

What does a Global Address Framework look like?

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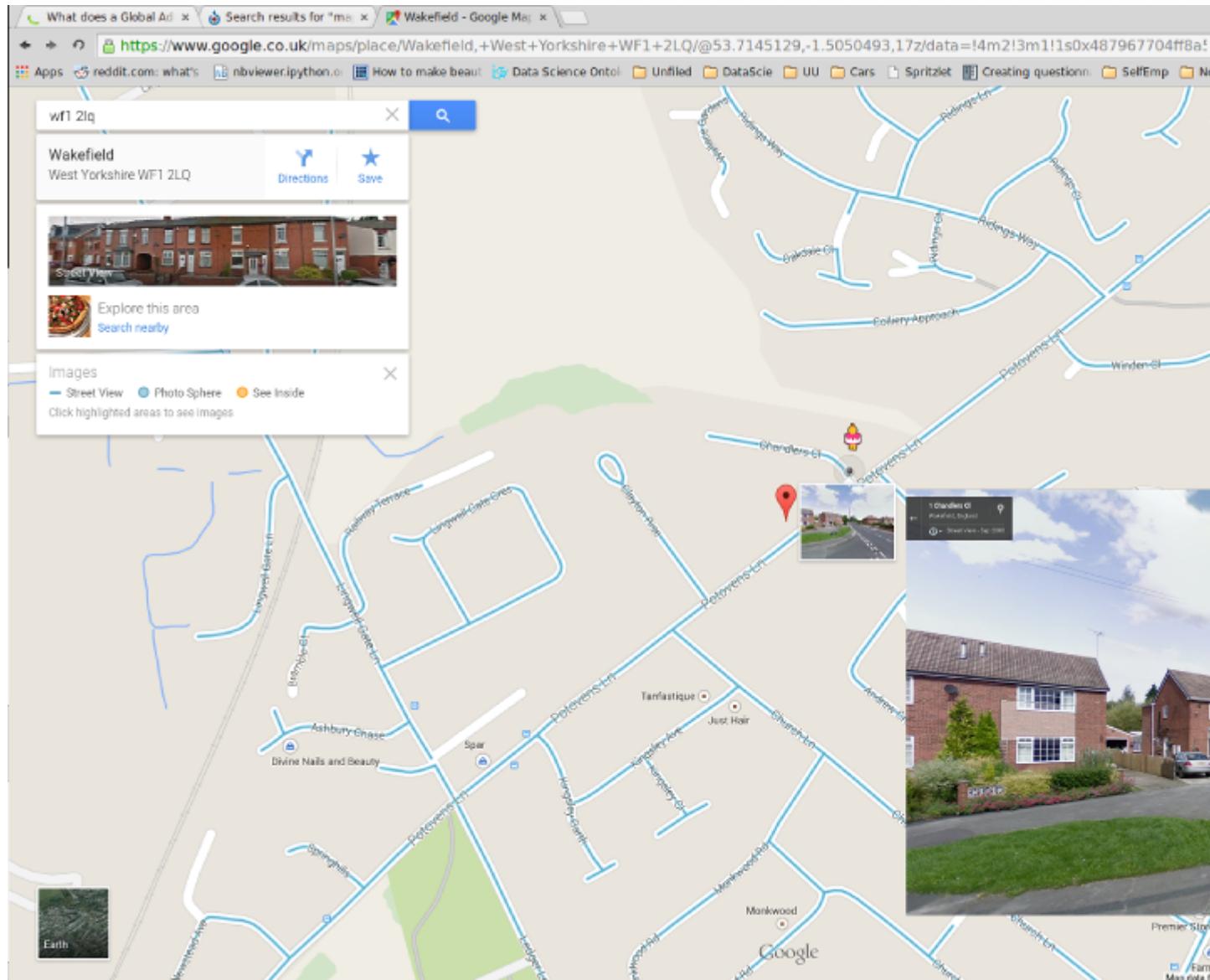


You can access this presentation on github:

https://github.com/AntArch/20150305_AddressDay.git

Addresses

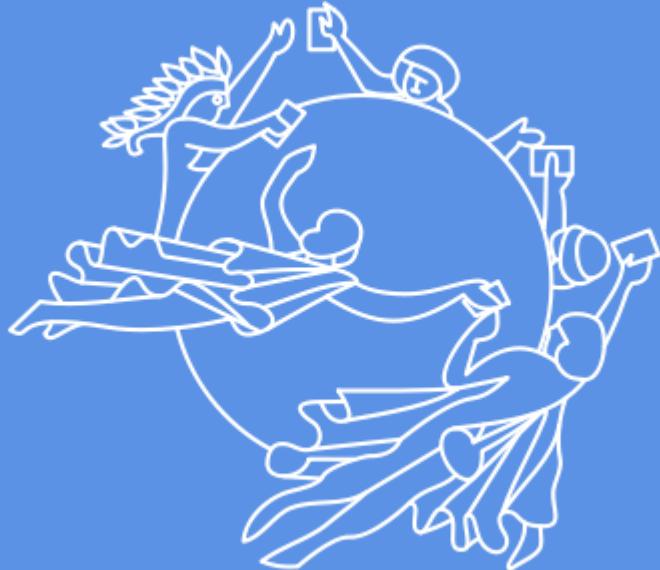
are part of everyday life



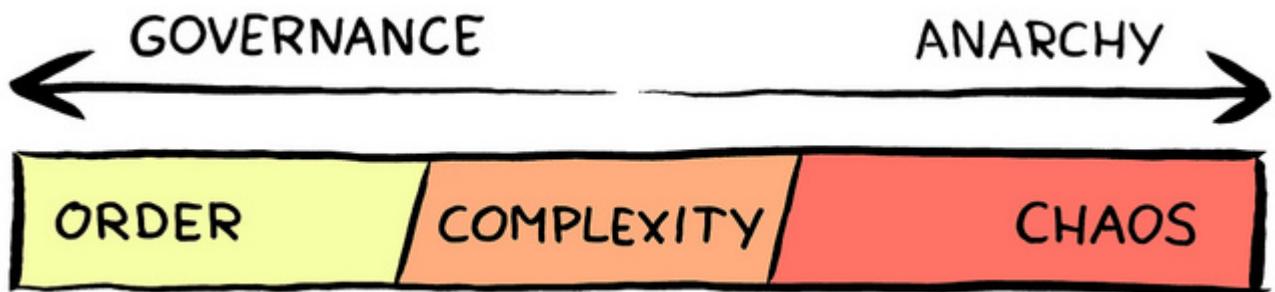


Kaye (2012)

Economy and commerce



Governance



Appelo (2010)

- Without an address, it is harder for individuals to register as legal residents.
- They are *not citizens* and are excluded from:
 - public services
 - formal institutions.
- This impacts on democracy.

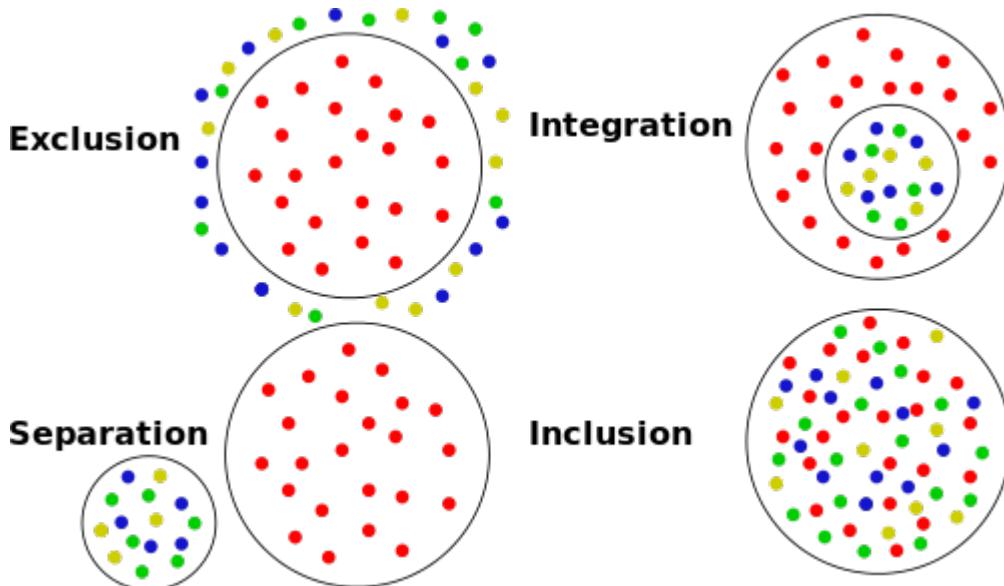
Urban Development



Crowley (2009)

- Key to managing *the explosion* of rural to urban migration.
 - Informal settlements housing the urban poor.
 - Poor infrastructure services.

Legal and Social integration



Beck (2015c)

- Formal versus Informal
- Barring individuals and businesses from systems:

- financial
- legal
- government
-

Security



Pavliga (1992)

- Addresses provide spatial structure.
 - This helps to identify, locate and access marginalized areas.

Sustainability and risk management



Huffman (2010)

- Addresses, geodemographics and spatial infrastructure support
 - sustainability
 - resilience
 - disaster management

Global Wellbeing

Personal Well-being 2012/2013



are a jolly good thing



Dystopos (2005)

The address disenfranchised?

It is almost impossible for individuals to be part of society without a legal identity.

4 billion people are excluded from the rule of law because they do not have a legal identity, and that **establishing such an identity often depends on having an official address**.

Addresses appear to be a key element in aiding the delivery of policies at national and international levels

UPU (2012) p. 6

... particularly with regard to:

- governance
- rule of law
- poverty reduction
- disease prevention
- the provision of basic services such as:
 - electricity
 - sanitation
 - water.

In Africa



40%
Access to
electricity



65%
Access to
clean water



34%
Access to improved
sanitation



c.33%
Of the **rural population**
has access to roads

Beck (2015d)

This century is witnessing a fundamental change in our way of life; for the first time in history, half of the world's population lives in towns and cities.

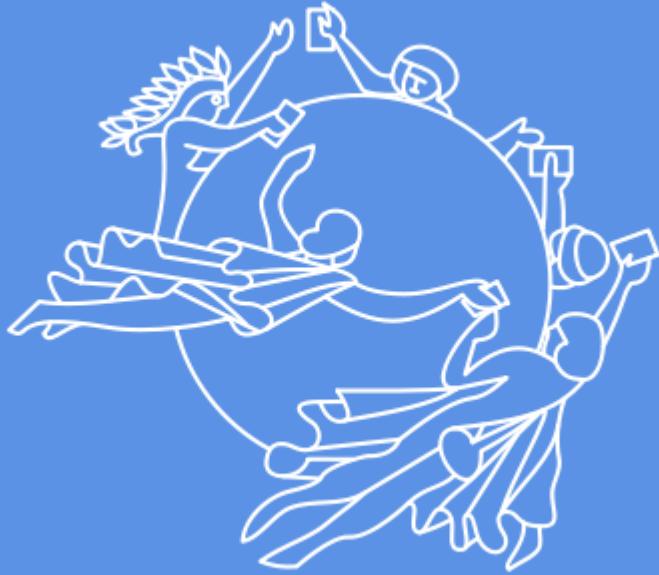
Urban areas are growing faster in developing countries, mostly through informal settlements.

The lack of an address, particularly in informal settlements, can also mean the lack of legal identity, equal opportunities for employment and social integration.

UPU (2012) p. 6

Addresses are becoming a **basic human right**.

Does this mean we need a global addressing framework?



What will it look like?

Characteristics of a Global Addressing Framework

A global addressing framework will come from one of two directions:

1. a set of **standards** and associated **semantics** that allows different **national addressing systems** to **interoperate** and be aggregated and generalised into a global entity.
2. an independent global system which is either:
 1. communally adopted (i.e. open).
 2. imposed by a monopoly player with a ubiquitous service for operational efficiency (i.e. Google, Apple, Facebook or Amazon).

Standards based

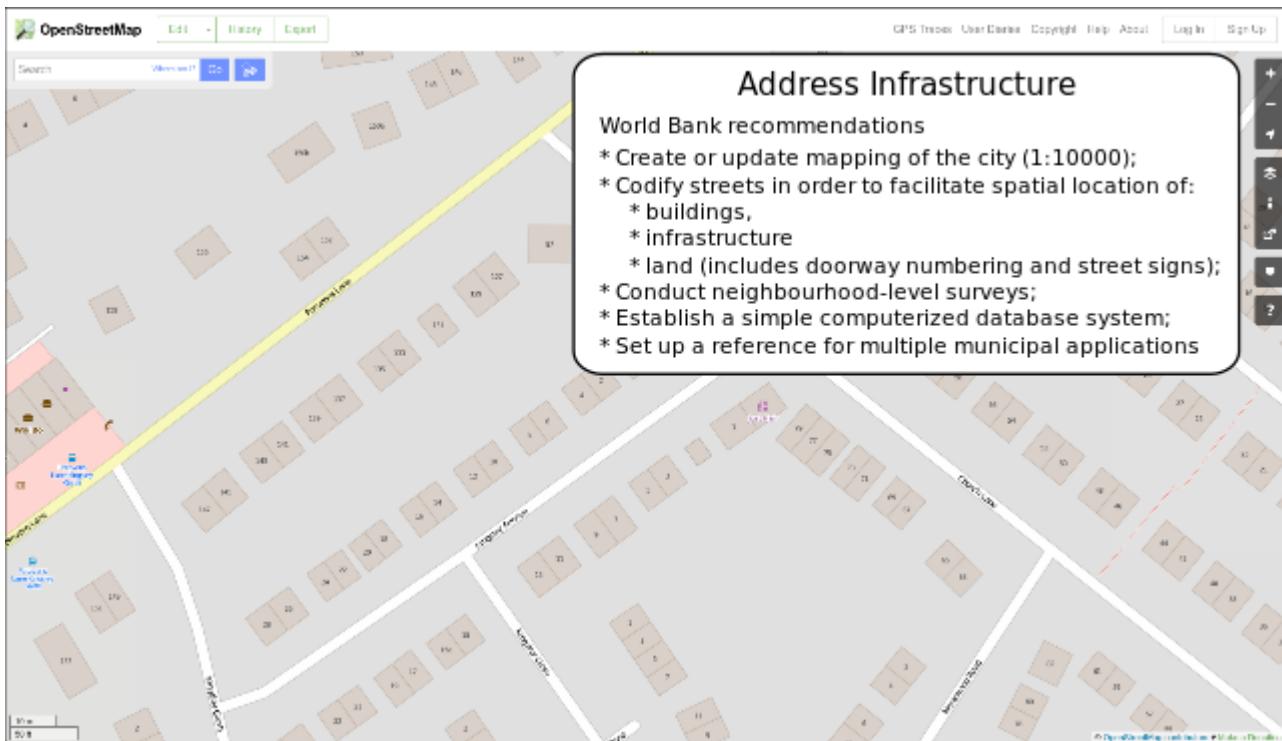
A global standards based system does not exist.

A vision is detailed in UPU (2012):

[Addressing the world: an address for everyone](#)

describes potential avenues to a global system.

advocates Address infrastructure



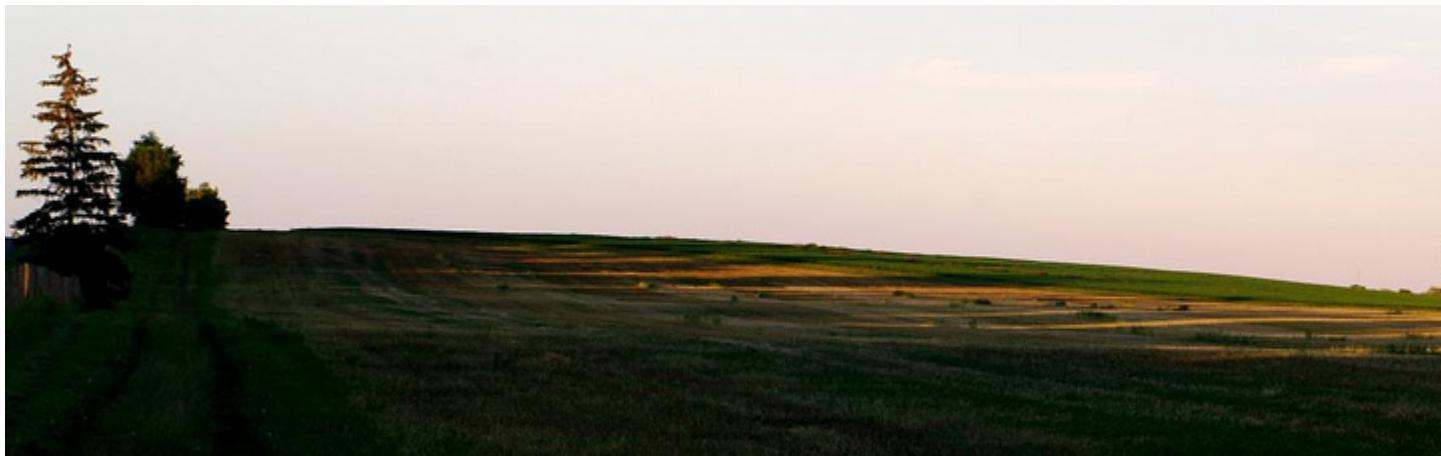
Beck (2015e)

National addresses

are the basis for a standards driven approach.

What are they like at a global level?

are biased and simply may not exist



Bauschardt (2015)

A global addressing framework should meet the needs of the rural, urban, formal and informal communities equally.

to reiterate - In Africa



40%
Access to
electricity



65%
Access to
clean water



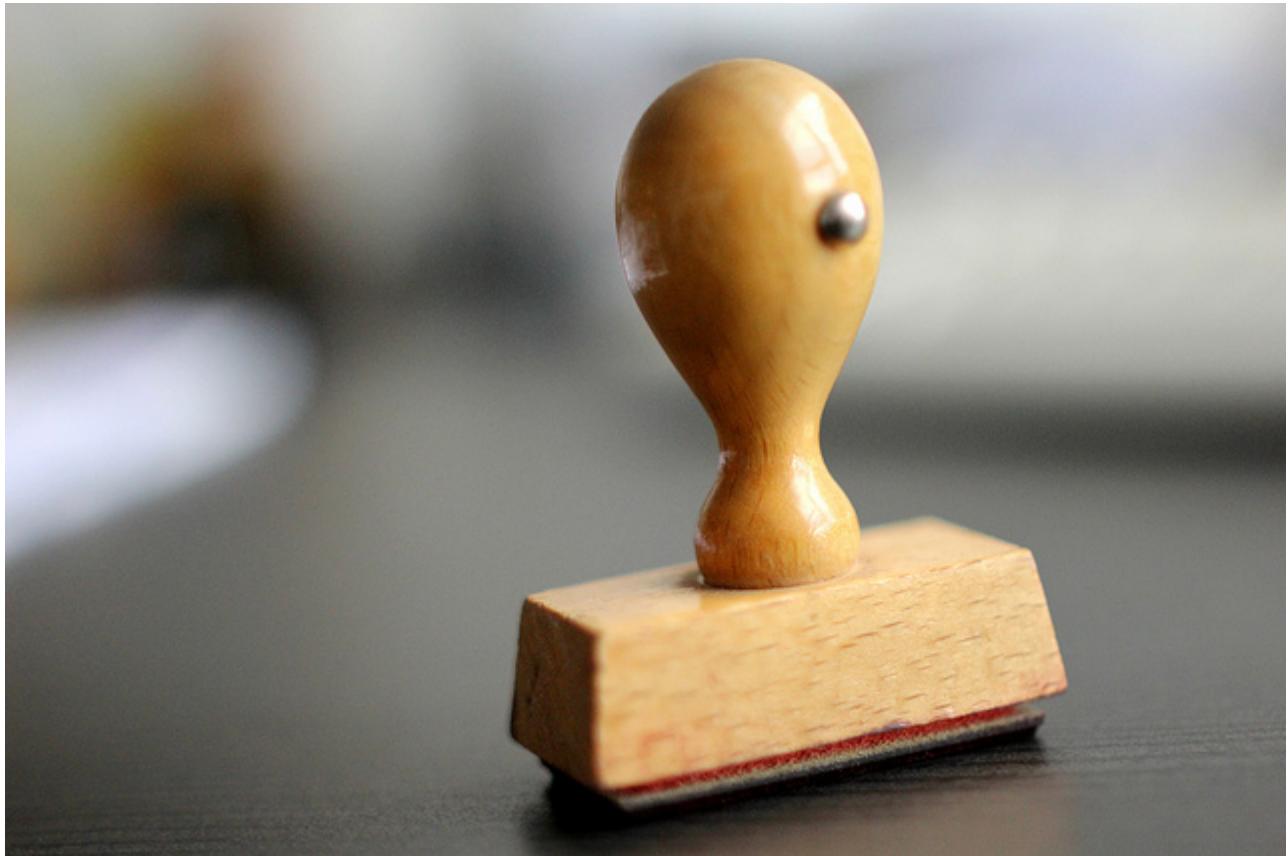
34%
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sanitation



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Beck (2015d)

are bureaucratic and costly

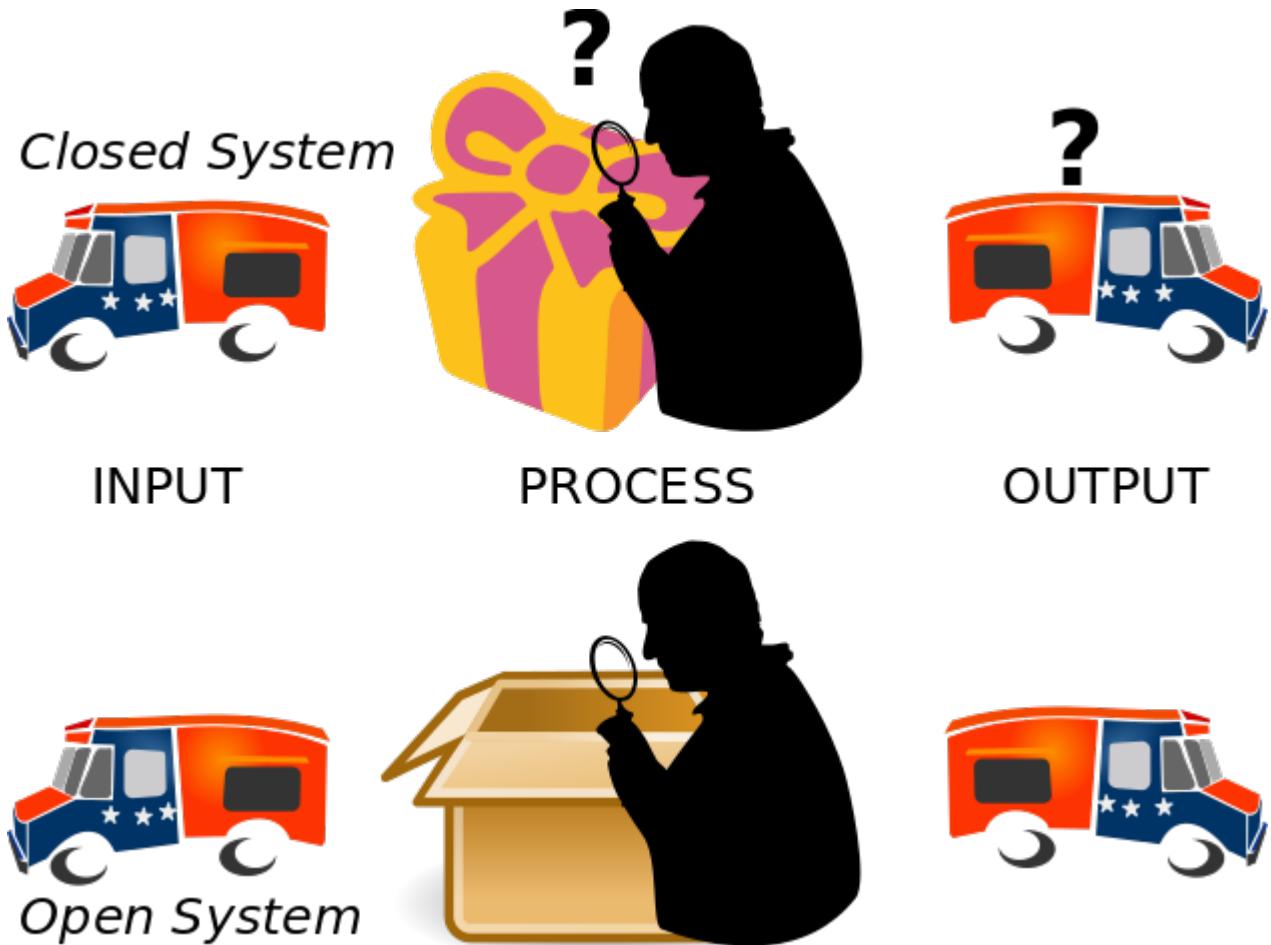


Schnettelker (2013)

Severely protracted when formal/informal issues are encountered.

A global addressing framework needs to be lightweight and cheap so it can be implemented in a timely manner.

can be opaque



Beck (2015b)

A global addressing framework needs to be transparent and reproducible.

tend to lack implicit spatial referencing

Address infrastructure is a **relative referencing system** that does not implicitly provide an accurate spatial location.

Official and third party geocoding and reverse geocoding services are required to find out the spatial reference of the address.

It is rare to see nations adopting the strategy described in the Danish case study (UPU 2012, p.52):

Note that the addressing system is first and foremost defined as a spatial reference system, which should enable safe “navigation” in the real world.

A global addressing framework should be based on a spatial reference system.

are not always open

The situation is best summarised in the Danish case study (UPU 2012, p.54):

Address data should be **available for all** users with as **few barriers as possible**.

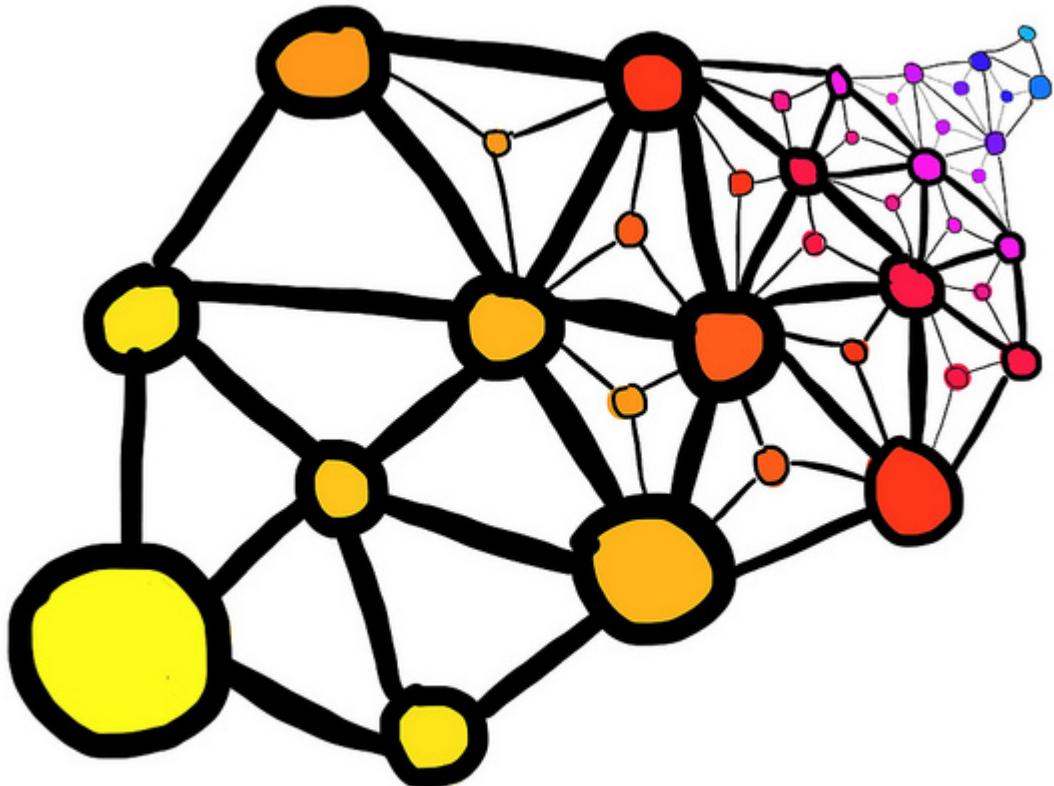
If this is not the case, the use of addresses as a common reference will not yield the otherwise

significant benefits.

A global addressing framework will be a Core Reference data set and should therefore be open or available with as few barriers as possible.

The Department for Business Innovation and Skills and Jeni Tennison at the [Open Data Institute](#) have described the need for Open Addressing in the UK (BIS 2014, Tennison (2014)).

are heterogeneous



van Staveren (2013)

requiring representations to be *openly* harmonised within the *semantic web*.

So.....

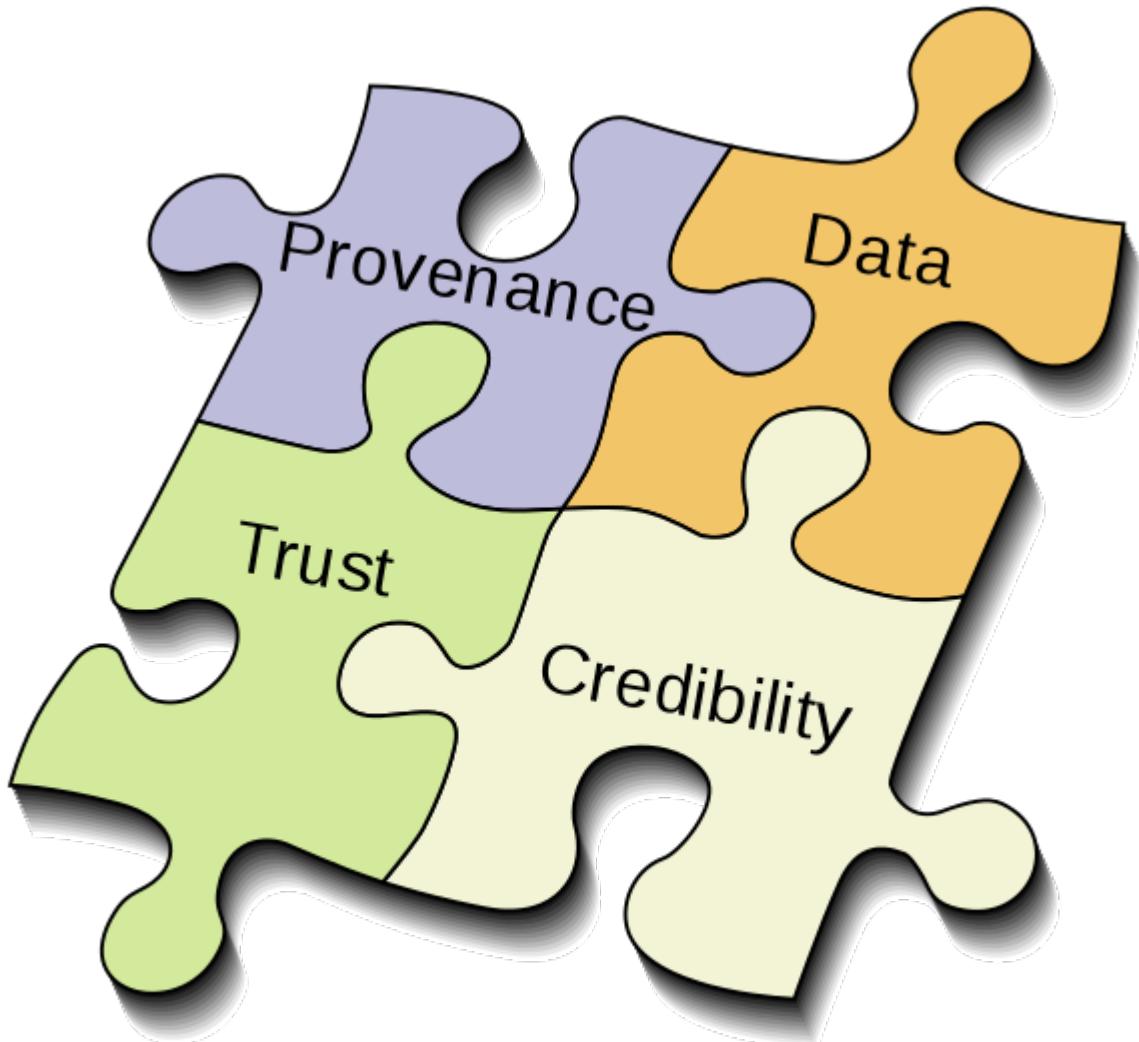
A global address framework needs to be *born global*



Rain (2007)

But.....

A global address framework must be credible



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Author: <http://commons.wikimedia.org/wiki/User:Arbeck>

Beck (2013b)

How do we do this?



fit for purpose?

DAIS

Determining Addresses which are Independent of infrastructure using a Spatial algorithm

..
Requirements for a Global Address Framework

..

DAIS Core

WGS84 algorithmic address minting



Addison (2009)

A global addressing framework needs to be transparent and reproducible.

A global addressing framework should be based on a spatial reference system.

A global addressing framework needs to be lightweight and cheap so it can be implemented in a timely manner.

Small footprint



Terwolbeck (2012)

Ubiquitous access across platforms.

No dependency on internet access.

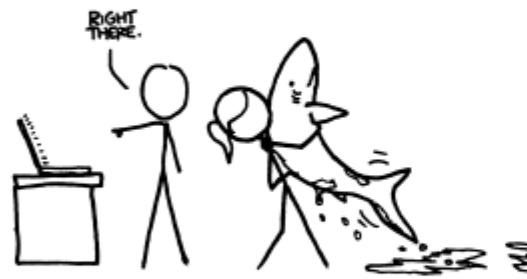
Short/memorable

XKCD PRESENTS:
SOME NEW

SCIENCE MNEMONICS

ORDER OF OPERATIONS

PARENTHESSES, EXPONENTS, DIVISION &
MULTIPLICATION, ADDITION & SUBTRACTION
TRADITIONAL: PLEASE EXCUSE MY DEAR AUNT SALLY



PLEASE EMAIL MY DAD A SHARK
OR: PEOPLE EXPECT MORE DRUGS AND SEX

TAXONOMY

KINGDOM, PHYLUM, CLASS,
ORDER, FAMILY, GENUS, SPECIES
TRADITIONAL: KING PHILIP CAME OVER FOR GOOD SEX



KATY PERRY CLAIMS ORGASMS
FEEL GOOD SOMETIMES
OR:
KERNEL PANICS CRASH OUR FAMILY GAME SYSTEM.

RESISTOR COLOR CODES

BLACK BROWN, RED, ORANGE, YELLOW,
GREEN, BLUE, VIOLET, GRAY, WHITE
TRADITIONAL: [NONE I CARE FOR]



"BIG BROTHER REPTILIAN OVERLORDS," YELLED
GLENN, "BRAINWASHING VIA GROUND WATER!!"

OR: BE BOLD, RESPECT OTHERS; YOU'LL GRADUALLY
BECOME VERSATILE, GREAT WIKIPEDIANS!

SI PREFIXES

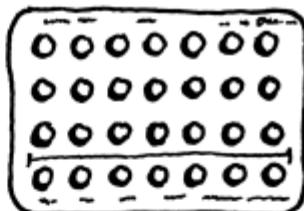
KILO, MEGA, GIGA, TERA, PETA, EXA, ZETTA, YOTTA
MILLI, MICRO, NANO, PICO, FEMTO, ATTO, ZEPTO, YOCOTO
TRADITIONAL: [I NEVER LEARNED ONE]



BIG:
KARL MARX GAVE THE PROLETARIAT ELEVEN ZEPPELINS, YO.
SMALL:
MICROSOFT MADE NO PROFIT FROM ANYONE'S ZONES, YO.

GEOLOGIC PERIODS

(PRECAMBRIAN) CAMBRIAN ORDOVICIAN SILURIAN
DEVONIAN CARBONIFEROUS PERMIAN TRIASSIC
JURASSIC CRETACEOUS PALEOGENE NEOGENE
TRADITIONAL: [I NEVER LEARNED ONE]



POLYCYSTIC OVARIAN SYNDROME DOES CAUSE PROBLEMS
THAT JUDICIOUS CONTRACEPTIVES PARTIALLY NEGATE.

PLANETS

MERCURY VENUS EARTH MARS
JUPITER SATURN URANUS NEPTUNE
TRADITIONAL: MY VERY EXCELLENT MOTHER
JUST SERVED US NACHOS



MARY'S "VIRGIN" EXPLANATION MADE
JOSEPH SUSPECT UPSTAIRS NEIGHBOR

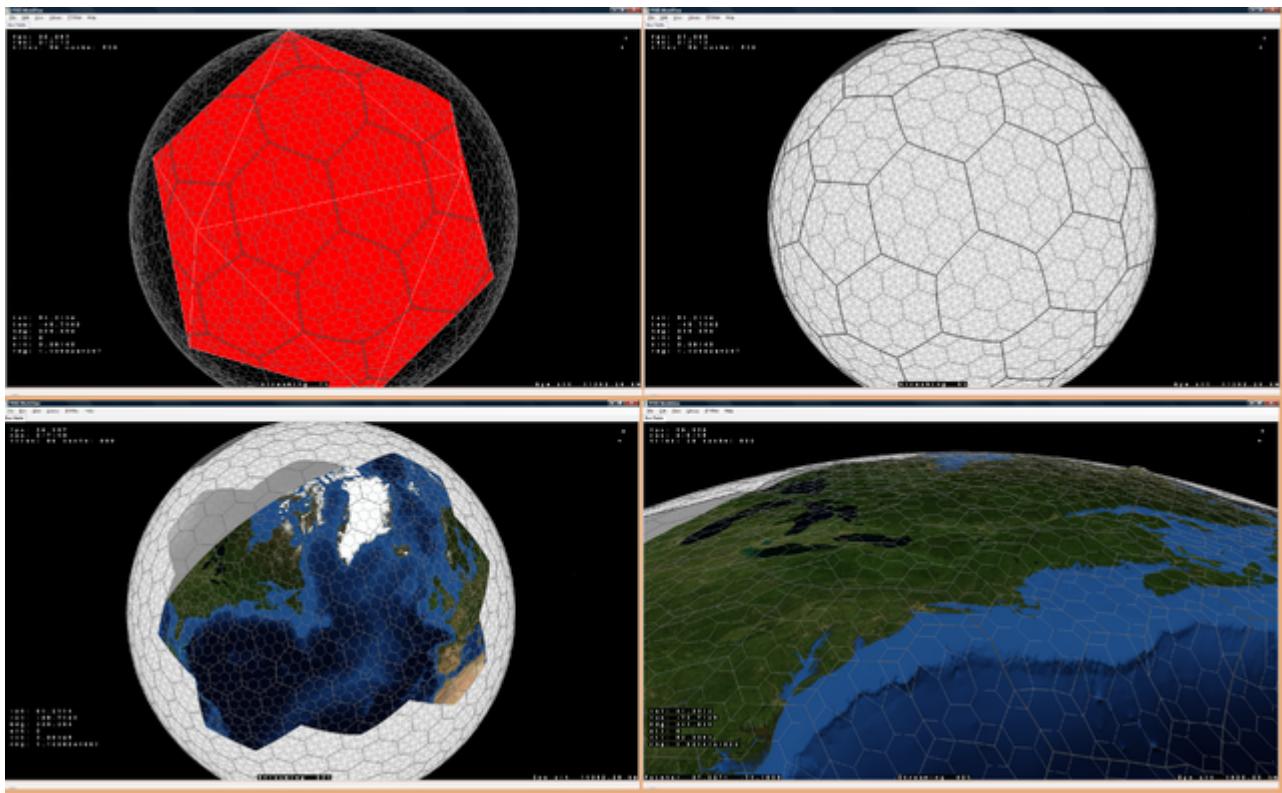
Self checking



Levine (2014)

Improving validity and credibility of downstream business processes.

Unlimited spatial recording



Petersen (2007)

Manila has a population density of 42,857 people per km². What are the spatial requirements for the range of addressing options?

A global addressing framework should meet the needs of the rural, urban, formal and informal communities equally.

Open and interoperable



Promoting interoperability

Referencing System and Scale Interoperability

Schematic Interoperability

Semantic Interoperability

Syntactic Interoperability

Policy Interoperability

Licence Interoperability

Legal Interoperability

Social Interoperability

Technical
Interoperability

Non technical
Interoperability

Open and interoperable

the lack of a consistent and transparent legal and policy framework for sharing spatial data continues to be an additional roadblock.

Pomfret & Ramage (2010)

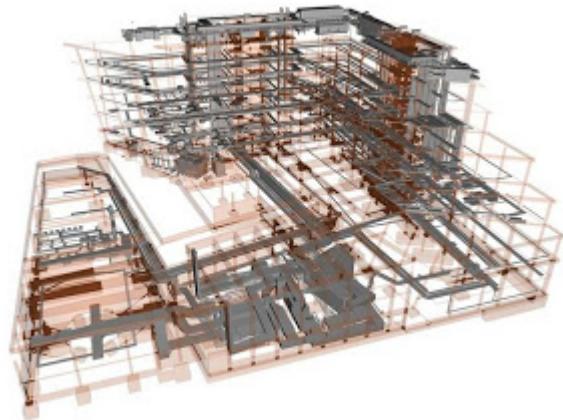
A global addressing framework should be open or available with as few barriers as possible.

DAIS +

Things that would be nice to have so that....

A global addressing framework should meet the needs of the rural, urban, formal and informal communities equally.

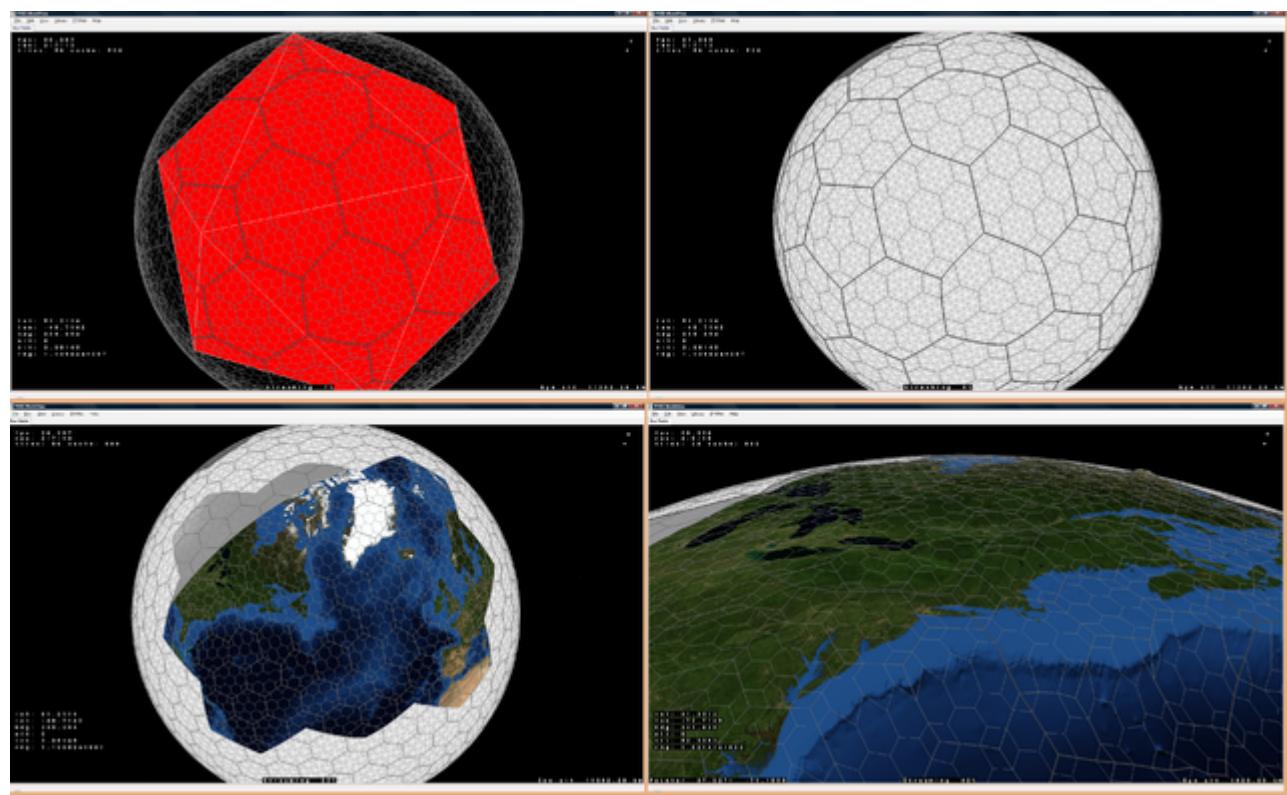
Indoor use and 3D



Arup (2013)

Incorporating wifi-triangulation - *individual room* addressing and navigation.

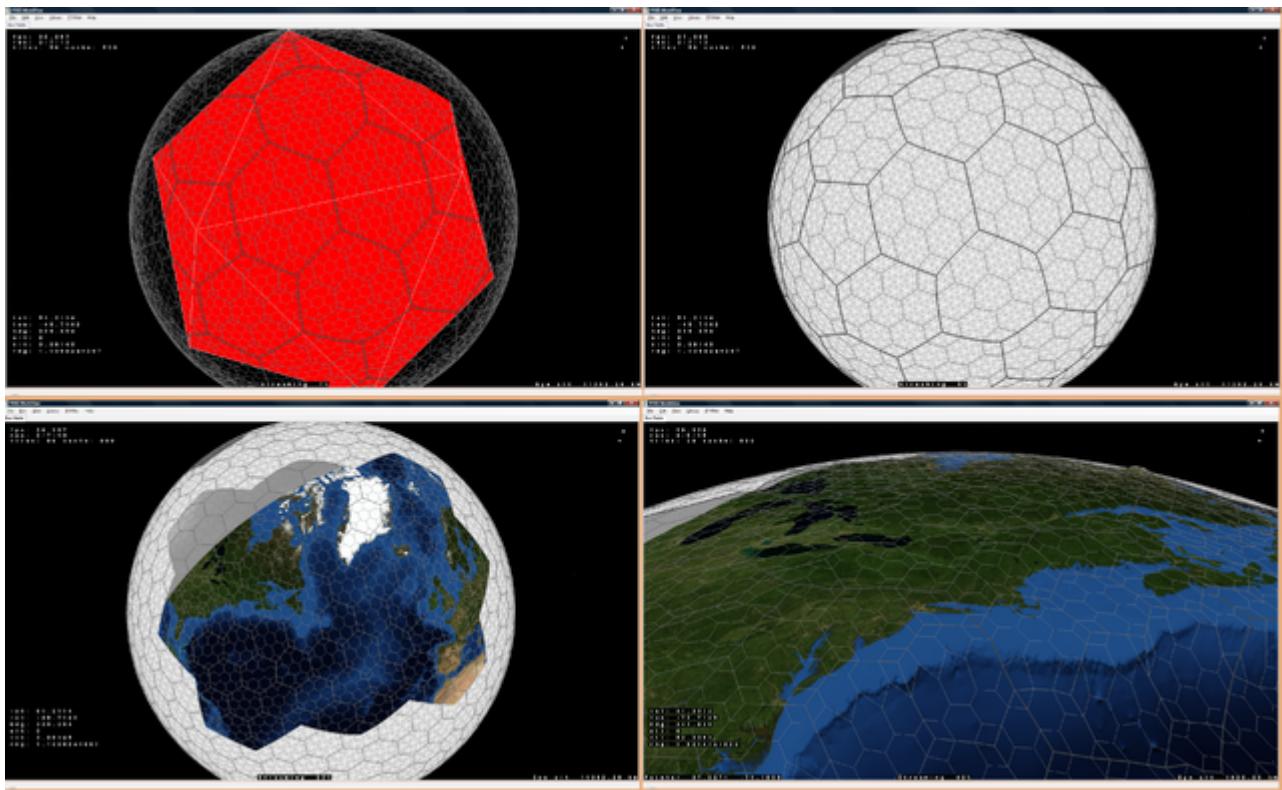
Inherent geo-statistical aggregation (spatially scalable)



Petersen (2007)

GIS free multi-scale analysis and reporting during disaster scenarios.

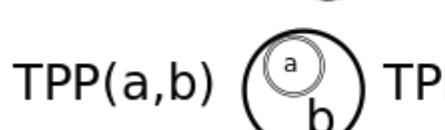
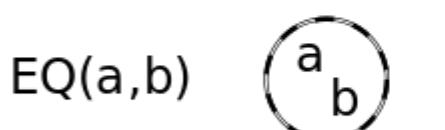
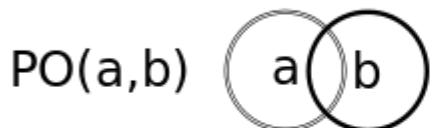
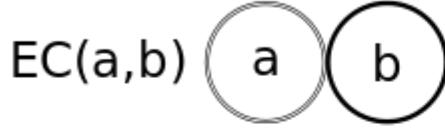
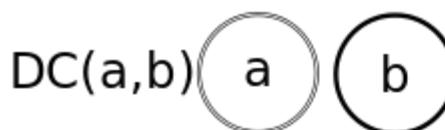
Area representation based on a regular tessellation



Petersen (2007)

It is still useable within traditional GIS.

Spatial adjacency relations within the encoding



Region Connection Calculus 8

RCC and OGC relationships

RCC8 property	RCC8 OGC relation URI	OGC property	OGC property URI
DC	geo:rcc8-dc	disjoint	geo:sf-disjoint
EC	geo:rcc8-ec	touches	geo:sf-touches
PO	geo:rcc8-po	overlaps	geo:sf-overlaps
EQ	geo:rcc8-eq	equals	geo:sf-equals
TPP	geo:rcc8-tpp	within	geo:sf-within
TPPi	geo:rcc8-tppi	contains	geo:sf-contains
nTPP	geo:rcc8-ntpp	within	geo:sf-within
nTPPi	geo:rcc8-ntppi	contains	geo:sf-contains
*	*	intersects	geo:sf-intersects

* logically represented as $\neg DC$
(the formal way of writing not(DC))

DC: Disconnected

EC: Externally Connected

PO: Partially Overlapping

EQ: Equal

TPP: Tangential Proper Part

TPPi: Tangential Proper Part inverse

nTPP: non-Tangential Proper Part

nTPPi: non-Tangential Proper Part inverse

Beck (2013a)

Understanding localised connectivity relations.

DAIS can

be used as a benchmark to evaluate technology candidates

For example (in alphabetical order):

- [GeoHash](#)
- [Maidenhead Locator System](#)
- [MapCode](#)
- [Natural Area Code](#)
- [Pyxis](#)
- [What3Words](#)

be a tool to shape future addressing needs



Beck (2015a)

be a vehicle to encourage tool development



Gray (2011)

support core reference geographies

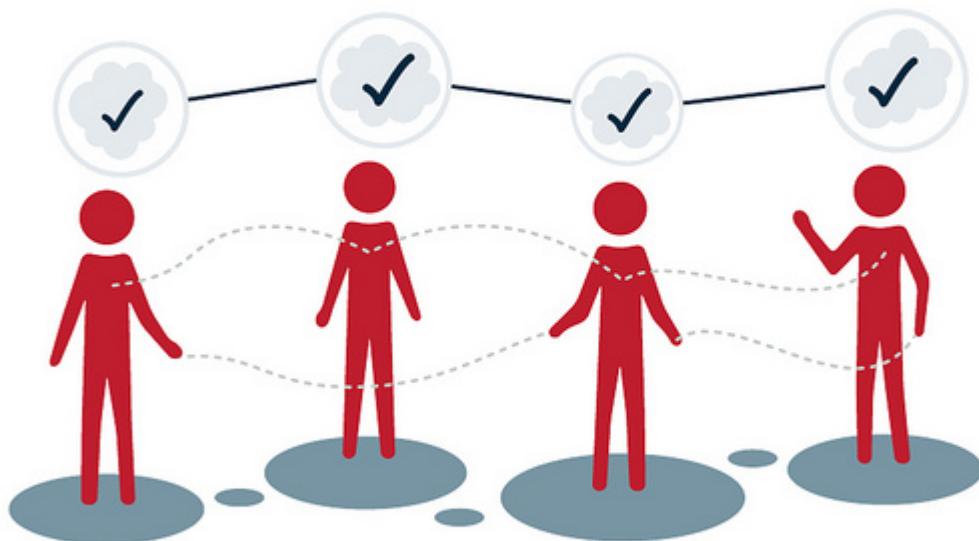
Bob Barr has described core reference geographies as geographic data which:

- Are definitive
- Should be collected and maintained once and used many times
- Are Natural monopolies (which addresses are)
- Have variable value in different applications
- Have highly elastic demand

Global addresses are a core reference geography.

be used to get buy-in and build trust and credibility

mutual trust

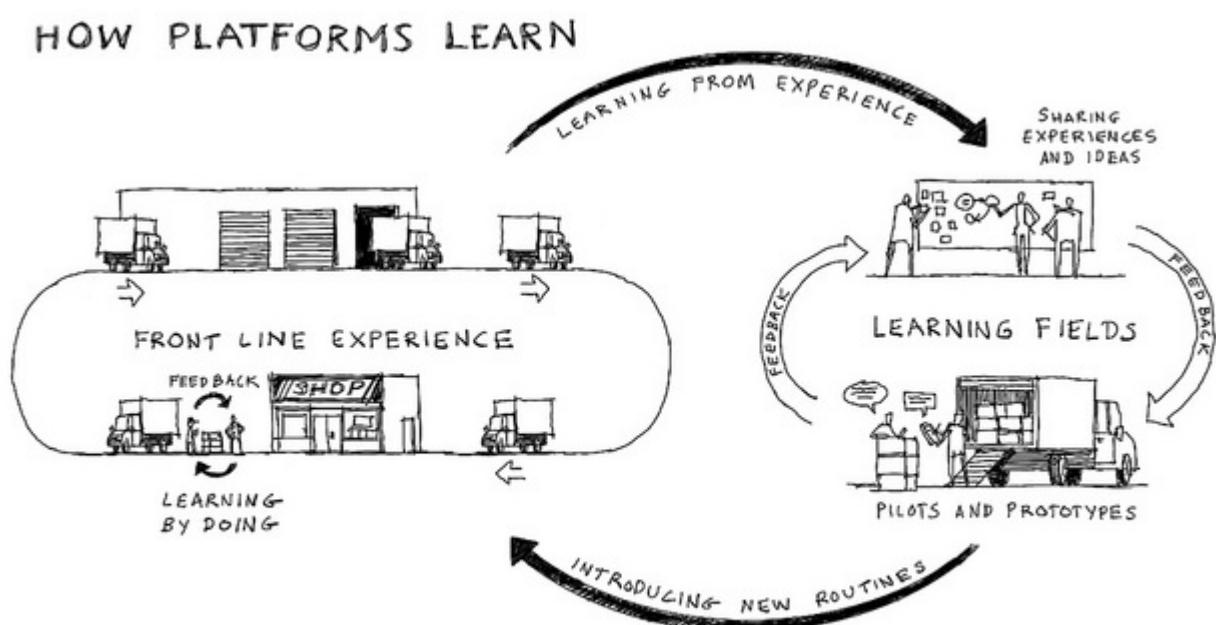


Core Values

@gavinkeech

Miemis (2010)

DAIS - evolving



Gray (2014)

These criteria need to change to reflect need.

..

DAIS is a platform which can be built upon.

So what next.....





Sane (2010)

Community

- What to do?
- How to collaborate effectively?
- How to build a community and consensus?
- Fit for what purposes?
- How to achieve credibility?

Any help greatly appreciated.



Swoboda (2011)

ant.beck@gmail.com

Thanks



Reid (2009)

You can access this presentation on github:

https://github.com/AntArch/20150305_AddressDay.git

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