GeoHub - UNDP's one stop shop for cloud based geospatial data visualisation and analytical tool

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Speaker is…

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- Full stack GIS developer in United Nations Development Programme
- GIS software developer with more than 12 years experience
- WaSH (Water, Sanitation and Hygiene) specialist in Eastern Africa region
What is GeoHub?

- A centralised ecosystem of geospatial services to support UNDP staff and development policy makers in the context of SDGs.
Previous challenges of using GIS data

No centralised geospatial repository

Specialized staff/skills required to work with geospatial

Geospatial analytics and work was carried out by consultants

Limited hardware/software capabilities, mainly commercial
GeoHub is...

1. a centralised geospatial database
2. a data catalog
3. a visualisation/analytical tool
4. a map sharing tool
5. a dashboard for specific datasets and use cases
1. Centralised geospatial database

Country offices, HQ

Third party data
STAC (Microsoft, etc)
Open Data...

Other UN agencies
(UNICEF, UNEP, FAO,
World Bank, etc)

GeoHub data upload portal

Raster (COG)

Vector (pmtiles)
2. Data catalog

- Tag search
- Bookmark (favourite)
- Browse metadata and Preview data

Easy to search all datasets

GeoHub
3. Visualisation/analytical tool

- Support two Legend type (simple or classify)
- Switch color map
- Filter data
- Add data label
- Simulation (available for dynamic vector data)
4. Map sharing tool

- Save current map as a private map
- Share in UNDP or Public
- Explore other users' maps
- Can edit other users' maps

Save map visualisation to share with colleagues.
5. Dashboard for specific datasets

Dashboard for High Resolution Electricity Access data
http://www-personal.umich.edu/~brianmin/HREA/
Technologies and software libraries/components
Backbone services

1. Dynamic Vector Tile Service
   - store data in PostGIS
   - leverage PostgreSQL (function layers)

2. Static Vector Tile Service
   - serve tiles containing binary geometries with their attributes through pmtiles

3. Raster Tile Service
   - vector and raster data as a cartographic map (picture)
1. Dynamic Vector Tile Service

Enable users to change parameters to simulate specific scenarios:

- Human Development Index (HDI) \[ HDI = (I_h \times I_e \times I_i)^{1/3} \]
- Risk indices (climate, population)

CREATE OR REPLACE FUNCTION admin.tool_layer_intersect (z integer default 0, x integer default 0, y integer default 0, params varchar default ' {
    "input_layer_name_1": {
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    },
    "input_layer_name_2": {
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        "icon": "fa-diamond",
        "label": "Layer to be intersected against, in schema.table format",
        "widget_type": "search box",
        "value": "input_layer_2",
        "hidden": 0
    }
}
')
2. Static Vector Tile Service

User uploaded vector data is converted to PMtiles format

Enable users to add their own datasets or third party vector datasets easily

Faster to render the data in serverless.
3. Raster tile service

Dynamic raster tiling server
https://titiler.unpgeohub.org/docs
Front end – web application

MapLibre

BULMA

SVELTE KIT
REST API to collaborate partners

- UNDP GeoHub has its own STAC like API to fetch datasets
- Documentation is available

We are welcoming any partners to collaborate with UNDP!!

https://geohub.data.undp.org/api
What’s next? Updates after Kosovo

- Improved UI/UX
- Develop scale adaptive hybrid geospatial layers (raster-vector) to represent risk indicators layers for the Disaster risk and resilience community
- Continue improving data pipeline to process more analytical and useful data (AI, machine learning, etc).
- Collaborate with other UN agencies
  - UNICEF, UNEP, WFP, FAO, etc.
  - Add their own data into GeoHub through their API (if applicable).
  - Implement Azure authentication for them who can partner with UNDP
- Provide social logins to gather more geospatial data from third parties.
  - Facebook, Google, etc.
- Rollout GeoHub in UNDP.
A centralized ecosystem of services to support development policy makers

GeoHub

Github repo
UNDP-Data/geohub

Try develop version
dev.undpgeohub.org

GeoHub production
geohub.data.undp.org