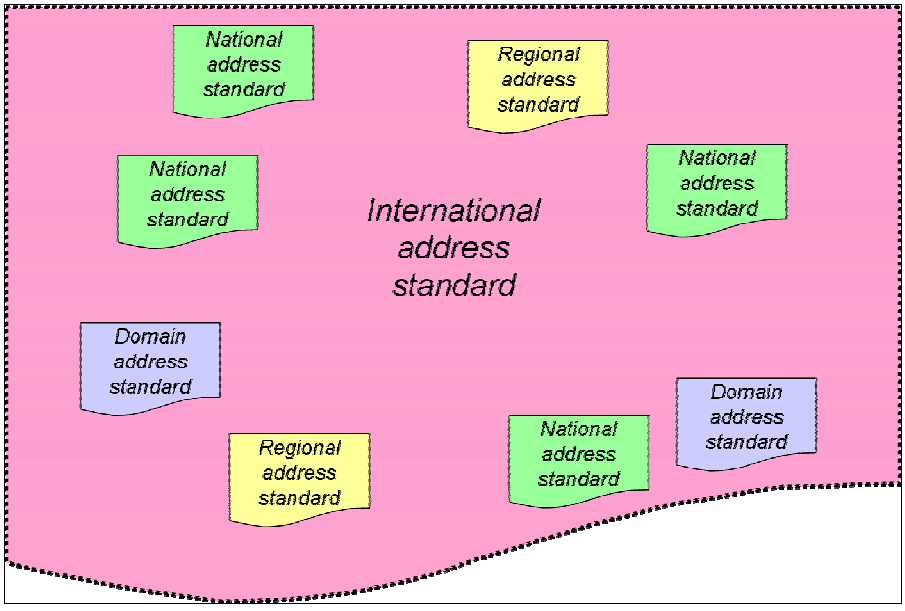
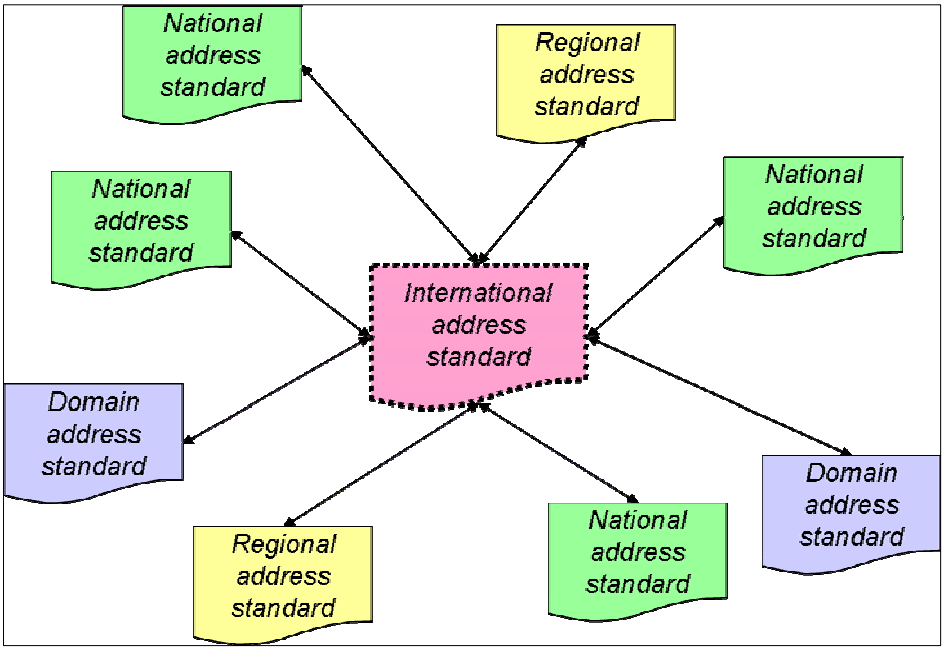


Figure 2: An international address standard as the superset of other address standards



Finally, an international address standard could be the universal interface between other standards, providing the general model of an address, address elements and related concepts (as opposed to being merely a collection of special cases). This is illustrated in Figure 3. This would require a good understanding to be developed first of an address and related concepts, so that the general model of an address could be identified and described. This is what the international address standard should become, but the maturity of our understanding of addresses is such that it would not be feasible to develop now an international address standard as the universal interface between other standards – particularly given the tight deadlines normally imposed for the completion of international standards, once initiated.

Figure 3: An international address standard as the universal interface between other address standards



6. Conclusions

We have presented here an overview of an address, including various definitions of an address. We have presented a preliminary taxonomy of addresses and some thoughts on the route to an international address standard. We have also introduced this workshop, which was conceived with the aim of discussing what an address actually is and exploring the possibility of developing an international address standard.

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References

Address Standard Working Group, 2008 (forthcoming), *Draft Street Address Standard*, third draft in preparation under the sponsorship of the United States Federal Geographic Data Committee, at http://meadow.spatialfocus.com/twiki/bin/viewauth/ADDRstandard/WebHome, contact syurman@spatialfocus.com or mwells@spatialfocus.com to get access to the site, [accessed 11 November 2007].

AS/NZS 4819:2003 (2003). Geographic information – rural and urban addressing, jointly published by Standards Australia, Sydney, Australia, and Standards New Zealand, Wellington, New Zealand.

BS 7666:2006, Spatial datasets for geographical referencing, British Standards Institution (BSI), United Kingdom.

Coetzee S & Cooper AK, November 2007, 'What is an address in South Africa?', *South African Journal of Science*, vol 103, no 11, pp 449-458.

Coetzee S & Cooper AK, 21 August 2007, 'The value of addresses to the economy, society and governance – a South African perspective', *45th Annual Conference of the Urban and Regional Information Systems Association (URISA)*, Washington DC, USA.

Coetzee S, Cooper AK, Lind M, Wells MM, Yurman SW, Wells E, Griffiths N & Nicholson MJ, 28 February 2008, 'Towards an international address standard', *GSDI 10*, St Augustine, Trinidad, 30pp.

Danish eGov Core Component Working Group, February 2006, *OIOXML Adresseguide* (en: Documentation Guidelines for Addresses), at http://www.oio.dk/files/Dokumentationsguide_for_adresse.pdf, [accessed 16 November 2007].

ISO 11180:1993, *Postal addressing* (withdrawn), International Organization for Standardization (ISO), Geneva, Switzerland.

ISO 19111:2007, *Geographic information – Spatial referencing by coordinates*, International Organization for Standardization (ISO), Geneva, Switzerland.

ISO 19112:2003, *Geographic information – Spatial referencing by geographic identifiers*, International Organization for Standardization (ISO), Geneva, Switzerland.

NASA (2005). *Geospatial Interoperability Return on Investment Study*, at http://www.isotc211.org/Outreach/Newsletter/Newsletter_08_2005/TC_211_Newsletter_08_Appendix_I.pdf, [accessed 11 November 2007].

OASIS Customer Information Quality (QIC) TC, 2007, *OASIS CIQ V3.0 Committee DRAFT Specifications*, at http://www.oasisopen.org/committees/tc_home.php?wg_abbrev=ciq#download, [accessed 11 November 2007].

SANS/WD 1883-1, 2007, Geographic Information – Address Standard, Part 1: Data format of addresses (draft), Standards South Africa, Pretoria.

UPU S42, 2006, S42: International postal address components and templates, Universal Postal Union (UPU), Berne, Switzerland.