

Addresses Unlock

Magnus Rademeyer¹, Kshetra Govindasamy²

¹Managing Director, AfriGIS (PTY) Ltd, Pretoria, magnus@afrigis.co.za

²Human Geographer, Department of business development and sales, AfriGIS (PTY) Ltd, Pretoria, kesh@afrigis.co.za

Abstract

The perception of the importance of geographic addresses as one of the basic building blocks of society has markedly changed over the years and is starting to take its rightful place in the plethora of government and business priorities. Close to or at the top. Addresses unlock value and supports economic growth. Much as the prevalence of cellular network coverage influences GDP, so does a proper, geographic relevant address database. Finding an address and understanding geographic address data is an important cog in the gears that makes both business and government turn.

From geographic risk management, land ownership through to route optimisation and environmental management, the address unlocks these activities from the bottom up. This paper deals with the status of address data in South Africa and gives some examples on the application of addresses in every day society. It also touches on the initiatives in place to standardise and coordinate this vital national asset and aims to give some guidelines for other African countries in their various stages of developing address databases and address standards. The SANS 1883 standard is used as a base reference for the discussion and illustrated with the AfriGIS National Address Database.

1. Introduction

The perception of the importance of geographic addresses as one of the basic building blocks of society has markedly changed over the years and is starting to take its rightful place in the plethora of government and business priorities. Addresses unlock value and supports economic growth. Much as the prevalence of cellular network coverage influences GDP, so does a proper, geographic relevant address database. With the age of the Internet, much of what we do has become relevant only to our presence in Cyberspace. Or has it?

This paper will focus on ‘addresses’, an essential building block and enabler for all spheres of society. I will conclude the paper with a brief look at a practical solution to land reform and address dataset building in the African context.

Although the paper reviews the overall progress and details around building address datasets and to which standards, the application domain of the actual address data is in the realm of the real world. Address data needs to be created but then, democratised in terms of ease of access to the information. Standard address capturing and verification interfaces need to be present in all walks of life to truly unlock the value this information can bring, much the same as personal identification or social security numbers. It needs to transcend the domain of the GIS professional into the day-to-day world of data capturing interfaces, from the bank teller or courier delivery agent. All of these application interfaces should be capturing verified, geocoded addresses in the correct structure with extreme simplicity and lightning speed.

As part of my introduction I'd like to briefly review a few successful case studies from Africa and beyond. Some countries operate a deed registration, while others operate a title registration. Some systems are centralised, and others decentralised. Some systems are based on a general boundaries approach, others on fixed boundaries approach (Lemmen & Oosterom 2013).

The UK has the NLPG (National Land and Property Gazetteer), which consists of spatial datasets and holds addresses of all fixed man-made properties. It covers England and Wales and comprises 27.8 million property records with over 29.3 million associated addresses. Underlying this project is a definitive National Street Gazetteer containing details of 1.5 million records. The NLPG, now in a centralised hub, has enabled mostly all entities of public service delivery to improve their service delivery time and reduce duplicated data systems. As can be seen from the British example, an address standard enables the development a national address database and related gazetteers.

In Denmark, the official national address register is also a key focus on service delivery, both in the private and public space. Of importance to the African context, the Danes have spent a considerable amount of resources on eliminating ambiguities. A qualitative analysis confirmed that the ambiguities affect people every day, often resulting in life threatening situations. The quantitative analysis proved that in the long term the savings arising from eliminating these ambiguities covers the costs of renaming the streets. A Danish statutory order now prohibits address ambiguities.

The Australians have the Australian Geocoded National Address File (G-NAF) housed in the Public Sector Mapping Agencies (PSMA). They follow a semi-automated process of integrating contributor address data into a standardised format that is acceptable for merging into the G-NAF. Any address data that cannot automatically be converted into the standard address format, is subjected to a manual review process. The PSMA is the custodian of the G-NAF and acts as a clearinghouse by merging data from as many as 15 government agencies and organisations into the G-NAF. The Australian example shows how an address standard can facilitate integrating data from different sources.

Ireland has a reference directory for addresses called the Ordnance Survey Ireland (OSi). The GeoDirectory as it is referred to, combines postal addresses and geocoded addresses to position on a map in one database, which is available to organisations, or individuals who require it. (Coetzee & Cooper 2008)

Coming back to Africa, the World Bank has undertaken activities in 52 cities in 15 countries, a sample of 11.2 million people. Before street addressing projects were undertaken, only 8% of streets had names; in other words, 92% were unidentified. The applications differ by country. Projects involving taxation were the most prevalent, examples being residence tax in Burkina Faso and Togo, tax registers in Senegal, and municipal taxation in Mauritania. Other applications involve urban management such as street system and household waste collection in Guinea, Cameroon, and Burkina Faso and an urban observatory in Cameroon (Vitkovic et al. 2005).

Next, the paper will review the context of Address data in South Africa.

2. Status of address data in South Africa

In South Africa, we have the SANS 1883 standard. This standard is currently being developed under the guidance of the South African Bureau of Standards (SABS) and a specialist team from the University of Pretoria. Together they have reviewed and analysed the cases from across the globe, and have tailored a turnkey approach that considers all the unique contextual realities in South Africa. The standard is broken up into 3 parts:

- SANS 1883-part 1, refers to Data format of addresses;
- SANS 1883-part 2, refers to guidelines for addresses in databases, data transfer, exchange and interoperability; and
- SANS 1883-part 3, refers to guidelines for address allocation and updates.

The aim of the South African address standard (SANS 1883), is to enable interoperability in address data, which in turn will springboard the facilitation of developing a national address database. The standard defines twelve address types that describe all forms of addresses currently in use in South Africa. These are: the Street address, Site address, Intersection address, Building address, Farm address, Informal address, Landmark address, SAPO box address, SAPO street address, SAPO site address, SAPO post restante address, and SAPO-type village address (Coetzee & Cooper 2008).

The main sources of address related data in South Africa are: the Surveyor General, Registrar of Deeds, Property ownership data, Chief Directorate Surveys and Mapping, Topographical maps with place names, Municipalities, Address allocation, property taxes, South African Post Office (SAPO),

Postal delivery and the South African Geographical Names Council. The SANS 1883 definition for an address includes service delivery by any institution in any number of ways, by post, by hand, by vehicle, or even virtually for a financial service, adding to the complexity of addresses that have to be represented in SANS 1883. For example, the Street address type and the SAPO street address type differ only in the locality part of the address.

The work done on SANS 1883 and the NAD is an ongoing process. We are fortunate to have a team of specialists from the University of Pretoria and SABS, who have dedicated their careers to ensuring that South Africa reaps full benefits from a completed, correct and validated National Address Standard.

3. Initiatives in place to standardise and coordinate

Address standards have been developed by a number of international organisations. These include the Universal Postal Union (UPU), the International Organisation for Standardisation (ISO) and the Organisation for the Advancement of Structured Information Standards (OASIS).

On an international stage, there was a strong calling for a widely accepted standardized domain model, taking into account the collective knowledge already existing worldwide. This calling was supported by the International Federation of Surveyors (FIG) and UN-Habitat and also by the Food and Agricultural Organization (FAO) of the UN (Lemmen & Oosterom 2013).

Result – the LADM Land Administration Domain Model (ISO 19152). This ISO covers basic information related to components of land administration, including water and elements above and below the earth's surface, basic administrative units, data on spatial units, topology and geometry. The ISO requires that data in a land administration system be documented in authentic source documents. Those source documents are the basis for building up a trusted and reliable land administration, as basis for transactions and for the establishment of new land rights in a land administration (Lemmen & Oosterom 2013). The ISO standard for the Land Administration Domain serves the following goals: communication between involved persons (information managers, professionals, and researchers) within one country and between different countries; support to the development of the application software for land administration; facilitation of cadastral data exchange and support to data quality management.

The Universal Postal Union (UPU) S42 international addressing standard consists of a generic list of address elements (used in all UPU member countries) and country-specific templates that informs users on how to transform address elements into an accurately formatted address. This can and has been

incorporated into software programs to manage addresses. Many countries with diverse address systems are already participating in this effort (UPU 2014).

South Africa has overcome a fair amount of hurdles with regard to a unified national address database. Some of which are: name changes in recent years, a wide variety of addressing systems, many areas with house numbers and street names and, tribal area and communal land with their own addressing system. These are but a few of the stumbling blocks that the SANS 1883 team have faced along their way.

To reiterate, the purpose of the South African address standard is to enable the sharing and exchange of address data. For this reason attributes such as the coordinate reference system, point of observation, originator, custodian and resource provider are included in the SANS 1883 data model. Data attributes such as the municipality, province, and country are included for the same reason. Since these latter attributes are identical for all addresses in a particular municipality (except for those few that lie across provincial boundaries), they do not have to be recorded for each individual address separately. These attributes are necessary only when the address data is shared or exchanged, when they can be added in a batch. Thus, the address database that is used for day-to-day maintenance of addresses in the municipality does not have to include these attributes and data elements.

South Africa has done some exceptional work in respect to addresses. We are slowly but surely seeing the impact on society, both in the public and private sphere. In the next part of this paper, I will review some examples of how addresses have helped to improve our daily existence.

4. Examples on the application of addresses in every day society

An address implicitly provides a position on the earth's surface. Addresses can exist in many formats and have a number of uses. Some of them are: directions for delivering post; delivery of a wide range of other services such as water, sewerage, telecommunications and electricity supply; refuse collection; billing; courier delivery; emergency response; goods delivery; serving summonses; household surveys; finalising an insurance claim and sending an assessor to an address; route optimisation for vehicle companies, health planning using address information to deliver medication; optimum location of mobile clinics based on profiled patient address data; demarcating areas for voting and finally as basic as putting your faith in your GPS system to 'get-u-there'!

In the next part of my paper, I will look at some guidelines for African countries and put forward a practical solution to land reform linking to a correct address allocation.

5. Guidelines for other African countries

Africa's governments are negatively impacted by disparate information. The information varies in terms of the number and format of references across different databases making it difficult and expensive to share information and bringing into question the reliability of address data. This, at its lowest level, refers directly to the address of the property. Wrong or no address = failed service delivery!

Giving people rights to the land and providing ownership certifications is an all-empowering quest. Not only will it give a sense of pride to the landowner, it catalyses economic growth. Landowners will be eligible to receive state and private funding and loans, inevitably increasing the spending power of each owner and the family. A strong case for poverty alleviation in Africa!

The solution lies in linking of Cadastral information to a national address. This approach can be done in one bold move - boost land reform and initialise the growth of a national address dataset which can be utilised by the different public and private spheres of the Africa country.

So how can this work? Note - the end goal is to give ownership rights to the individual while simultaneously creating an accurate cadastral and address dataset. The World Bank has tabled a process flow, which has been adopted in Africa. It can be summarized as

Overview of the process:

Activity 1: Designing the street addressing program

Activity 2: Conducting a feasibility study

Responses to questions asked during the feasibility study

Activity 3: Setting up the street addressing unit

Activity 4: Estimating costs and time frames

Activity 5: Defining the scope of the program

Activity 6: Choosing a codification system

Street addressing key tasks:

Activity 7: Mapping

Activity 8: Surveying and numbering doorways

Activity 9: Recording addresses

Activity 10: Installing street signs

Activity 11: Producing the address map and street index

Activity 12: Conducting a media campaign

Activity 13: Maintaining and adapting the system (Vitkovic et al. 2005)

Some practical consideration (Kurwakumire 2014); (Barry 2014):

1. Ortho-photographs and pre-project data collection is an integral part of the project success. All government and private entities should be willing to share their information.
2. Many semi-skilled workers can be hired to digitize and geocode from all the archived hardcopy maps. It is also important that the fieldworkers are from the local area and are trained on how to collect GPS information from the field. This approach provides a business case for job creation.
3. African people mostly don't believe that their governments are there to help them. It would be the prerogative of the government and stakeholders to conduct a public campaign, which invokes a sense of comradeship between the government and its citizens.
4. Media releases should inform citizens clearly of the protocols for ownership. Some common points of confusion: the effects of the capacity of married persons on property ownership, registration of land rights of minors and registration of multiple claimants.
5. Governments should invest time in conducting crowdsourcing campaigns, offering incentives to its citizens if they use their mobile devices to send information about their street and cadastral information.
6. Village chiefs are key to the community participating, getting their buy-in at an early stage will be critical for overall success.
7. It is equally important to involve the chief surveyor. The cadastral experts should analyse the incoming data and fix the addresses linked to the cadastral polygons. This step is critical and should happen in synergy. With a diligent approach to the data harvesting – cleaning and validating, the output could be a finalised cadastral dataset with each owners' documents attached to the vector layer and a unified address and street dataset.
8. Obtaining the necessary momentum to complete these tasks within any realistic timeframe is frequently a challenge because the perceived benefits are in the distant future. One suggestion would be linking these activities to a process which encompasses a bigger initiative, such as an election or census, usually adds the critical mass of showing a short term benefit for the capturing of geographic data at address or even boundary level.

Finally, a proper address database is vital to a functioning economy. It is central in a developing and developed economies with a broad range of applications from unlocking of finances, receipt of government services through to the delivery of emergency services and even your much loved door to door delivery from online stores such as Kalahari or Amazon. In Conclusion and in alignment to this conference, there is great potential for the poor in Africa, but they will only realize this potential when they are able to gain Property Rights. To quote De Soto (2000) “what the poor lack is easy access to the property mechanisms that could legally fix the economic potential of their assets so they could be used to produce, secure or guarantee greater value in the extended market”.

References:

- Barry, M ., 2014, 'Land Tenure administration and GIS: Trends and Challenges', *Position IT*, Jan/Feb 2014, pp. 35-40.
- Coetzee, S & Cooper, A., 2008, *Can the South African address standard (SANS 1883) work for small local municipalities?* Research-space CSIR, viewed 14 April 2014, <http://researchspace.csir.co.za/dspace/bitstream/10204/2769/1/Cooper4_2008.pdf>.
- Hernando, de Soto., 2000. *The mystery of capital: why capitalism triumphs in the West and fails everywhere else*. New York: Basic Books.
- Kurwakumire, E., 2014, 'A pro-poor land adjudication procedure for communal land', *Position IT*, Jan/Feb 2014, pp. 24-30.
- Lemmen, C & Oosterom, P., 2013, *The Land Administration Domain Model Standard, 5th Land Administration Domain Model*, Workshop 24-25 September 2013, Kuala Lumpur- Malaysia, viewed 14 April 2014, <http://www.fig.net/news/news_2013/ladm2013/01.pdf>.
- UPU – Universal Postal Union., 2014, *S42, international addressing standards*, Universal Postal Union, viewed 14 April 2014, <http://www.upu.int/uploads/tx_sbdwnloader/sheetAddressingS42InternationalAddressingStandardsFactSheetEn.pdf>.
- Vitkovic, CF., Godin, L., Leroux ,H., Verdet, F. & Chavez, R., 2005, *World Bank: Street Addressing and the Management of Cities*, World Bank Site Resources', viewed 14 April 2014, <http://siteresources.worldbank.org/CMUDLP/Resources/461753-1160058503655/Street_Addressing_Manual.pdf?resourceurlname=Street_Addressing_Manual.pdf>.