UN Open GIS INITIATIVE

UN Vector Tile Toolkit development and its application

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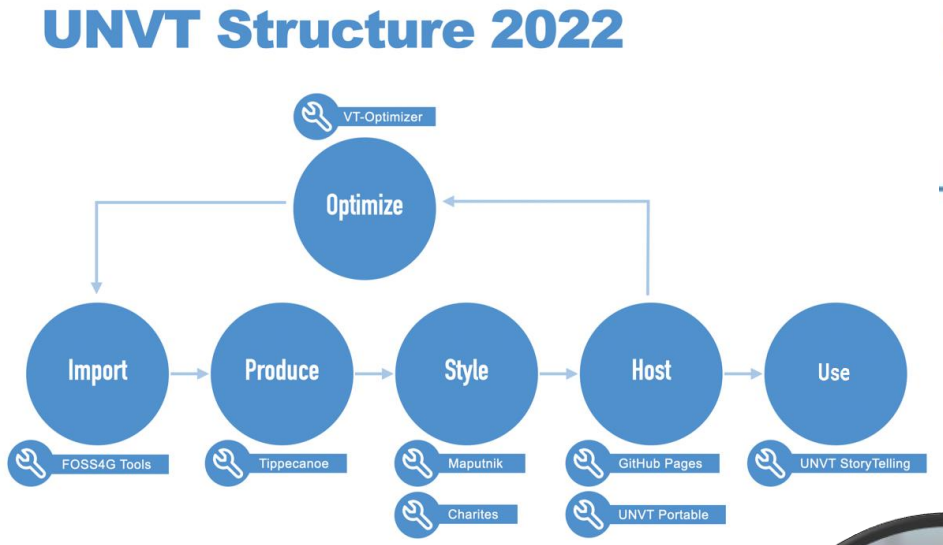
The United Nations Vector Tile Toolkit

United Nations Geospatial

UN Vector Tile Toolkit

Combining efforts with UN.



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- UNVT is a collection of Open Source Software (OSS) to produce, host, style and optimize vector tiles for web mapping. It also shares technical know-how.
- UNVT is an effort under **the UN Open GIS Initiatives**. It was initiated by Mr. Hidenori Fujimura in 2018
- UNVT first aims to achieve automatic continuous update of the basemap vector tiles for UN operations. It also aims to facilitate the use of the vector tile technology among partners.

Meet him in Florence!
Founder of UNVT.
Mr. Fujimura

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Some example of our tool

Our tools and activities cover various phases of vector tile development/application.

Tools listed here are some example of newly developed UNVT for general use.

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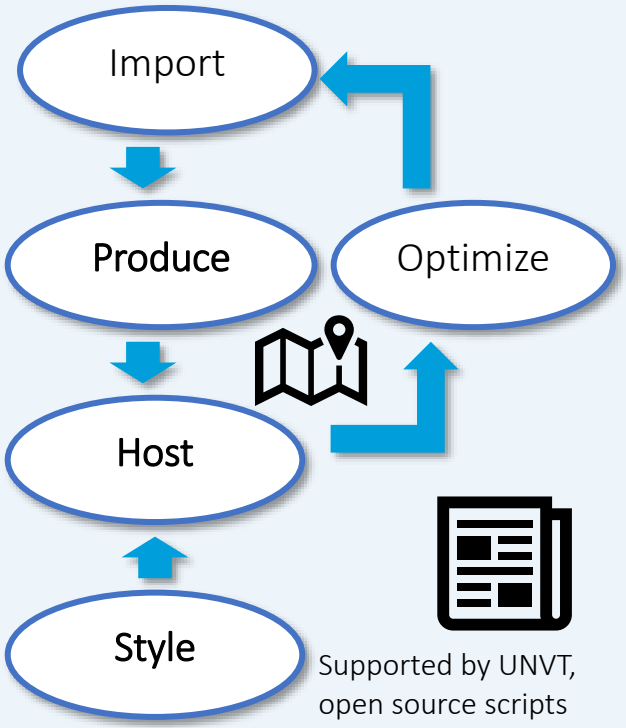
UNVT workflow of developing **vector tile** for base map



The United Nations Vector Tile Toolkit

New developments in UNVT

- produce - 3D
- host - FTS
- style - charites
- optimize
- use - storytelling

Vector Tile Styling tool – unvt/charites
- make styling work easy and fun

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Efficient Styling– Use of YAML files

- **JSON file** based on Mapbox style specification (or MapLibre style specification)
- Wise use of YAML files increases efficiency
- We use UNVT/charites

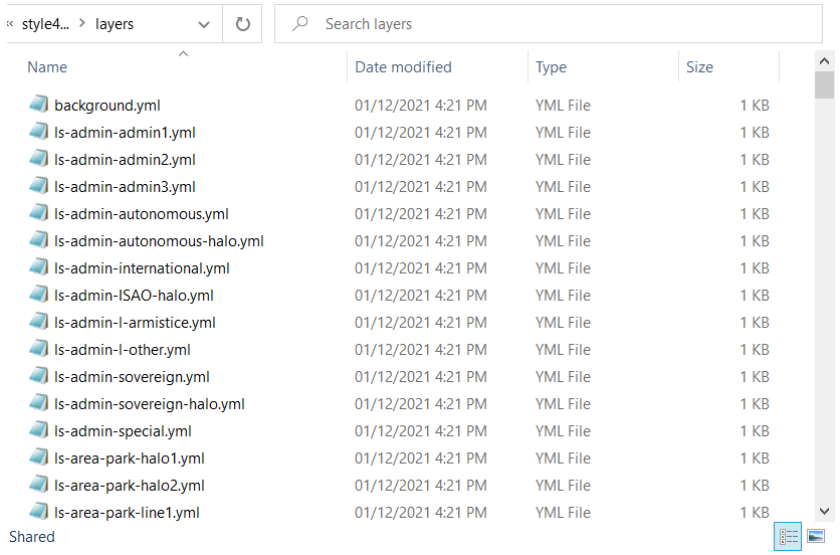
Style files (mapbox/maplibre/arcgis)

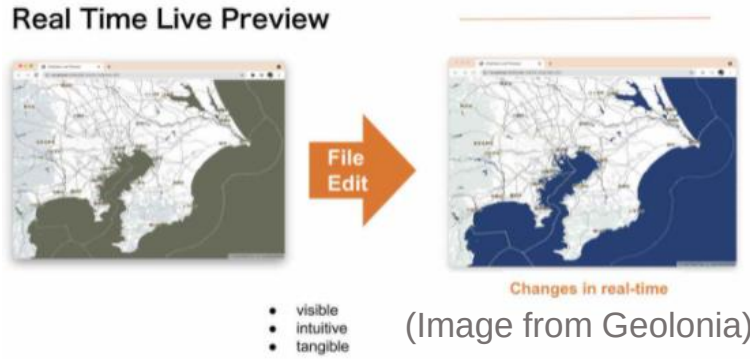
- **JSON format**
  - Many lines (thousands)
  - In a single file
  - Hard to read/edit

Our tool **Charites**

Let's edit with

- **YAML format**
  - Human readable
  - Structured files
  - Re-usable
  - Stored in the series of config files





(Image from Geolonia)

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A story about the tool development

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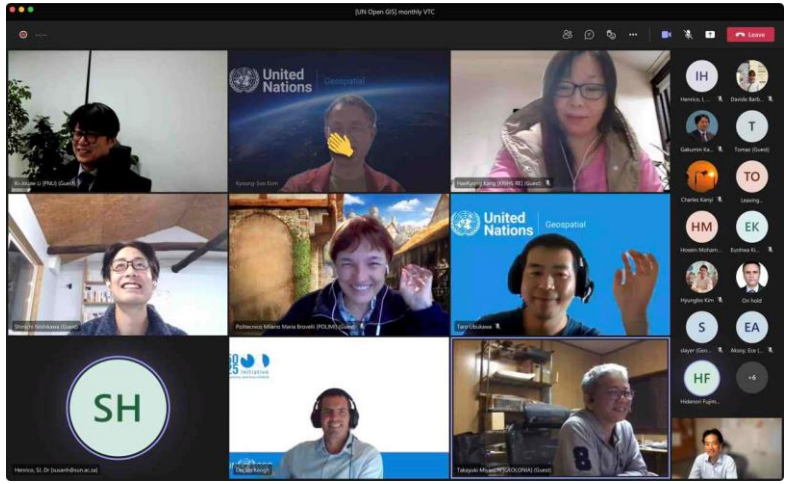
テキストと操作画面

- Originally, we used HOCON parser to edit the style. These work was reported at UNVT workshop in May 2021

- Our partner, Geolonia, supported the shared idea, and contributed to develop a tool with YAML files. They contributed their tool at the UN Open GIS monthly meeting in October 2021.



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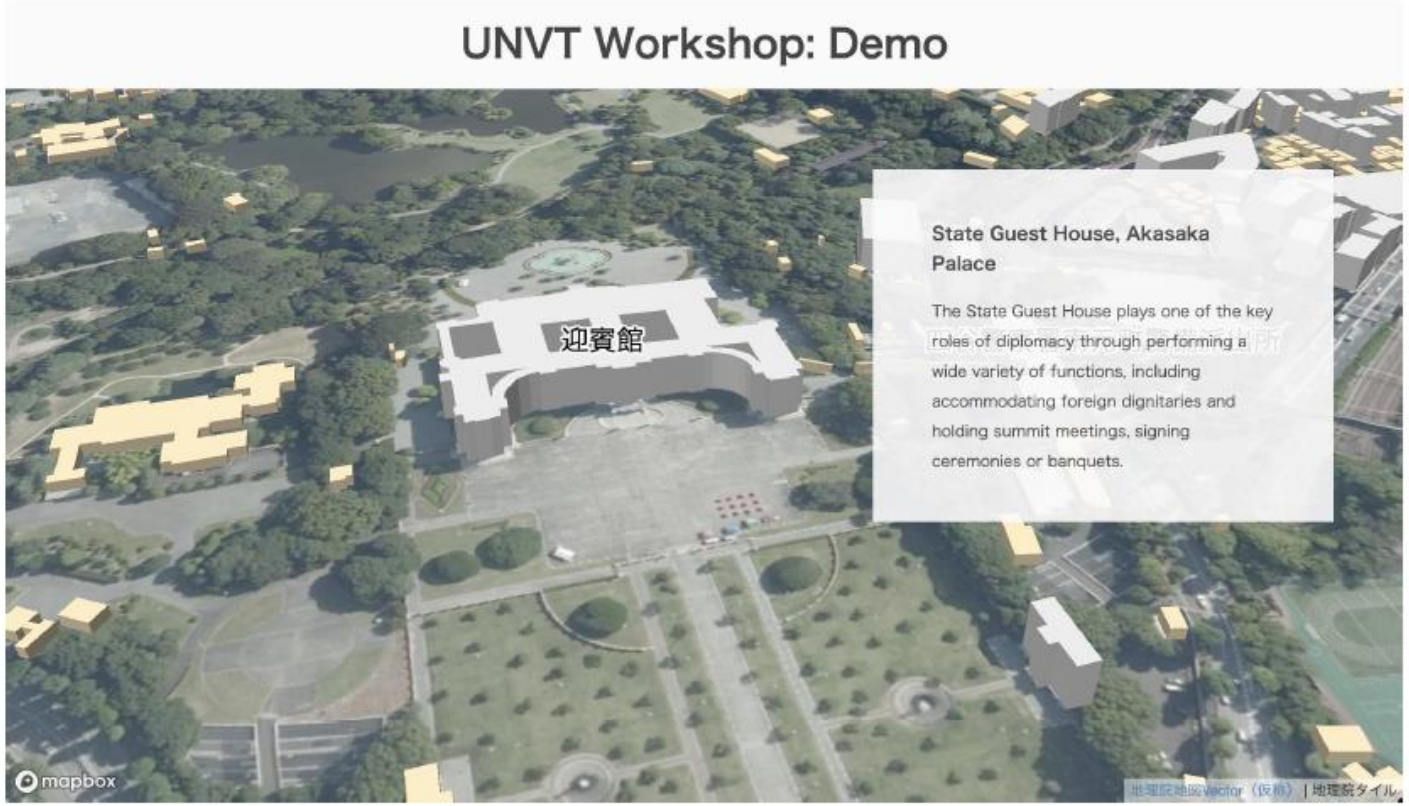
Storytelling – unvt/tell

A tool for data consumption.
Making a simple story-telling map with easy preparation. (Just prepare text with YAML fortmat.)

- https://github.com/unvt/tell
- https://www.youtube.com/watch?v=CVajhAUDLMs



Workshop was recorded and released from YouTube

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Storytelling:

Making a story map by editing simple text (YAML)

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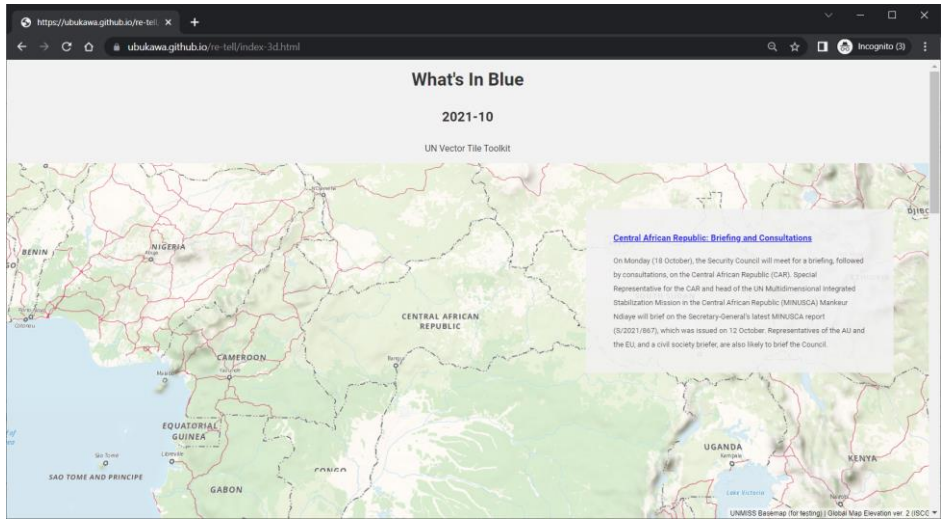
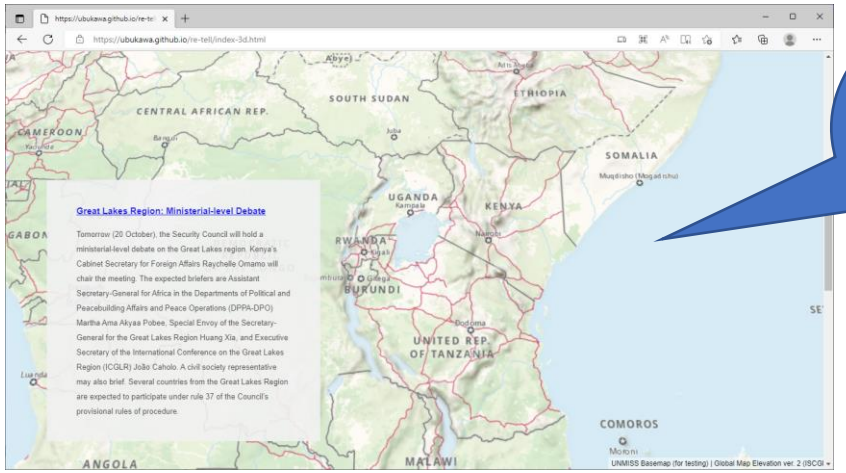
story.yml - Notepad

File Edit Format View Help

```
style: ./style.json
title: What's In Blue
subtitle: 2021-10
byline: UN Vector Tile Toolkit
theme: light
footer: This is the end of the story. The source of this story is <a href='https
view:
# you can pick the location information from https://optgeo.github.io/relief
  car:
    center: [21.91, 7.71]
    zoom: 4.84
  lakes:
    center: [33.9, -3.15]
    zoom: 4.84
  haiti:
    center: [-73.73, 19.25]
    zoom: 5.34
chapters:
  - id: c1
    alignment: right
    url: https://www.securitycouncilreport.org/whatsinblue/2021/10/central-afric
    title: Central African Republic: Briefing and Consultations
    description: >
      On Monday (18 October), the Security Council will meet for a briefing, fo
    location: car
  - id: c2
    alignment: left
    url: https://www.securitycouncilreport.org/whatsinblue/2021/10/great-lakes-r
```

Ln 3, Col 18 130% Unix (LF) UTF-8





Map moves with the story

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3D expression (1) – Use of 3D Terrain

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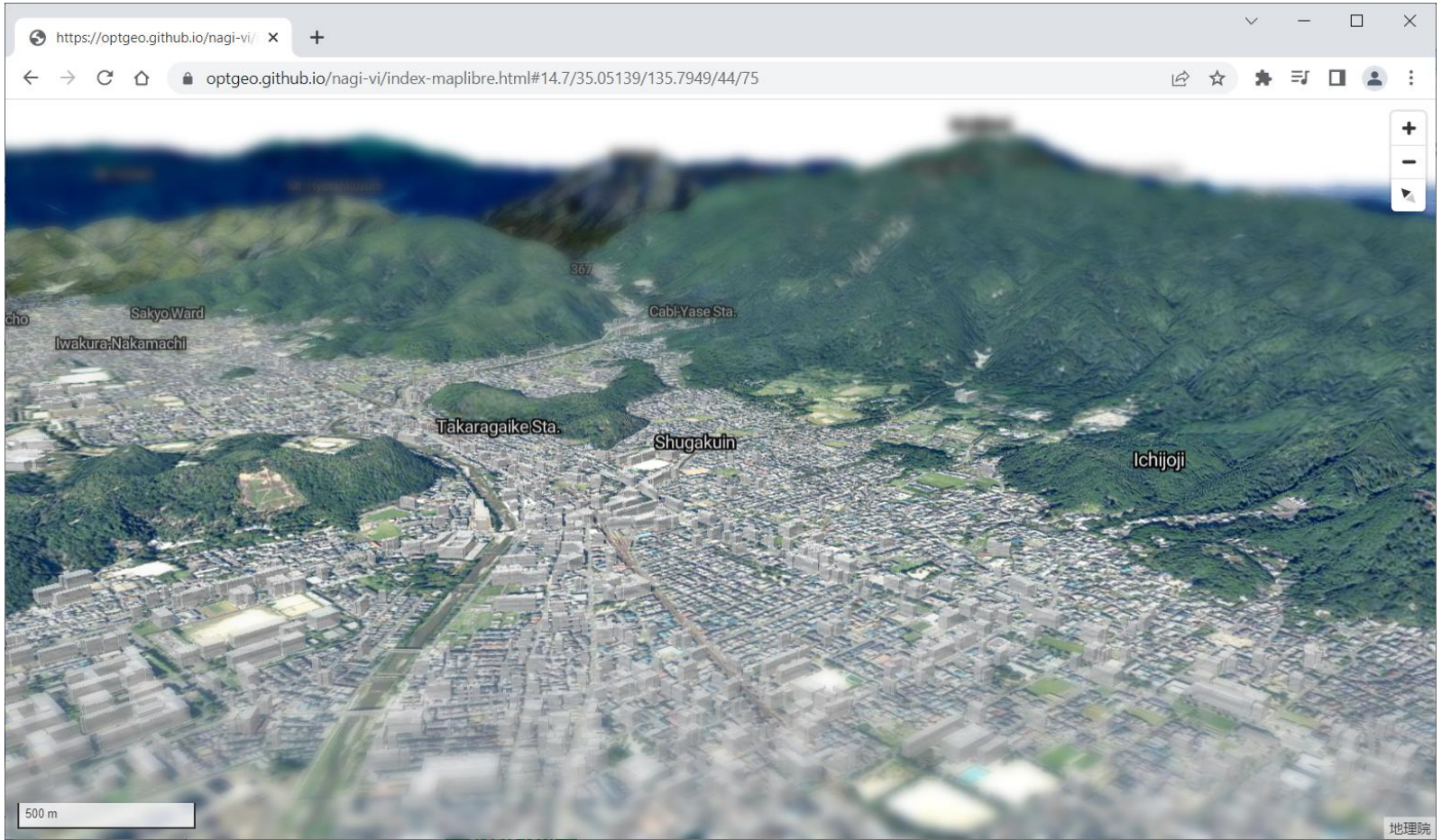
- 3D terrain with **Mapbox GL JS and MapLibre GL JS**: https://github.com/optgeo/nagi-vi
- Vector Tiles + Terrain Tiles + Orthophotos (focus on center)



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We were one of the early users of MapLibre GL JS ver. 2.2.x (3D terrain.)

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3D expression (2) – voxel tile

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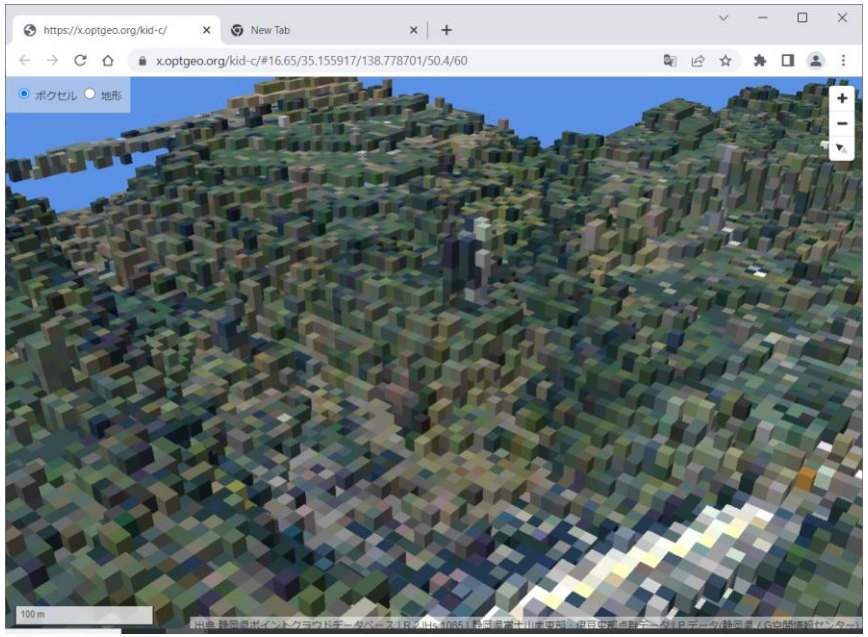
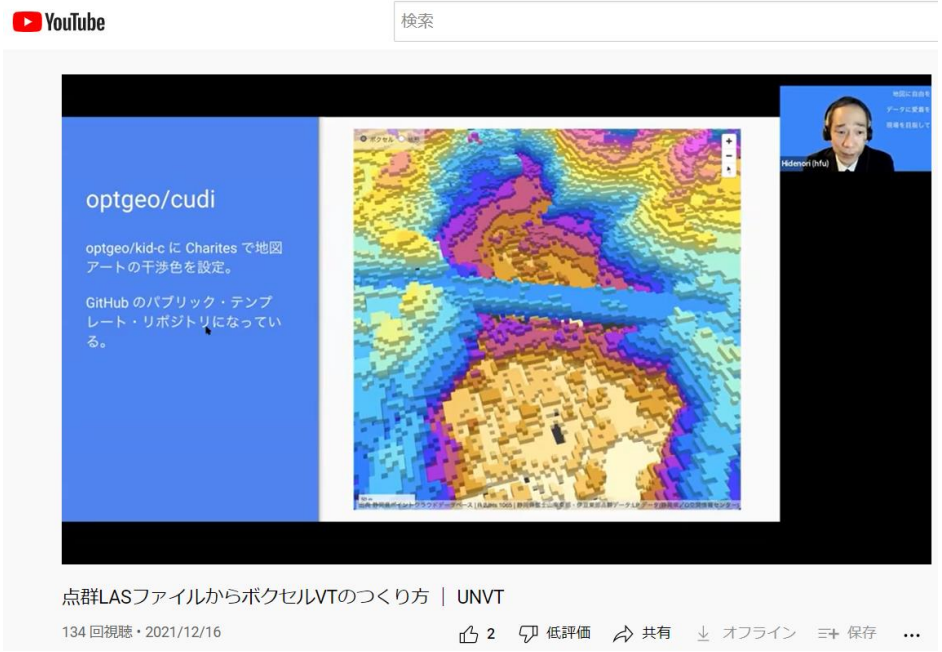
- A lot of work on voxel tiles:
  - Lightweight abstraction of lidar data





https://github.com/optgep/kid-c
https://github.com/optgeo/togari

Learning Material:
Creation of Voxel vector tile from LAS (in Japanese)
© FuruhashiLab., hfu and UNVT contributors, CC0
https://www.youtube.com/watch?v=LrDk0VFodTE

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3D expression (3) – RGB Elevation

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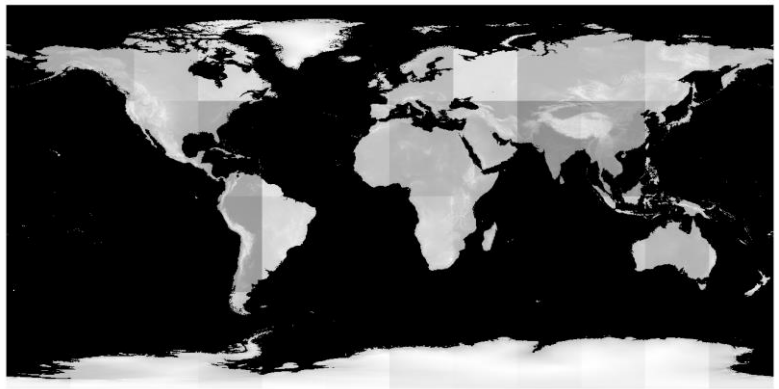
Let's develop Free and Open RGB Elevation tiles from the open source DEM

- We have a tool to easily create RGB elevation tile
  - https://github.com/unvt/rgbify -- A docker file based on osgeo/gdal:ubuntu. It has mapbox/rio-rgbify in it.
- Development of RGB elevation tiles from SRTM data and others.
  - from SRTM: ZL 6-11 https://github.com/unvt/rgbify-srtm (About 180GB)
  - from Global Map: ZL 2-8 https://github.com/ubukawa/globalmap-el (About 2 GB)

SRTM has some void area. Need for further improvement.



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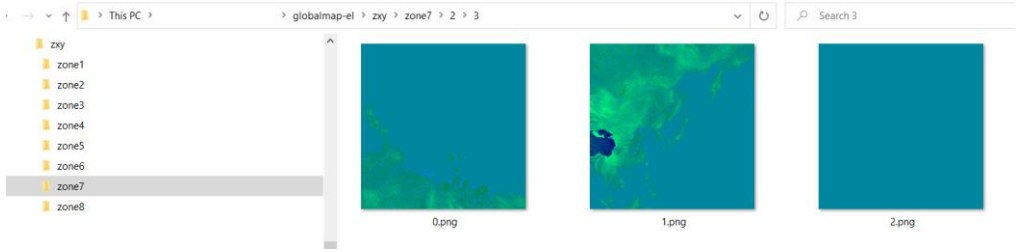

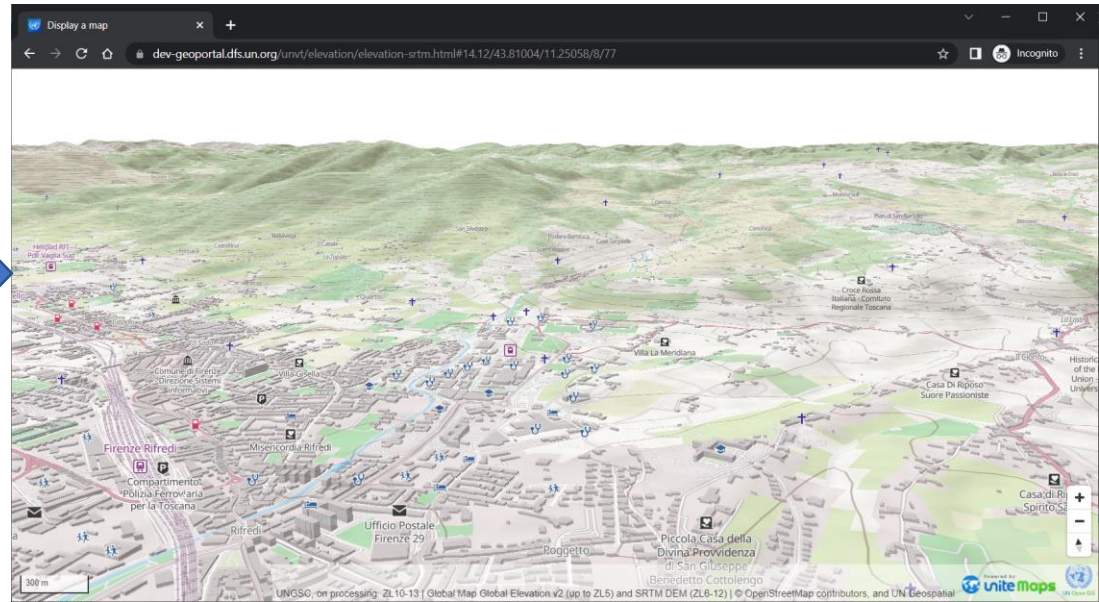

Vector Tile on Raspberry Pi

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- We can build a vector tile server and/or data processing machine with a single board PC.

How can we build a vector tile processing machine?

We have developed a single line Tool installer for Raspberry Pi. By running it, we can create a ready-to-use vector tile processor!

https://github.com/unvt/equinox

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Any other (if any)

- ほかに紹介したいツールやレポジトリがあれば追加

Some ongoing projects

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I also would like to introduce some our our related projects

- Vector Tile deployment in UN
- UNVT Portable (?)
- GSI(?)
- ???

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Vector Tile Development in UN

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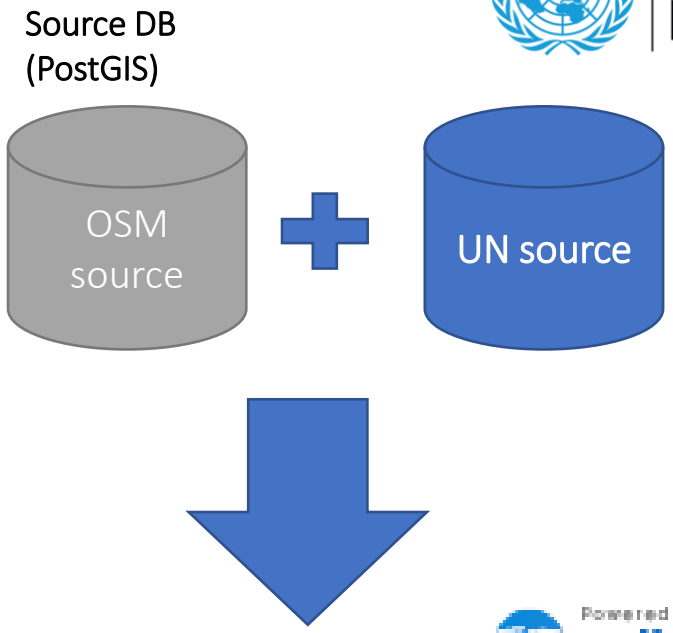
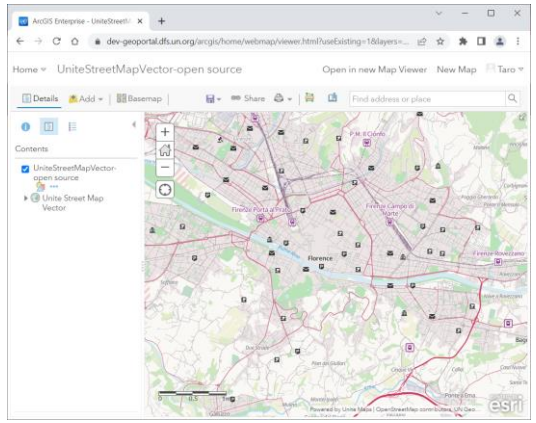
UN Mappers

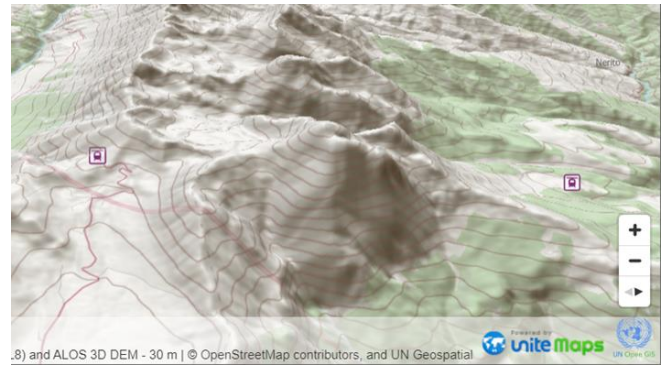
- Vector tile from PostGIS database
  - Use of nodejs scripts and tippecanoe
  - 841 mbitles (140 GB)
- Automatic update of the whole data base.
  - Regular update as scheduled task.
  - (35 hours for global data update)
- Style is prepared
- Hosting web map
  - Vector Tiles for Esri Arcgis Online.
  - Web Map APP with MapLibre



Users
- Web APP
- GeoPortal
- Etc.

Powered by unite Maps





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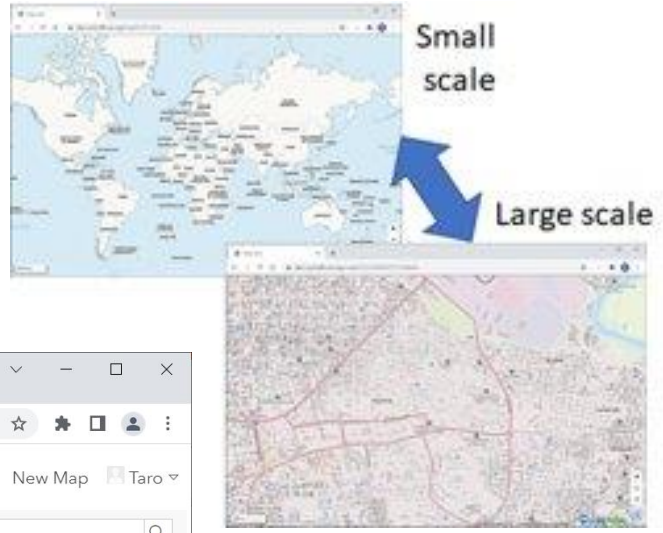
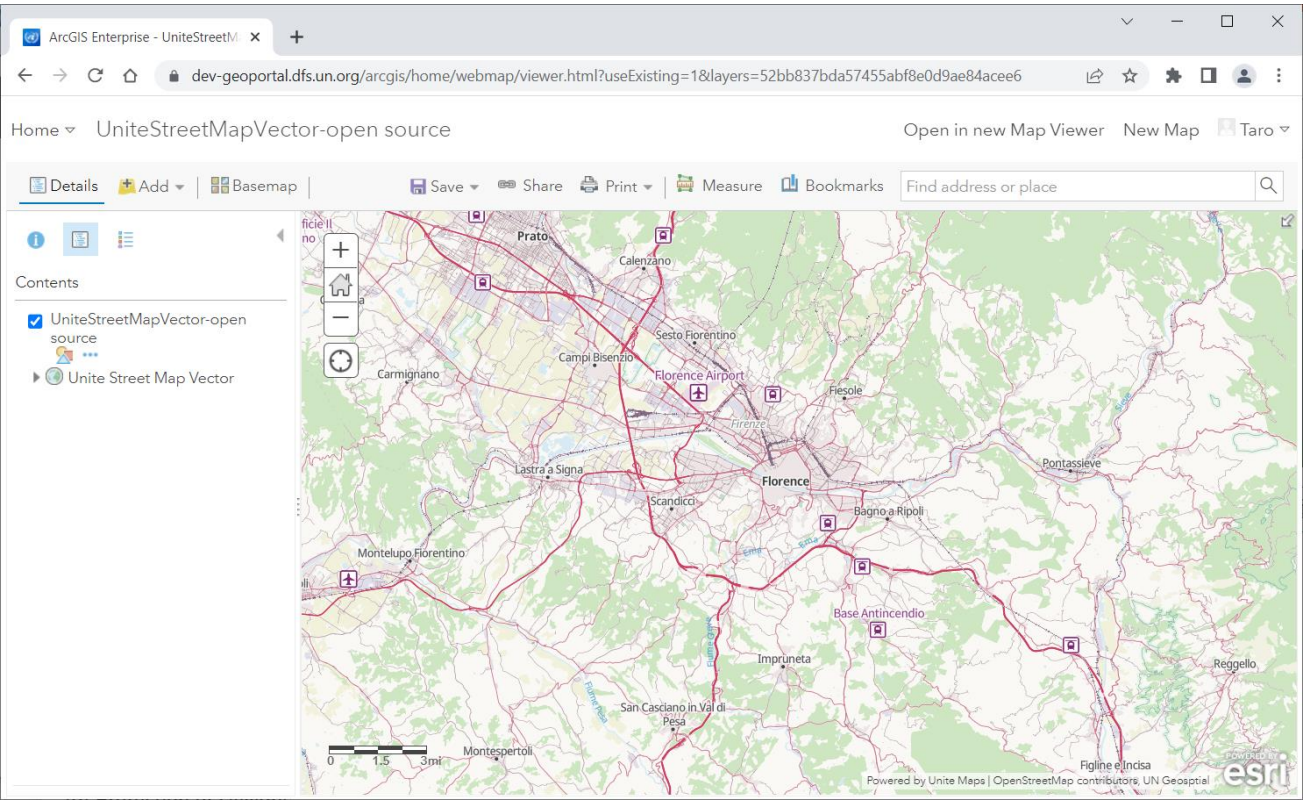
Vector Tile in ArcGIS Online



We needed adjustments for vector tile consumption in ArcGIS online. We struggled and have a lot of lessons.



- ArcGIS REST API
  - Style
  - Index
  - Tilemap (for OverZoom)
- Azure AD authentication
- CORS setting

UNVT Portable

- スライド1～2枚程度で説明

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(FYI) Use of various plug-ins

- We learn various plug-ins from partners' projects

Any other (if any)

- ほかに紹介したい取り組みがあれば追加

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How we share our experiences?

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- Conduct workshops
- Documentations
- At GitHub

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Workshops

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Hackathon with students

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Way Forward

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Summary

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