

Freedom in Geographical Information Systems

Ganesh

Trying to be an Independent Researcher, Hacker & Activist

✉ **geoneo**

≈ **vu3ygg**

✉ **31gane@gmail.com**

January 4, 2017

License

This document is licensed under Creative Commons NC ND 4.0.

This document represents mostly my thoughts, research, experiences and references
to other creative works.



Read the CC NC ND 4.0 License Deed [here](#)

Read the CC NC ND 4.0 Legal Code [here](#)

Overview

What is GIS ?

Cartography & Maps

Carto-Cube

Projection & Truth

Shape

Projection

Problem is ...

Organized Diversity

Modality

Remixxxx... & Disruption

Flow of Information

Conventional Way

Commons Collaborative Way

Grass-root Emergent Way

Arming the Commons'

What are the general needs ?

Data - Availability & Accessibility

Availability of Free & Open - Tools

Knowing Data & Tools

Connecting Data & Tools

Credits :)

Inspiration



whaaaazzz up human ?

Good or Bad or Neutral ?

technology

is

neither *Good*

nor *Bad*

not even *Neutral*

Melvin Kranzberg

?

what is gis anyway

one of the interesting ways

"to look"

at things happening in

Earth

(present World)

GIS = Geo Systems + Information Systems

which is a *psychedelic* mix of :

- ▶ theories
- ▶ tools
- ▶ information
- ▶ methods
- ▶ strategies

from both the domains

a collaborative scientific process associated with geographical systems to
collect data, analyze, disseminate, share, distribute information
adhering to open standards

gis proliferates and promulgates a democratic and romantic relationship
between man, machine, and earth to reach a positive emergence

So What ?

well !... we have limitations

- ▶ senses
- ▶ perception
- ▶ reliable data collection
- ▶ repetitive & concurrent analysis
- ▶ modeling & repetitive reporting

Mapssssss !

What are Maps ?

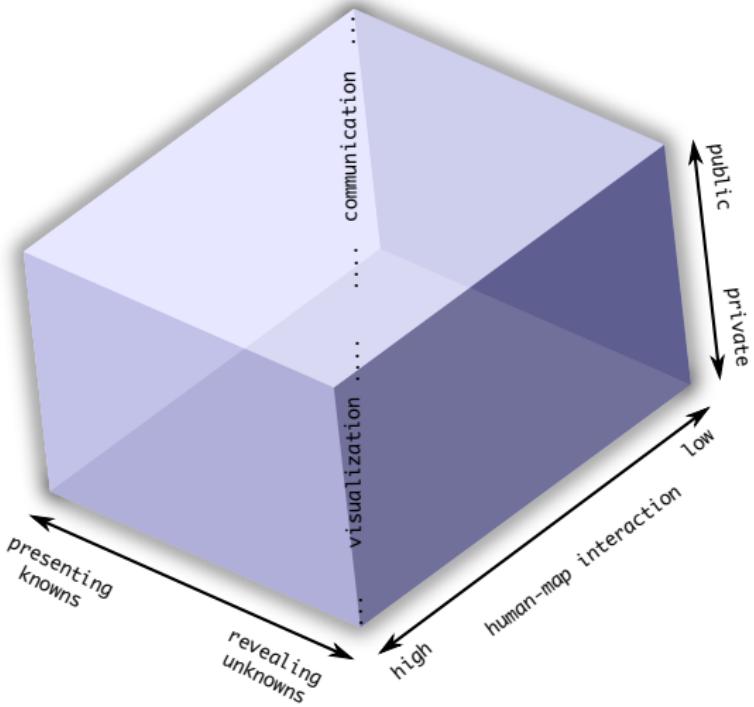
the **medium** through which geographically representable information is
shared and disseminated

What is Cartography ?

the art & way of designing **maps** effectively

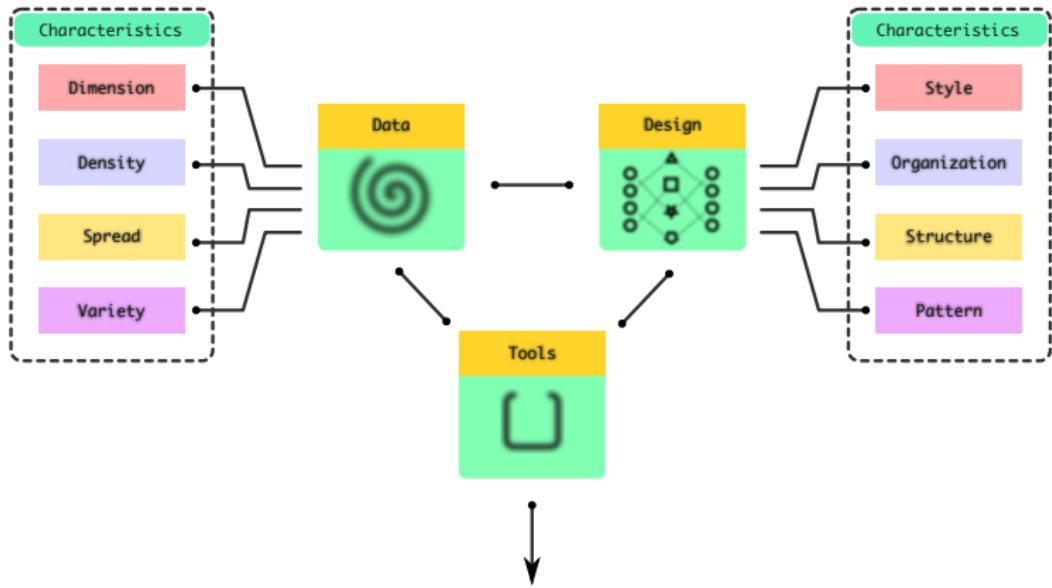
= science + aesthetics + technique

Carto-Cube



Reference : cartography cube

How Carto-Mapping works ?



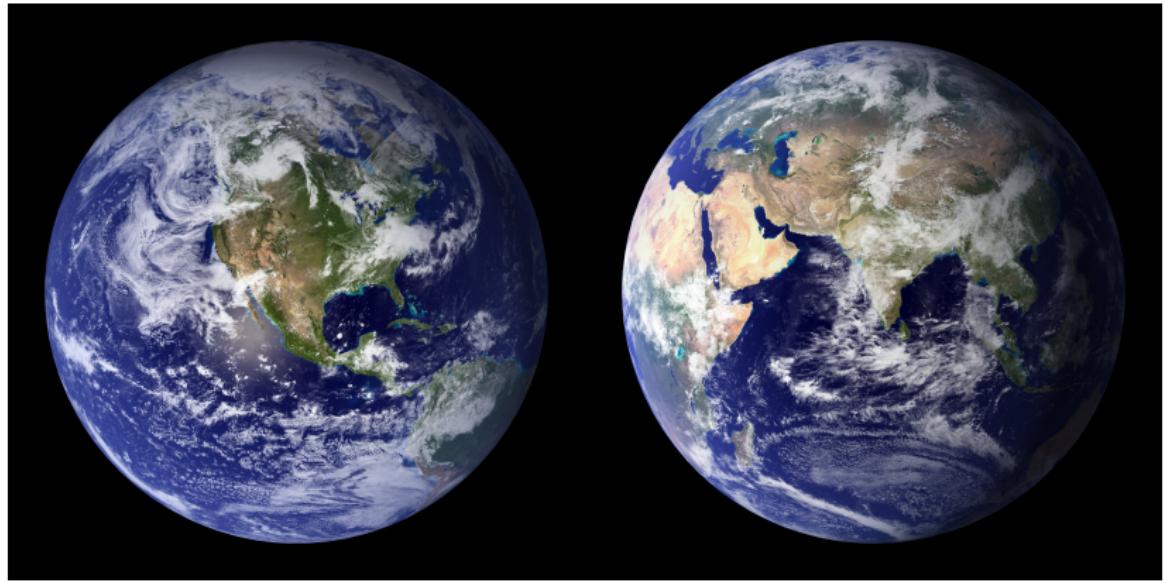
Projected Representation

What is True,

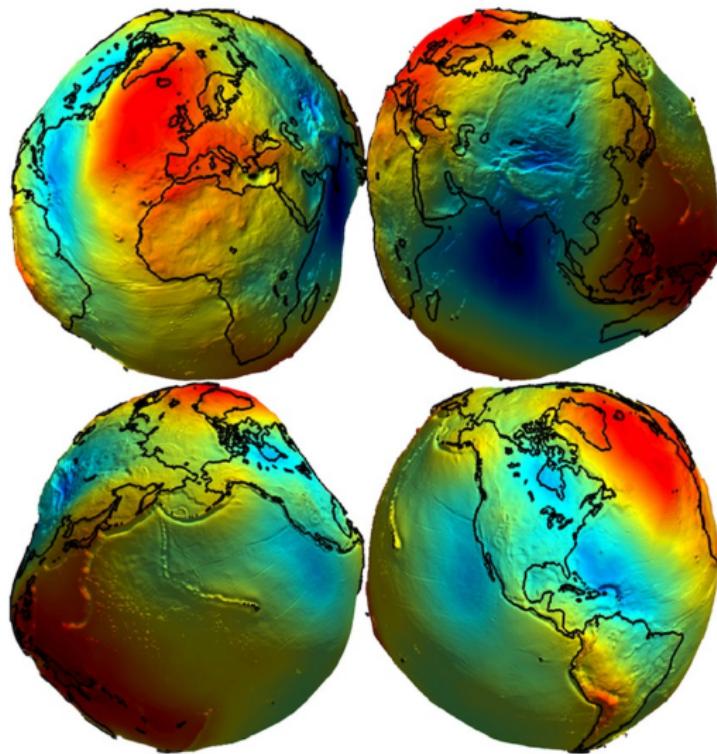
What is False,

Or .. Something in between ?

is it a spheroid ?



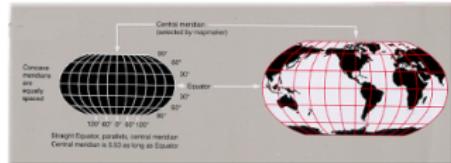
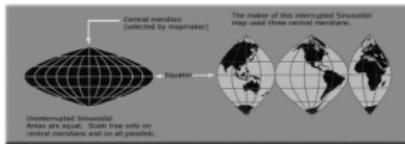
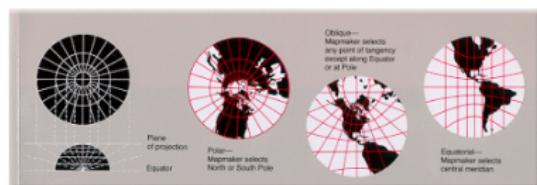
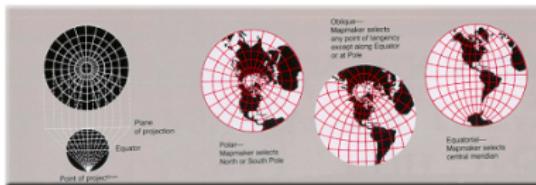
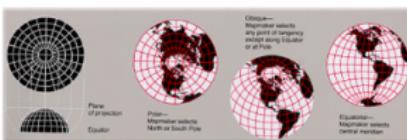
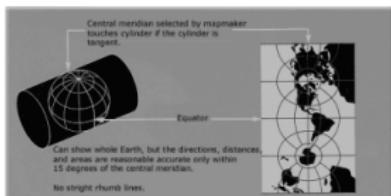
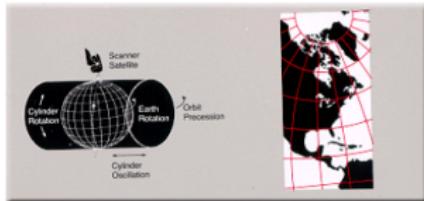
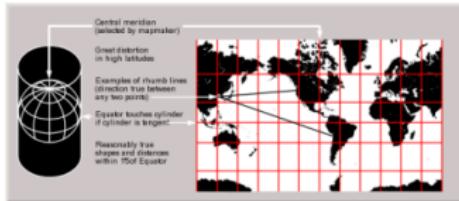
is it a geoid ?



Projection

Metric Properties = f (area, shape, direction, distance)

models always results in some form of distortion



Reference: *GIS wiki - Map Projections*

The True Size of Africa

A small contribution in the fight against rampant *Immappancy*; by Kai Krause

Graphic layout for visualization only (some countries are cut and rotated)
But the conclusions are very accurate: refer to table below for exact data

COUNTRY	AREA x 1000 km ²
China	9.597
USA	9.629
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221



In addition to the well known social issues of illiteracy and innumeracy, there also should be such a concept as "*immappancy*", meaning insufficient geographical knowledge.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose "1-2 billion" and "largest in the world", respectively.

Even with Asian and European college students, geographical estimates were often off by factors of 2-3. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as Mercator).

A particularly extreme example is the worldwide misjudgement of the true size of Africa. This single image tries to embody the massive scale, which is larger than the USA, China, India, Japan and all of Europe.....combined!

Top 100 Countries

Area in square kilometers, Percentage of World Total
Sources: Britannica, Wikipedia, Almanac, 2010

Rank	Country	Area, km ²	%
1	Russia	17,098,342	9.15
2	Canada	9,985,610	4.76
3	China	9,395,961	4.62
4	United States	9,239,091	4.45
5	Brazil	8,515,750	3.75
6	Australia	7,692,024	3.52
7	Germany	3,287,363	2.35
8	Argentina	2,959,342	2.08
9	Kazakhstan	2,724,908	1.85
10	Bolivia	2,659,413	1.79
11	Algeria	2,636,730	1.65
12	Congo	2,344,968	1.60
13	Greenland	2,190,866	1.55
14	Uganda	2,180,500	1.47
15	Mexico	1,964,375	1.38
16	Indonesia	1,953,240	1.37
17	Syria	1,939,765	1.32
18	Iran	1,628,756	1.13
19	Mongolia	1,584,706	1.12
20	Malta	1,582,000	1.08
21	Chad	1,284,000	0.86
22	Hungary	1,287,000	0.85
23	Armenia	1,281,000	0.85
24	South Africa	1,281,000	0.83
25	Kenya	1,241,748	0.82
26	Eritrea	1,134,200	0.75
27	Ethiopia	1,096,951	0.74
28	Mauritania	1,082,000	0.68
29	Egypt	1,062,000	0.67
30	Uzbekistan	1,052,798	0.62
31	Malta	925,798	0.54
32	Venezuela	925,059	0.61
33	Namibia	857,000	0.54
34	Mozambique	856,986	0.54
35	Pakistan	856,000	0.53
36	Tunisia	876,000	0.53
37	Liberia	792,102	0.51
38	Zambia	782,612	0.51
39	Myanmar	762,000	0.50
40	Albania	692,096	0.44
41	Senegal	637,957	0.43
42	Yemen	637,000	0.43
43	C. African Rep.	622,994	0.42
44	Ukraine	603,500	0.41
45	Montenegro	597,000	0.41
46	Brunei	587,000	0.39
47	Keeps	580,367	0.38
48	Iran	578,000	0.38
49	Thailand	573,129	0.34
50	Spain	565,966	0.34
51	Portugal	562,000	0.33
52	Cameroun	479,442	0.32
53	Papua New Guinea	482,844	0.31
54	Malta	479,000	0.31
55	Uganda	466,558	0.31
56	Sweden	441,379	0.30
57	Switzerland	434,200	0.30
58	Paraguay	499,792	0.27
59	Zimbabwe	380,757	0.26
60	Angola	377,000	0.26
61	Germany	367,114	0.24
62	Rep. of Congo	342,000	0.23
63	Uganda	339,000	0.23
64	Vietnam	331,212	0.22
65	Malaysia	330,800	0.22
66	Uganda	327,000	0.22
67	Côte d'Ivoire	322,963	0.21
68	Poland	312,088	0.21
69	Costa Rica	312,000	0.21
70	Italy	301,338	0.20
71	Timor-Leste	299,000	0.20
72	Philippines	303,000	0.20
73	Botswana	297,000	0.19
74	New Zealand	270,467	0.19
75	Qatar	287,958	0.18
76	Weakland	256,000	0.18
77	Ecuador	250,369	0.20
78	Greece	245,957	0.17
79	United Arab Emirates	243,000	0.17
80	Uganda	241,039	0.16
81	Ghana	236,539	0.16
82	Kenya	234,000	0.16
83	Leso	230,800	0.16
84	Guinea	214,968	0.14
85	Burkina Faso	214,000	0.14
86	Kyrgyzstan	199,951	0.13
87	Senegal	186,722	0.13
88	Uganda	185,000	0.13
89	Cameroon	181,038	0.12
90	Ukraine	176,316	0.11
91	Saint Lucia	175,000	0.11
92	Turkey	165,610	0.11
93	Nepal	147,161	0.11
94	Bangladesh	146,000	0.11
95	Tajikistan	143,108	0.10
96	Greece	131,967	0.09
97	Malta	129,000	0.09
98	North Korea	120,538	0.08
99	Maldives	116,444	0.08
100	Yemen	117,609	0.08

TOP 100 TOTAL 132,932,234 69.34

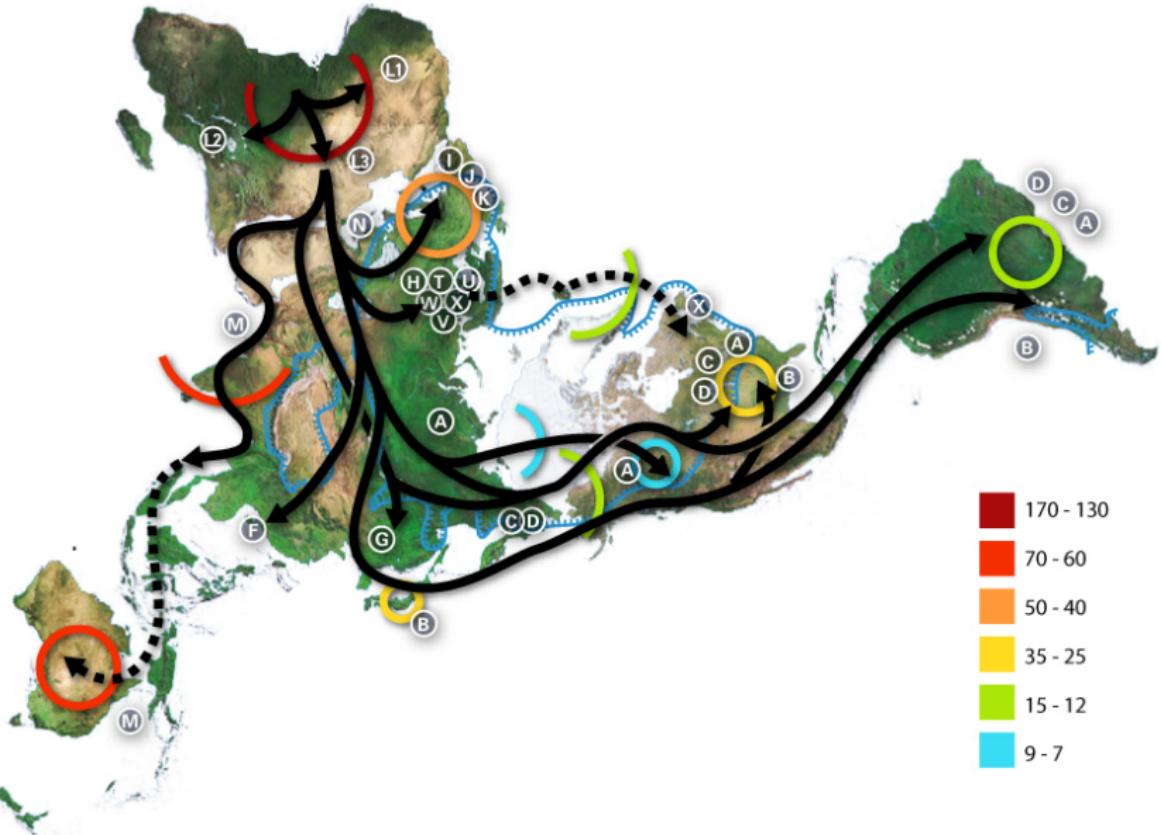


No Rights Reserved This work is placed in the Public Domain

well, –

Essentially, all models are wrong, but some are useful.

George E.P. Box



Let's see what XKCD draws about it ??

:D

WHAT YOUR FAVORITE

MAP PROJECTION

SAYS ABOUT YOU

MERCATOR



YOU'RE NOT REILY INTO MAPS.

VAN DER Grinten



YOU'RE NOT A COMPLICATED PERSON. YOU LOVE THE MERCATOR PROJECTION; YOU JUST WISH IT WEREN'T SQUARE. THE EARTH'S NOT A SQUARE, IT'S A CIRCLE. YOU LIKE CIRCLES. TODAY IS GONNA BE A GOOD DAY!

ROBINSON



YOU HAVE A COMFORTABLE PAIR OF RUNNING SHOES THAT YOU WEAR EVERYWHERE. YOU LIKE COFFEE AND ENJOY THE BEATLES. YOU THINK THE ROBINSON IS THE BEST-LOOKING PROJECTION, HANDS DOWN.

Dymaxion



YOU LIKE ISAAC ASIMOV, XML, AND SHOES WITH TOES. YOU THINK THE SEGWAY GOT A BAD RAP. YOU OWN 3D GOGGLES, WHICH YOU USE TO VIEW ROTATING MODELS OF BETTER 3D GOGGLES. YOU TYPE IN DVORAK.

WINKEL-TRIPEL



NATIONAL GEOGRAPHIC ADOPTED THE WINKEL-TRIPEL IN 1998, BUT YOU'VE BEEN A WT FAN SINCE LONG BEFORE "NatGeo" SHOWED UP. YOU'RE WORRIED IT'S GETTING PLAYED OUT, AND ARE THINKING OF SWITCHING TO THE KAVRAYSKY. YOU ONCE LEFT A PARTY IN DISGUST WHEN A GUEST SHOWED UP WEARING SHOES WITH TOES. YOUR FAVORITE MUSICAL GENRE IS "POST-".

GOODE HOMOLOSIDINE



THEY SAY MAPPING THE EARTH ON A 2D SURFACE IS LIKE FLATTENING AN ORANGE PEEL, WHICH SEEMS EASY ENOUGH TO YOU. YOU LIKE EASY SOLUTIONS. YOU THINK WE WOULDN'T HAVE SO MANY PROBLEMS IF WE'D JUST ELECT NORMAL PEOPLE TO CONGRESS INSTEAD OF POLITICIANS. YOU THINK AIRLINES SHOULD JUST BUY FOOD FROM THE RESTAURANTS NEAR THE GATES AND SERVE THAT ON BOARD. YOU CHANGE YOUR CAR'S OIL, BUT SECRETLY WONDER IF YOU REALLY NEED TO.

HOB-DYER



YOU WANT TO AVOID CULTURAL IMPERIALISM, BUT YOU'VE HEARD BAD THINGS ABOUT GALL-PETERS. YOU'RE CONFLICT-AVERSE AND BUY ORGANIC. YOU USE A RECENTLY-INVENTED SET OF GENDER-NEUTRAL PRONOUNS AND THINK THAT WHAT THE WORLD NEEDS IS A REVOLUTION IN CONSCIOUSNESS.

PLATE CARRÉE
(EQUIRRECTANGULAR)



YOU THINK THIS ONE IS FINE. YOU LIKE HOW X AND Y MAP TO LATITUDE AND LONGITUDE. THE OTHER PROJECTIONS OVERCOMPLICATE THINGS. YOU WANT ME TO STOP ASKING ABOUT MAPS SO YOU CAN ENJOY DINNER.

A GLOBE!



YES, YOU'RE VERY CLEVER.

PEIRCE QUINCUNCIAL



YOU THINK THAT WHEN WE LOOK AT A MAP, WHAT WE REALLY SEE IS OURSELVES. AFTER YOU FIRST SAW INCEPTION, YOU SAT SILENT IN THE THEATER FOR SIX HOURS. IT FREAKS YOU OUT TO REALIZE THAT EVERYONE AROUND YOU HAS A SKELETON INSIDE THEM. YOU HAVE REALLY LOOKED AT YOUR HANDS.

WATERMAN BUTTERFLY



REALLY? YOU KNOW THE WATERMAN? HAVE YOU SEEN THE 1909 CAHILL MAP IT'S BASED— ... YOU HAVE A FRAMED REPRODUCTION AT HOME?! WHOA.LISTEN, FORGET THESE QUESTIONS. ARE YOU DOING ANYTHING TONIGHT?

GALL-PETERS



I HATE YOU.

Diversity :)

Organized Diversity

ontological, theoretical



knowledge organization



modalities

measurement & data collection



processing, analysis



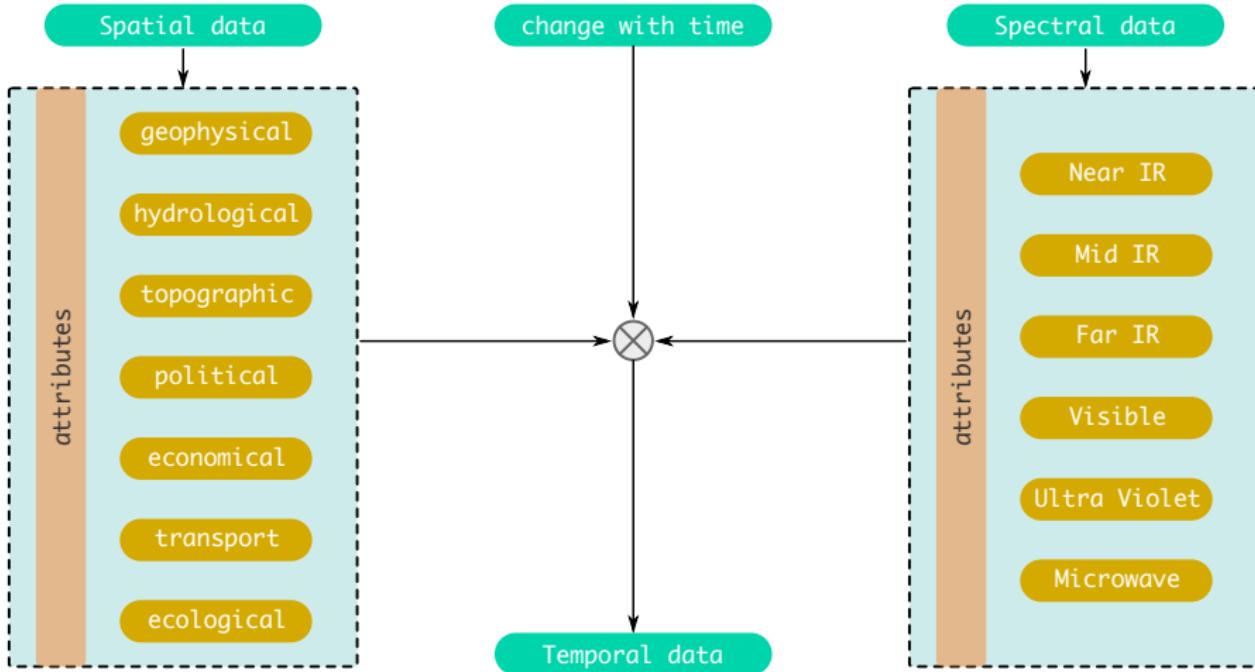
attributes

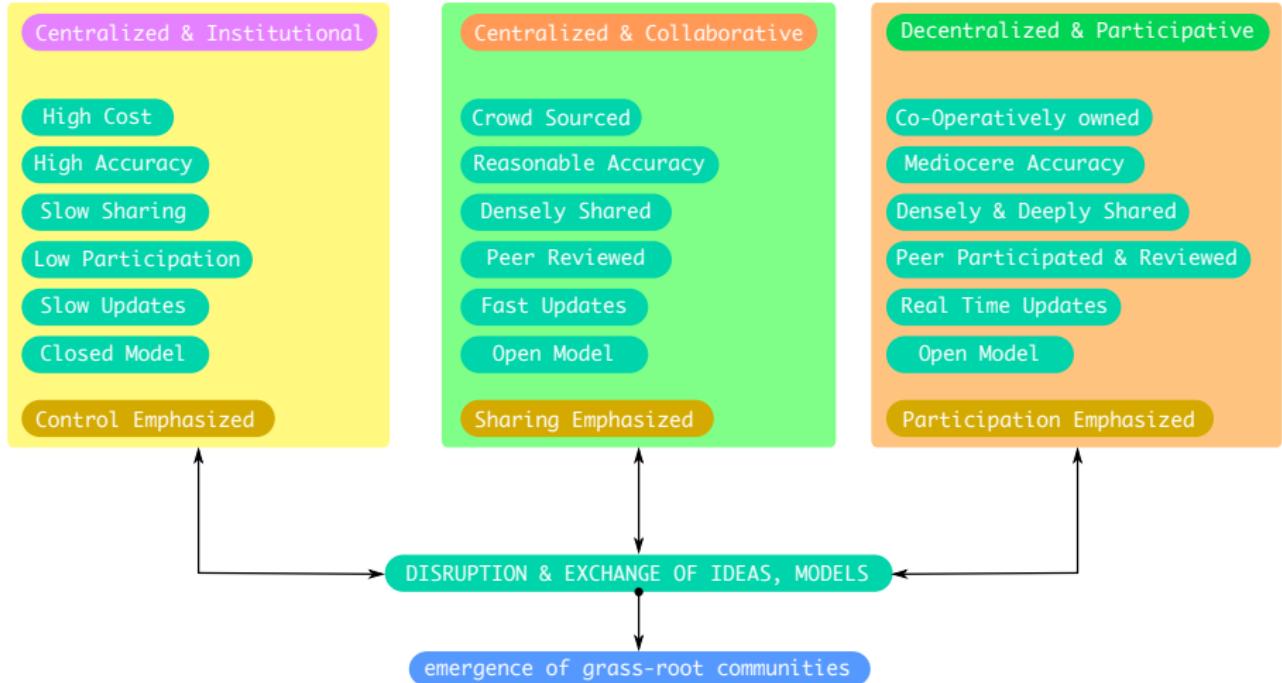


dimensions



visualization





How does Info. Flow ?

Once upon a time ...

THE
PICTORIAL
MISSIONARY MAP
OF THE
WORLD



WORLD WAR I INDIAN VETERANS MEMORIAL LIBRARY OF THE GENEALOGICAL SOCIETY OF AMERICA
Memorializing our dear Radios
December 1942
Presented by John S. Smith
in memory of his son, John S. Smith, Jr., who
was killed in action in France.

Sessions: 2000TH 0000007-8-Da, El. Seratio: Basco.—Print This Sheet, or Use your 2000 Photo, Transparency, or Use your 2000 Scanner.

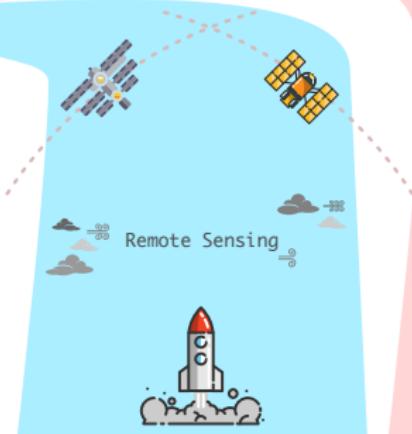
the conventional way ...

Establishments

Institutions



Surveying



Remote Sensing

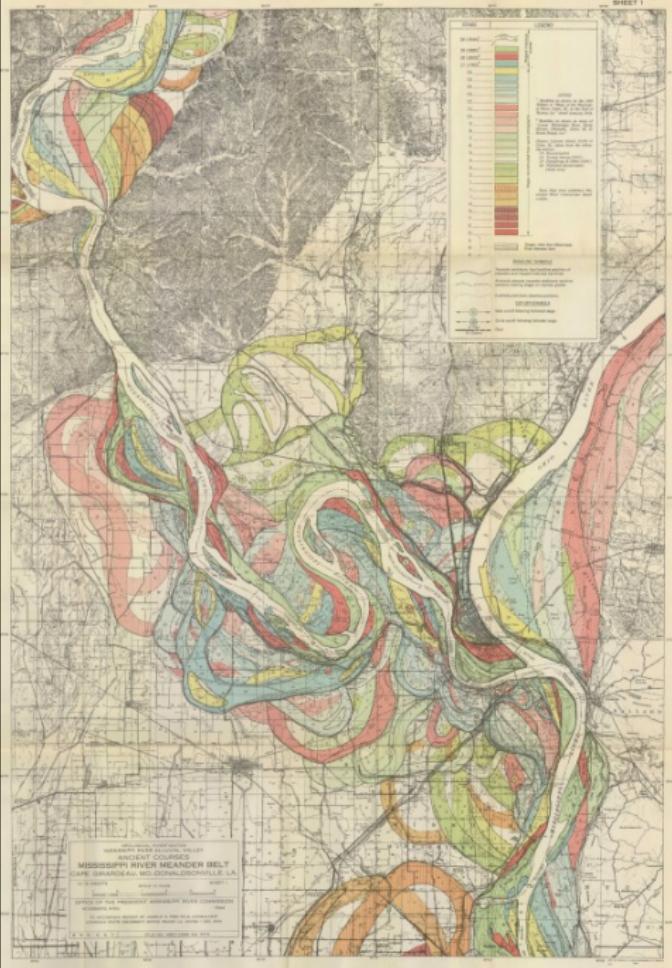


Dissemination



it is centralized too !

resulted in maps like these..... !



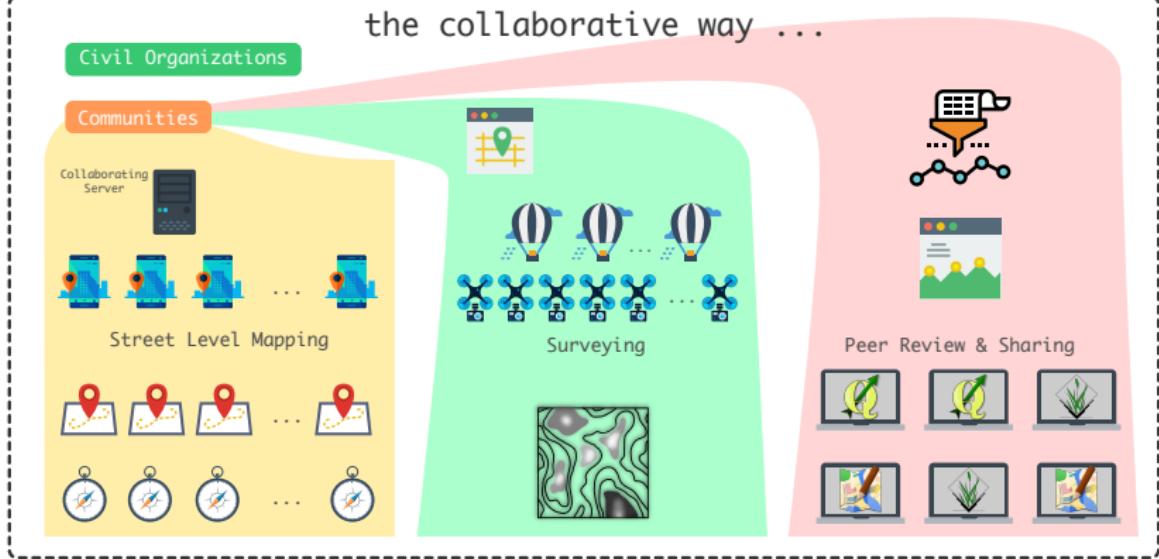
meanwhile, rise in technology ...



with, changes in ...

education, science, technology & creative commons ...

the collaborative way ...



partially centralized but collaborative (decentralized):

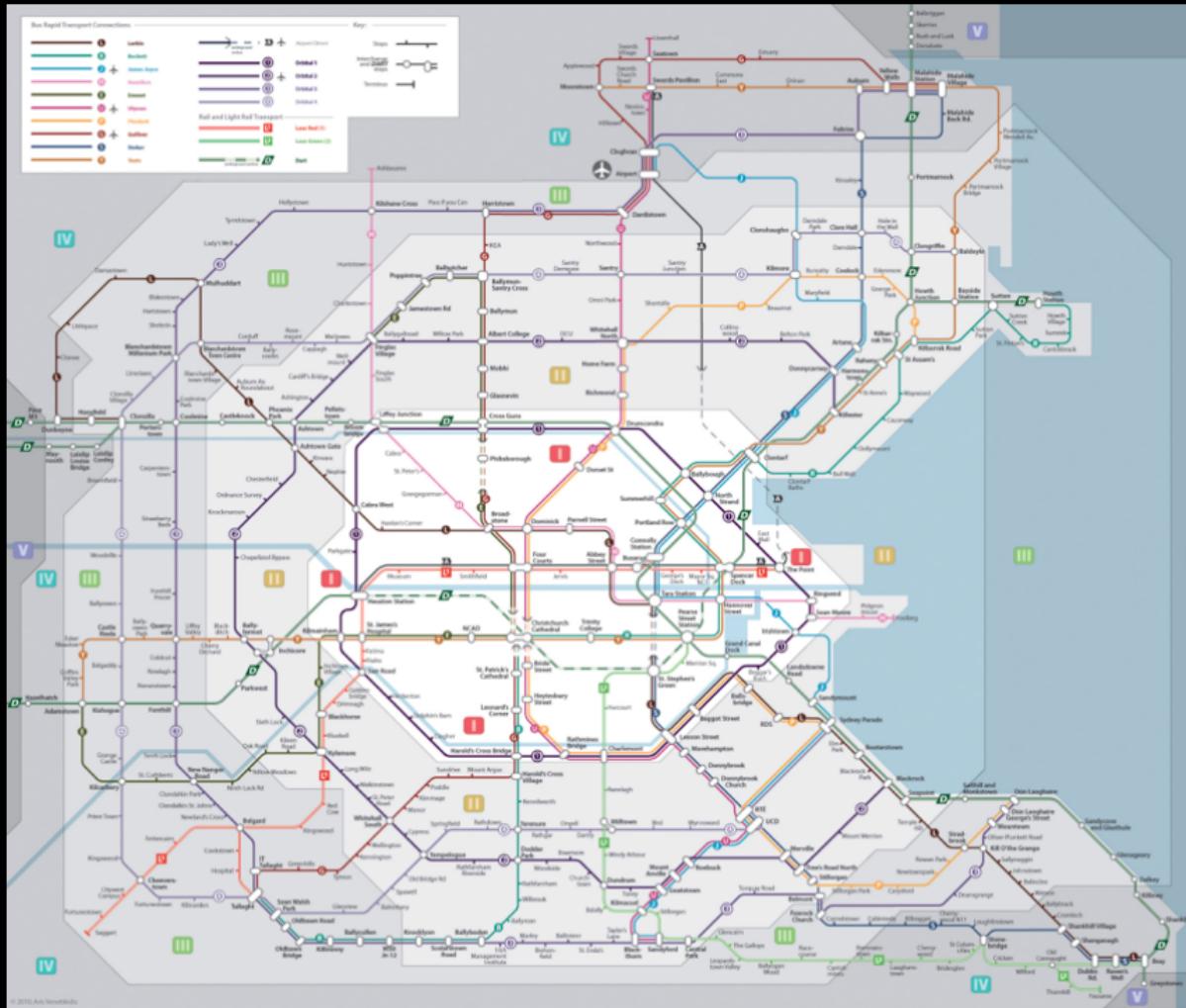
existing infrastructure + creative commons + opendata + internet

resulted in maps like these..... !

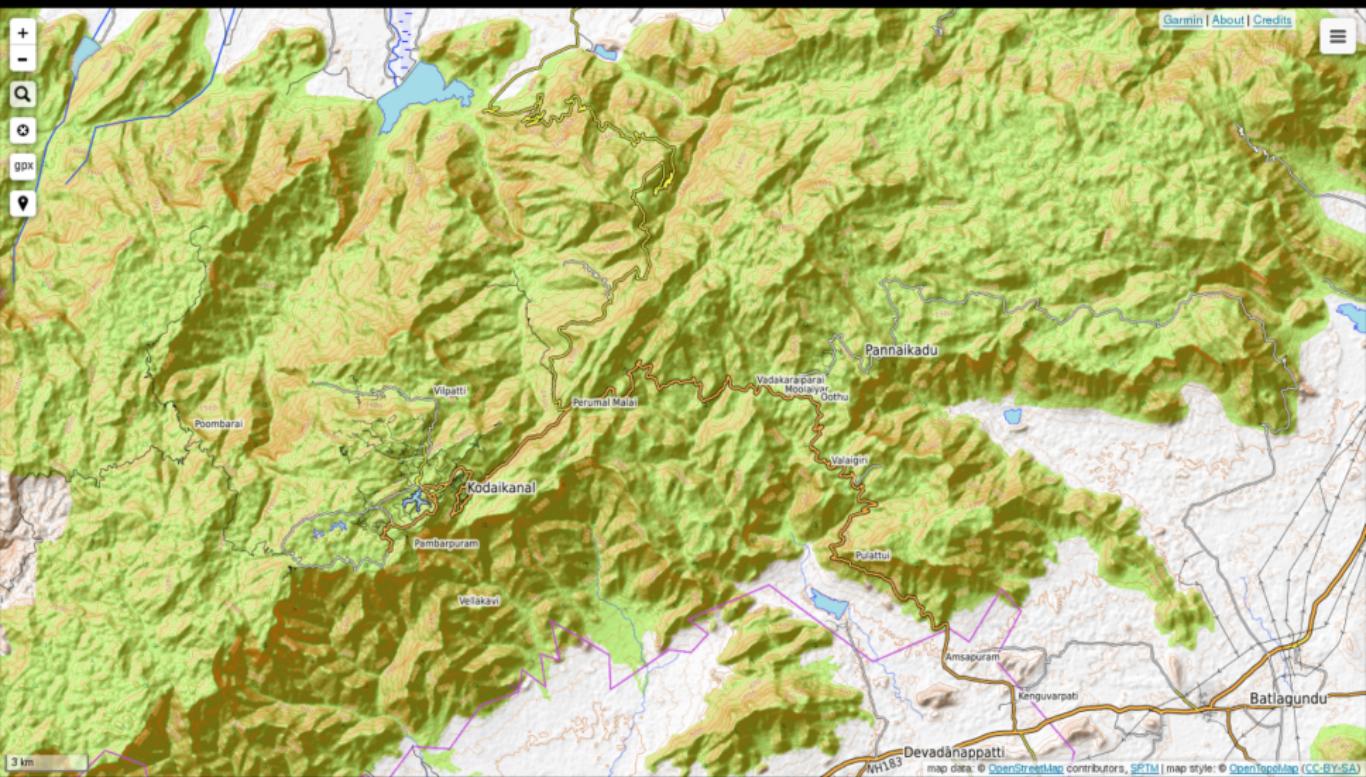












with emergent grass root infrastructure

&

commons based peer production ...

the grassroots way ...

Emergent Communities

Networks

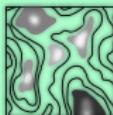
grassroots
mesh network



Street Level Mapping



Surveying



Peer Review & Sharing



meshed + self-regulated grassroots :

existing infrastructure + creative commons + opendata + grass-roots emerged internet

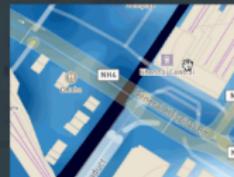
for : Humanitarian, Disaster Rescue, Relief, Recovery, Direct Governance ...

will create more than these..... !

Flooded Streets

உசங்களை

46 inundated roads reported



This is a crowdsourced effort to map inundated roads in Chennai. Report a flooded street by zooming into the map and clicking it. All the data is open.

Flood Layers

Vulnerable and Inundated areas

● Flood relief camps (Including closed)

Affected Areas (reset)

Aminjikarai

Velachery

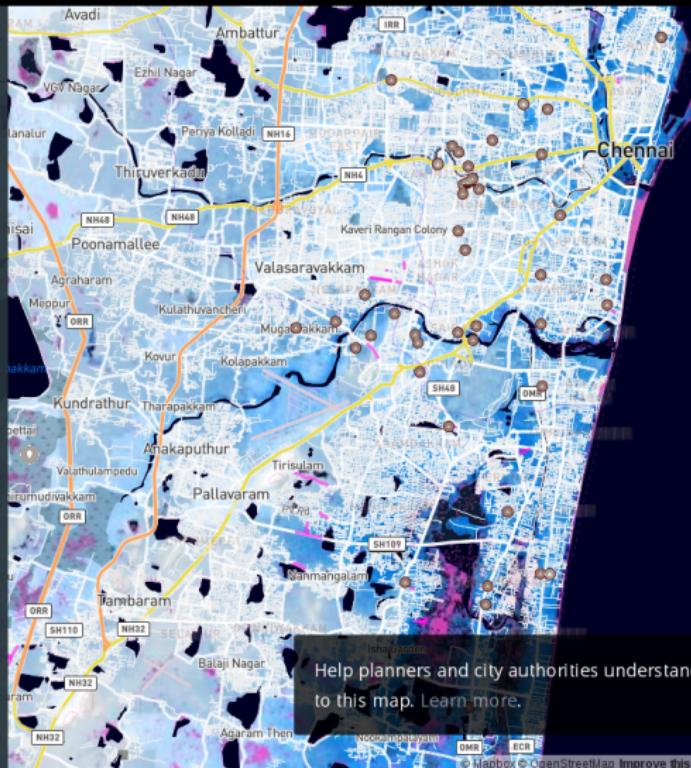
Mudichur

Old Mahabalipuram Road

Highlight (reset)

Waterbodies

Road Subways & Tunnels



© Mapbox © OpenStreetMap Improve this map © DigitalGlobe | © Mapbox © OpenStreetMap Improve this map

Enoughhhh...
Let us Know the Needs

general needs :



Open Community

Collaboration, Cooperation, Peer Review

Open Licenses

Free to Use, Edit, Share, Distribute

Open Standards

Version Controlled, Scientific alignment

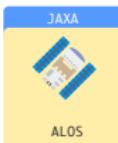
Open Tools

Transparency, Freedom to Share & Create

Open Data

what are accessible public data sources ?

Public Research Institutions



ALOS



IRS*



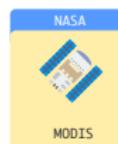
SENTINEL



SRTM



LANDSAT



MODIS

...



ASTER

Public - Data Access Portals

USGS Earth Explorer

USGS Eros Center

NASA EOSDIS

ESA Sentinel Scientific Data Hub

ESA Earth Online

JAXA EORC

⋮

ISRO - NRSC Bhuvan

institutional + crowd-collaborative public data sources ...

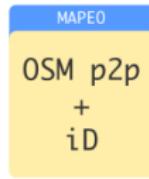


...

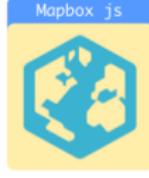
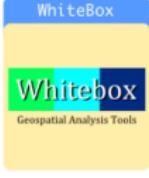
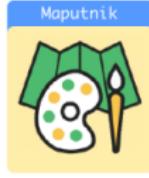


+ remixes

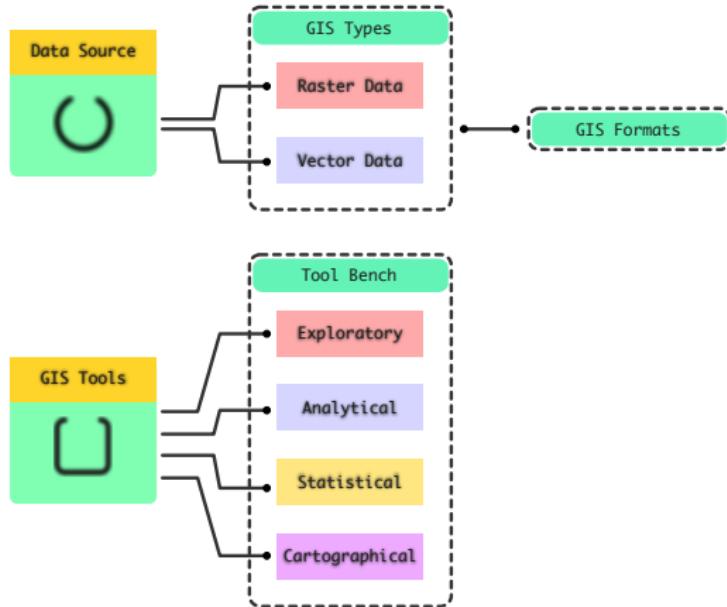
Free & Open Technologies/Tools :



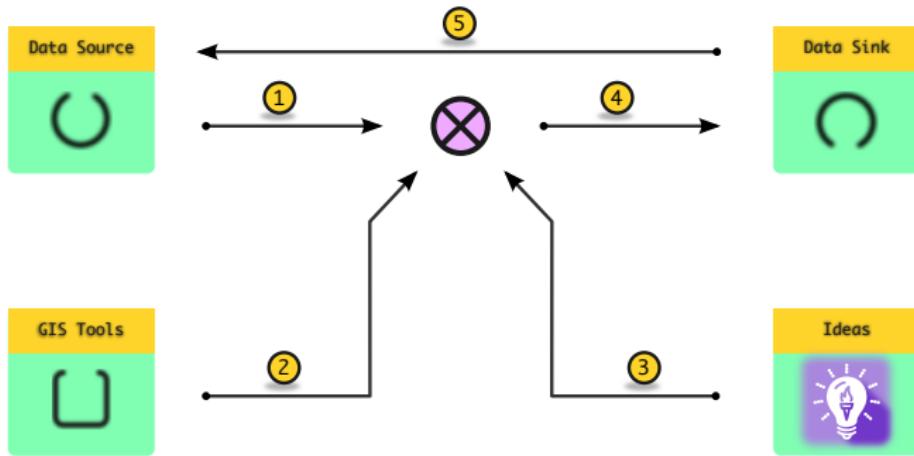
there's lot more
&
still innovating ... :)



Know the Organization - in general



Connections



Credits

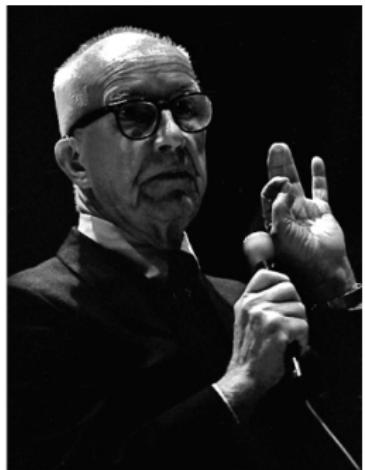
This Document Contains contents, icons, taken from collaborative internet web sites which offer the content distributed under Public Domain or CC license.

Since every icons in each block diagram cannot be attributed separately
So i am providing the link where it can be from.



think !

people inspire people



these *dudes* somehow inspired me to learn & do Geo(G/IS)

locally these folks continues to inspire me by their silent actions... :)



+ all Open Mappers' & GIS'ers out there !