

Open Geospatial Data - the GIS Lab experience

UCT Open Data Day 2019

Saturday, 2nd March 2019

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[The GIS Lab](#) | [Digital Library Services](#), UCT Libraries

University of Cape Town

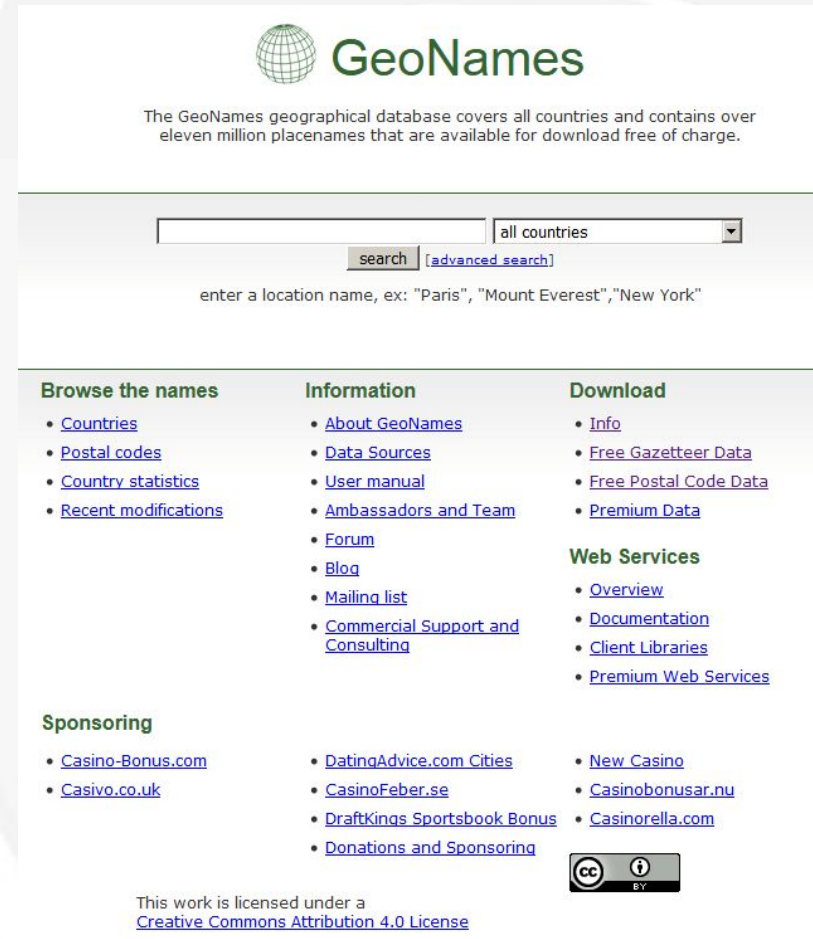


1. Thank You For The Data
2. The Benefits of Open Geospatial Data
3. Cost of Opening Access to GeoSpatial Data
4. Portals | Trapdoors | Barriers



Thank You For The Data

- Geospatial research at UCT owes an enormous debt of gratitude to Open Data providers.
- Chief amongst them the United States government who led the way by opening unrestricted global access to many spatial datasets.



The screenshot shows the GeoNames website interface. At the top, there is a globe icon and the text "GeoNames". Below this, a description states: "The GeoNames geographical database covers all countries and contains over eleven million placenames that are available for download free of charge." A search bar is present with a dropdown menu set to "all countries" and a "search" button. Below the search bar, a prompt says "enter a location name, ex: 'Paris', 'Mount Everest', 'New York'". The main content area is divided into three columns: "Browse the names" (with links to Countries, Postal codes, Country statistics, and Recent modifications), "Information" (with links to About GeoNames, Data Sources, User manual, Ambassadors and Team, Forum, Blog, Mailing list, and Commercial Support and Consulting), and "Download" (with links to Info, Free Gazetteer Data, Free Postal Code Data, and Premium Data). Below these columns is a "Sponsoring" section with links to Casino-Bonus.com, Casivo.co.uk, DatingAdvice.com Cities, CasinoFeber.se, DraftKings Sportsbook Bonus, and Donations and Sponsoring. A "Web Services" section includes links to Overview, Documentation, Client Libraries, and Premium Web Services. At the bottom, there is a Creative Commons Attribution 4.0 License logo and text stating "This work is licensed under a Creative Commons Attribution 4.0 License".

Thank You For The Data

NASA and the JPL provide remotely sensed images (LandSat, MODIS) and topographic information (ETOPO, SRTM).

Find a DAAC •

LP DAAC

LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER

Home About Dataset Discovery Citing Our Data Tools User Resources User Services Site Search Login with Earthdata

Home > About



LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER (LP DAAC)

— Who is the LP DAAC?

The LP DAAC operates as a partnership between the U.S. Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA) and is a component of NASA's Earth Observing System Data and Information System (EOSDIS). Data specialists, system engineers, user service representatives, and outreach staff work together to support LP DAAC activities and distribute data to the remote sensing community.

- What does the LP DAAC do?
- When and where was the LP DAAC established?
- Management at the LP DAAC
- Significant events at the LP DAAC

USGS
science for a changing world

EarthExplorer - Home

Home

Search Criteria Data Sets Additional Criteria Results

2. Select Your Data Set(s)

Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the *Additional Criteria* or *Results* buttons below. Click the plus sign next to the category name to show a list of data sets.


☐ Use Data Set Prefilter [\(What's This?\)](#)

Data Set Search:

- Aerial Imagery
- AVHRR
- CEOS Legacy
- Commercial Satellites
- Declassified Data
- Digital Elevation
- Digital Line Graphs
- Digital Maps
- EO-1
- Global Fiducials
- HCMM
- ISERV
- Land Cover
- Landsat
- NASA LPDAAC Collections

Search Criteria Summary (Show)

Map Satellite



Thank You For The Data

As online access grew easier, NGO's were able to run projects that supplemented existing government public data.

WorldClim - Global Climate Data

Free climate data for ecological modeling and GIS

Contact

Home

WorldClim Version2

WorldClim version 2 has average monthly climate data for minimum, mean, and maximum temperature and for precipitation for 1970-2000.

You can download the variables for different spatial resolutions, from 30 seconds (~1 km²) to 10 minutes (~340 km²). Each download is a "zip" file containing 12 GeoTiff (.tif) files, one for each month of the year (January is 1; December is 12).

variable	10 minutes	5 minutes	2.5 minutes	30 seconds
minimum temperature (°C)	tmin 10m	tmin 5m	tmin 2.5m	tmin 30s
maximum temperature (°C)	tmax 10m	tmax 5m	tmax 2.5m	tmax 30s
average temperature (°C)	tavg 10m	tavg 5m	tavg 2.5m	tavg 30s
precipitation (mm)	prec 10m	prec 5m	prec 2.5m	prec 30s
solar radiation (kJ m ⁻² day ⁻¹)	srad 10m	srad 5m	srad 2.5m	srad 30s
wind speed (m s ⁻¹)	wind 10m	wind 5m	wind 2.5m	wind 30s
water vapor pressure (kPa)	vapr 10m	vapr 5m	vapr 2.5m	vapr 30s


Below you can download the standard (19) WorldClim [Bioclimatic variables](#) for WorldClim version 2. They are the average for the years 1970-2000. Each download is a "zip" file containing 19 GeoTiff (.tif) files, one for each month of the [variables](#).



Natural Earth

Free vector and raster map data at 1:10m, 1:50m, and 1:110m scales

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Map Gallery

Bathymetry

Natural Earth is a public domain map dataset available at 1:10m, 1:50m, and 1:110 million scales. Featuring tightly integrated vector and raster data, with Natural Earth you can make a variety of visually pleasing, well-crafted maps with cartography or GIS software.

Natural Earth was built through a collaboration of many [volunteers](#) and is supported by [NACIS](#) (North American Cartographic Information Society), and is free for use in any type of project (see our [Terms of Use](#) page for more information).



Convenience

Natural Earth solves a problem: finding suitable data for making small-scale maps. In a time when the web is awash in geospatial data, cartographers are forced to waste



Neatness Counts

The carefully generalized linework maintains consistent, recognizable geographic shapes at 1:10m, 1:50m, and 1:110m scales. Natural Earth was built from the ground up so you will

COUNTRYNAM	SCALE	SCALERANKY	FEATURECLA	SOVE
Alghanistan	1.000000000000	Countries	Alghanis	
Aland	3.000000000000	Countries	Finland	
Albania	1.000000000000	Countries	Albania	
Algeria	1.000000000000	Countries	Algeria	

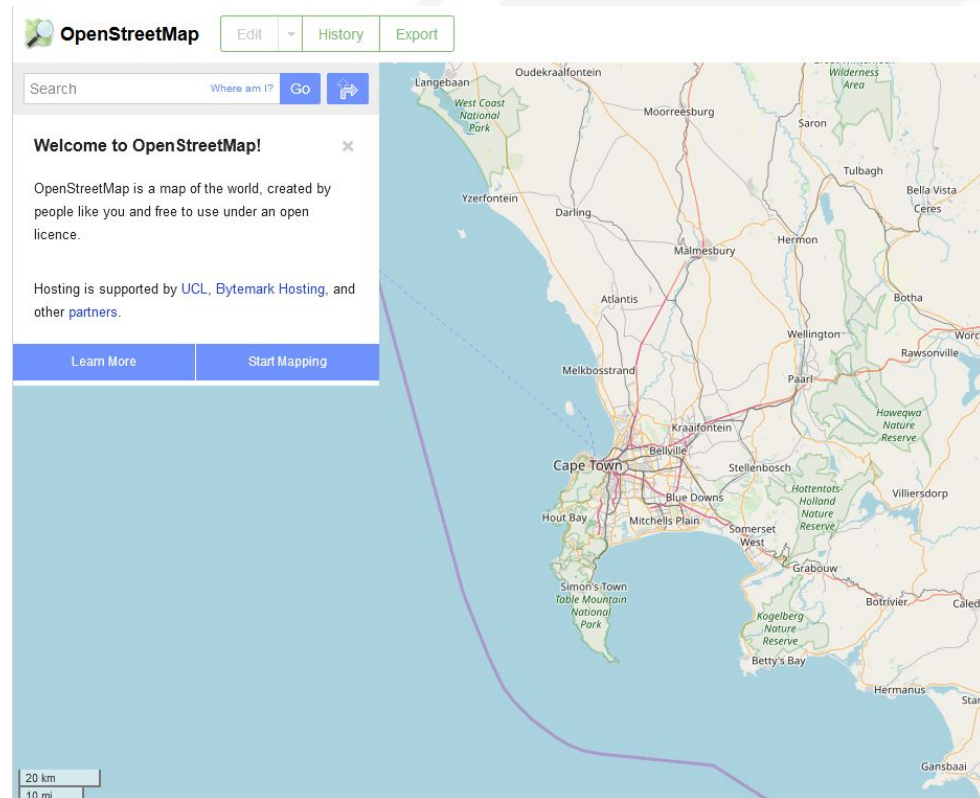
GIS Attributes

Natural Earth, however, is more than just a collection of pretty lines. The data attributes are equally important for mapmaking. Most data contain embedded feature names, which are



Thank You For The Data

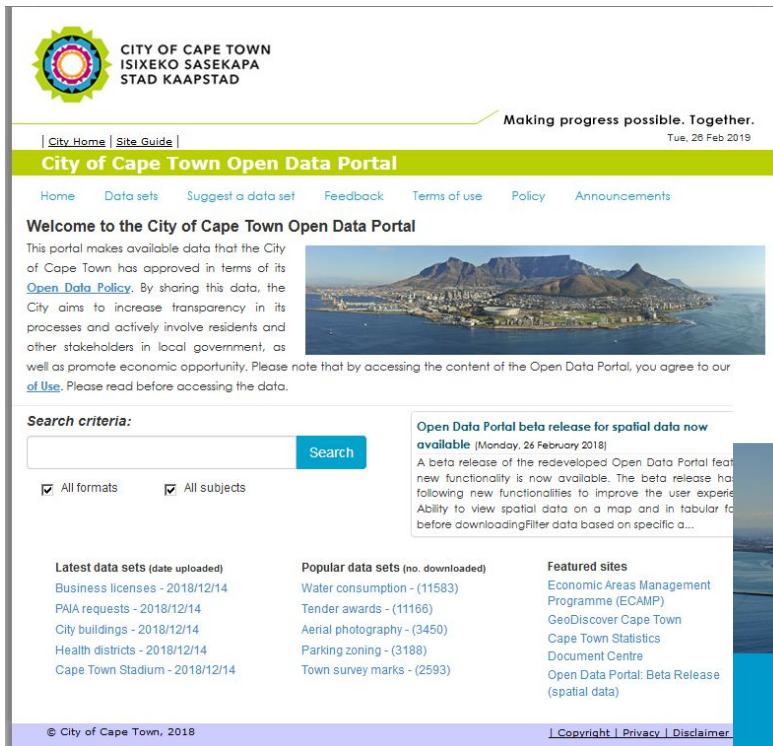
Or, alternatively, provided crowd sourced data





Thank You For The Data

The UCT GIS Lab would like to specifically thank the City of Cape Town for their Open Data Portals



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Making progress possible. Together.
Tue, 26 Feb 2019

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City of Cape Town Open Data Portal

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Welcome to the City of Cape Town Open Data Portal

This portal makes available data that the City of Cape Town has approved in terms of its [Open Data Policy](#). By sharing this data, the City aims to increase transparency in its processes and actively involve residents and other stakeholders in local government, as well as promote economic opportunity. Please note that by accessing the content of the Open Data Portal, you agree to our [of Use](#). Please read before accessing the data.

Search criteria:

☐ All formats ☒ All subjects

Search

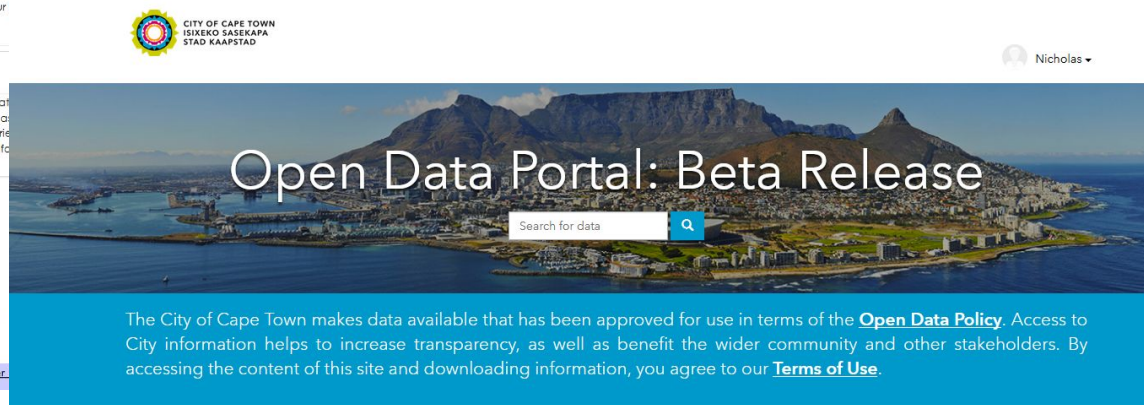
Open Data Portal beta release for spatial data now available (Monday, 26 February 2018)
A beta release of the redeveloped Open Data Portal featuring new functionality is now available. The beta release has the following new functionalities to improve the user experience:
Ability to view spatial data on a map and in tabular format before downloading. Filter data based on specific a...

Latest data sets (date uploaded)
Business licenses - 2018/12/14
PAIA requests - 2018/12/14
City buildings - 2018/12/14
Health districts - 2018/12/14
Cape Town Stadium - 2018/12/14

Popular data sets (no. downloaded)
Water consumption - (11583)
Tender awards - (11166)
Aerial photography - (3450)
Parking zoning - (3188)
Town survey marks - (2593)

Featured sites
Economic Areas Management Programme (ECAMP)
GeoDiscover Cape Town
Cape Town Statistics
Document Centre
Open Data Portal: Beta Release (spatial data)

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Open Data Portal: Beta Release

Search for data

The City of Cape Town makes data available that has been approved for use in terms of the [Open Data Policy](#). Access to City information helps to increase transparency, as well as benefit the wider community and other stakeholders. By accessing the content of this site and downloading information, you agree to our [Terms of Use](#).





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The Benefits of Open Geospatial Data

Before the geospatial access revolution of the the 1990's, when the World Wide Web exploded and available bandwidth vastly increased, the bulk of a UCT GIS project's time budget was spent

- on **creating the data** necessary to perform a single analysis, or
- waiting on **physical transfer** media to be shipped or mailed across the planet from governments or corporations that research funds had bought.

The Benefits of Open Geospatial Data

As a result

- the projects undertaken tended to cover either a small area in high detail or a larger area at a very coarse resolution
- User-created datasets were rarely made available to other researchers
- Restrictive licensing and proprietary (expensive) software formats further limited the use of created or derived products.

The Benefits of Open Geospatial Data

Today users are spoiled for choice for datasets

- Geospatial project requirements shifted from creating data to finding data, which is a massive time saving
- The new challenge lies in determining the most suitable dataset to use
- There is benefit to locally updated, curated dataset lists and clean datasets created by topic specialists and GIS Librarians



The Benefits of Open Geospatial Data

As a result more time can be spent doing analysis

- This means that more projects can be undertaken
- on a wider variety of topic
- in more detail
- across larger areas



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The Cost of Opening Access to Geospatial Data

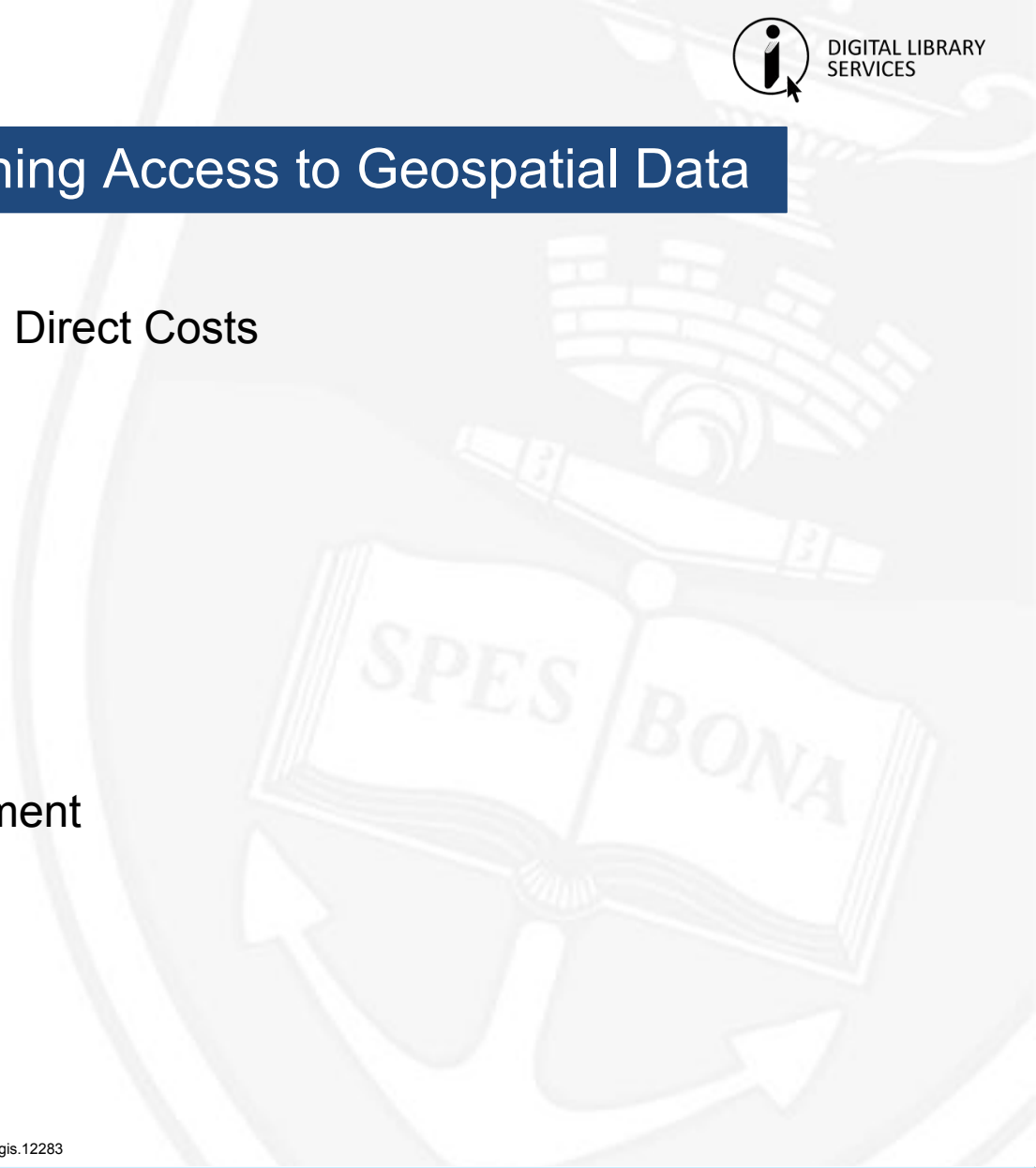
- Geospatial Data size varies, it can be Small Data, Large Data or Big Data
- Direct & Indirect Costs
- The Privacy Problem (data scrubbing and manipulation)



The Cost of Opening Access to Geospatial Data

Direct Costs

- Hardware
- Software
- Bandwidth
- Staffing
- Workflow Integration
- Maintenance & Development
- Ensuring Privacy



After The Cost(s) of Geospatial Open Data, Johnson, et al, 2017, <https://onlinelibrary.wiley.com/doi/full/10.1111/tgis.12283>





The Cost of Opening Access to Geospatial Data

Indirect Costs

- **Citizen Participation Challenges**
 - Spatial & Technical Literacy required to use geospatial data.
- **Uneven Provision of Geographic Coverage & Interoperability**
 - Data poverty skews analyses toward places that have data, which may disadvantage areas unable to provide equivalent detail in useful formats for researchers.

After The Cost(s) of Geospatial Open Data, Johnson, et al, 2017, <https://onlinelibrary.wiley.com/doi/full/10.1111/tgis.12283>





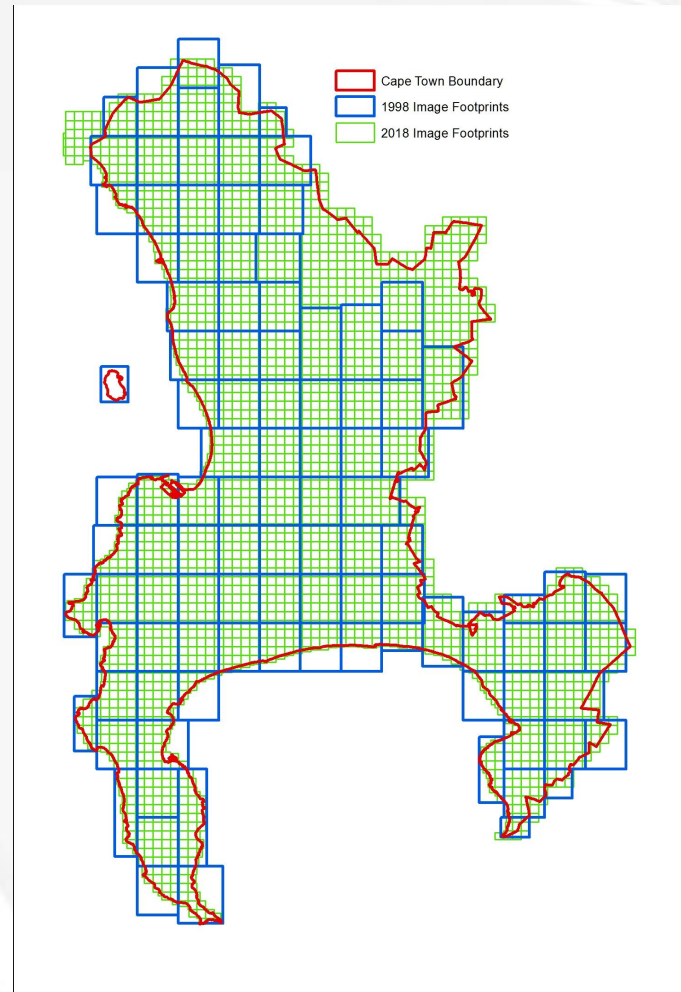
The Cost of Opening Access to Geospatial Data

Indirect Costs

- Subsidising Private Sector Activity
 - Empowering private sector businesses to mediate citizen access to government systems such as deeds searches, zoning lookups, online application for passports, fine payments at the expense of the individual citizen.
- Corporate Influence & Capture of Efforts
 - Focus of effort on 'profitable' datasets at the expense of comprehensive or limited use but still important datasets.
 - Using formats that are widely useful not tailored specifically for corporate workflows

The Cost of Opening Access to Geospatial Data

- The GIS Lab has obtained a copy of the City of Cape Town's basic data annually since 2002
- The city of CT is an area roughly 100km x 50km in extent (2,500 Km²)
- The baseline vector datasets (roads, suburbs, property boundaries, etc) have grown from 1GB in 2002 to 1.5GB in 2018 and changed file format for a total of GB
- The aerial imagery storage size has increased from 5GB in 1998 at 25cm resolution to 67GB in 2018 at 8cm resolution for a total of 720GB of imagery for the City of Cape Town.
- All imagery is in highly compressed, proprietary image formats (50x compression)
- LIDAR data is also available for 2013 (339GB), 2015 (100GB), 2017 (288GB) and 2018 (338GB) for a total of 1TB.





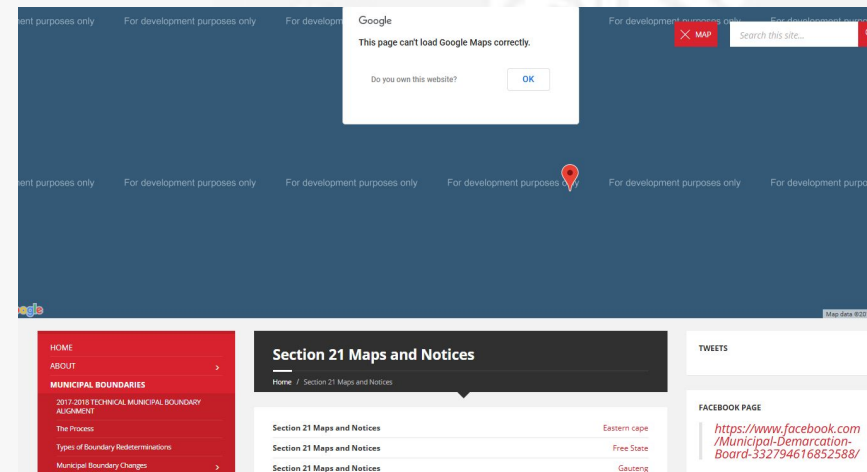
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Portals - Trapdoors - Barriers

Trapdoors - Dormant Portals

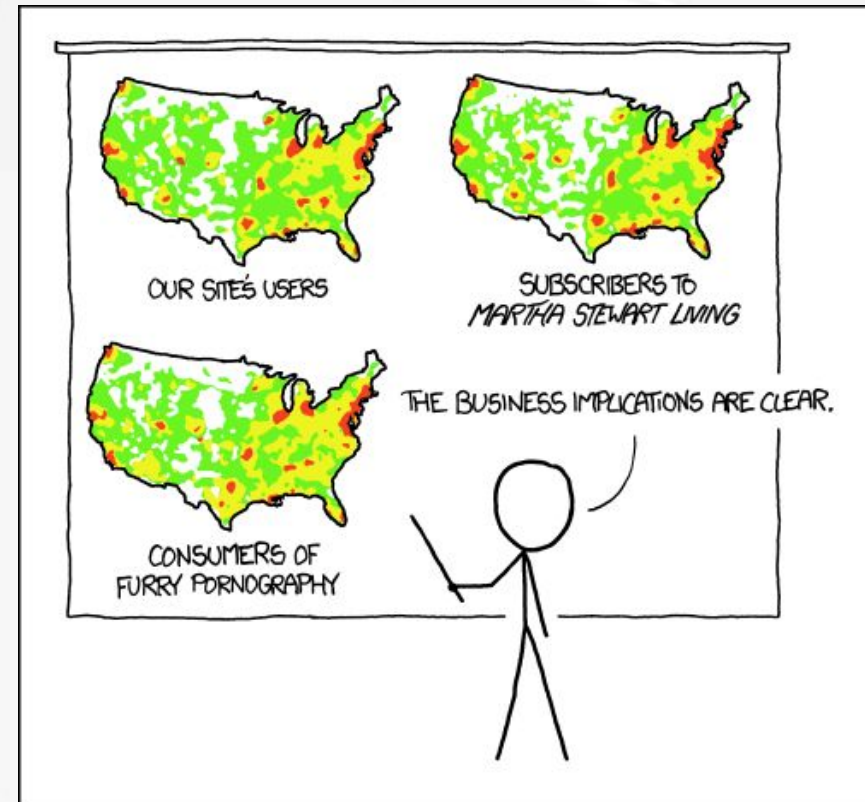
- Dormant portals become **direct barriers** to data access
 - Fall out of date
 - Format & Interface decay
 - Clutter search results with dead links
 - Awareness of the data drops
- Dormant portals **indirectly become barriers** to data access as the hosting organisation may
 - Deem that it has done its due diligence
 - Decide that as no one is using the dead datasets, no further projects can be justified



Portals - Trapdoors - Barriers

Portal Barriers

- Geospatial Literacy
- Web Maps vs Data Portals



PET PEEVE #208:
GEOGRAPHIC PROFILE MAPS WHICH ARE
BASICALLY JUST POPULATION MAPS

Image from xkcd - <https://xkcd.com/1138/>

References | Reading

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- **Economic Assessment of the Use Value of Geospatial Information:** Richard Bernknopf and Carl Shapiro, 2015, ISPRS International Journal of Geo-Information; doi:10.3390/ijgi4031142 <https://www.mdpi.com/2220-9964/4/3/1142>
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- **xkcd:** Randall Munroe, <https://xkcd.com/1138/>, <https://xkcd.com/2116/>



References | Reading

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- City of Cape Town ArcGIS Open Data Portal <https://odp-cctegis.opendata.arcgis.com/>
- City of Cape Town Original Open Data Portal <https://web1.capetown.gov.za/web1/OpenDataPortal/Default>
- Digital Chart of the World https://worldmap.harvard.edu/data/geonode:Digital_Chart_of_the_World
- EarthExplorer <https://earthexplorer.usgs.gov/>
- ESRI Open Data <https://www.esri.com/en-us/arcgis/open-vision/standards/open-data>
- ETOPO <https://www.ngdc.noaa.gov/mgg/global/>
- Geonames <https://www.geonames.org/>
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- JPL <https://www.jpl.nasa.gov/>
- LP DAAC https://lpdaac.usgs.gov/dataset_discovery
- Municipal Demarcation Board ArcGIS Portal
<https://dataportal-mdb-sa.opendata.arcgis.com/datasets?source=Municipal%20Demarcation%20Board&t=2011>
- Municipal Demarcation Board <http://www.demarcation.org.za/site/>
- NASA <https://www.nasa.gov/>
- Natural Earth <https://www.naturalearthdata.com/>
- Open Source Geo <https://www.osgeo.org/>
- Open StreetMap <https://www.openstreetmap.org/#map=9/-33.8647/18.9377>
- SRTM <http://srtm.csi.cgiar.org/>
- UNEP GRID <http://www.grid.unep.ch/index.php?lang=en>
- United Nations <http://www.un.org/en/>
- US Census <https://www.census.gov/>
- USGNS <https://geonames.usgs.gov/>
- World Bank <https://www.worldbank.org/>
- World Health Organisation <https://www.who.int/>
- WorldCLIM <http://www.worldclim.org/>



Thank You

