TiTiler

Not Just a Tile Server

Vincent Sarago - Developmentseed

Vincent sarago

Software Engineer @ Developmentseed

COG Tzar

Self-Taught Python dev with great mentors 👋 @sgillies

Creator of @RemotePixel

MSc in Earth Sciences

Bike & Coffee

TiTiler

What?

Why?

How?

Ti...

Ping Me!

What?

TiTiler

https://developmentseed.org/titiler/

What?

Python >=3.7

rio-tiler
morecantile
rio-cogeo
cogeo-mosaic

Rasterio / GDAL / PyProj

FastAPI

What?

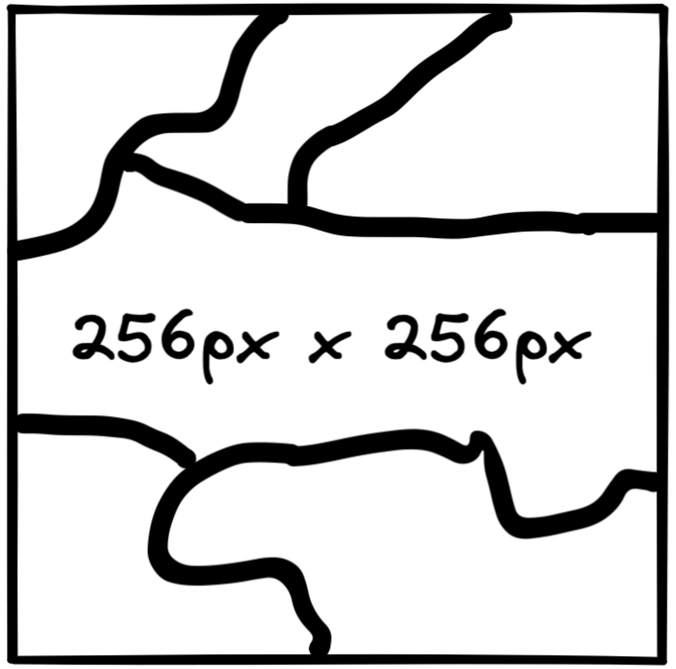
- Production ready (Built on top of FastAPI)
- Cloud Optimized GeoTIFF support (and all Raster supported by GDAL)
- SpatioTemporal Asset Catalog (STAC) support
- Multiple projections (TileMatrixSets) support via morecantile.
- JPEG / JP2 / PNG / WEBP / GTIFF / NumpyTile output format support
- OGC WMTS support
- Full OpenAPI documentation
- Virtual mosaic support (via MosaicJSON)
- Extensible / Customizable

What?

Maps

What?

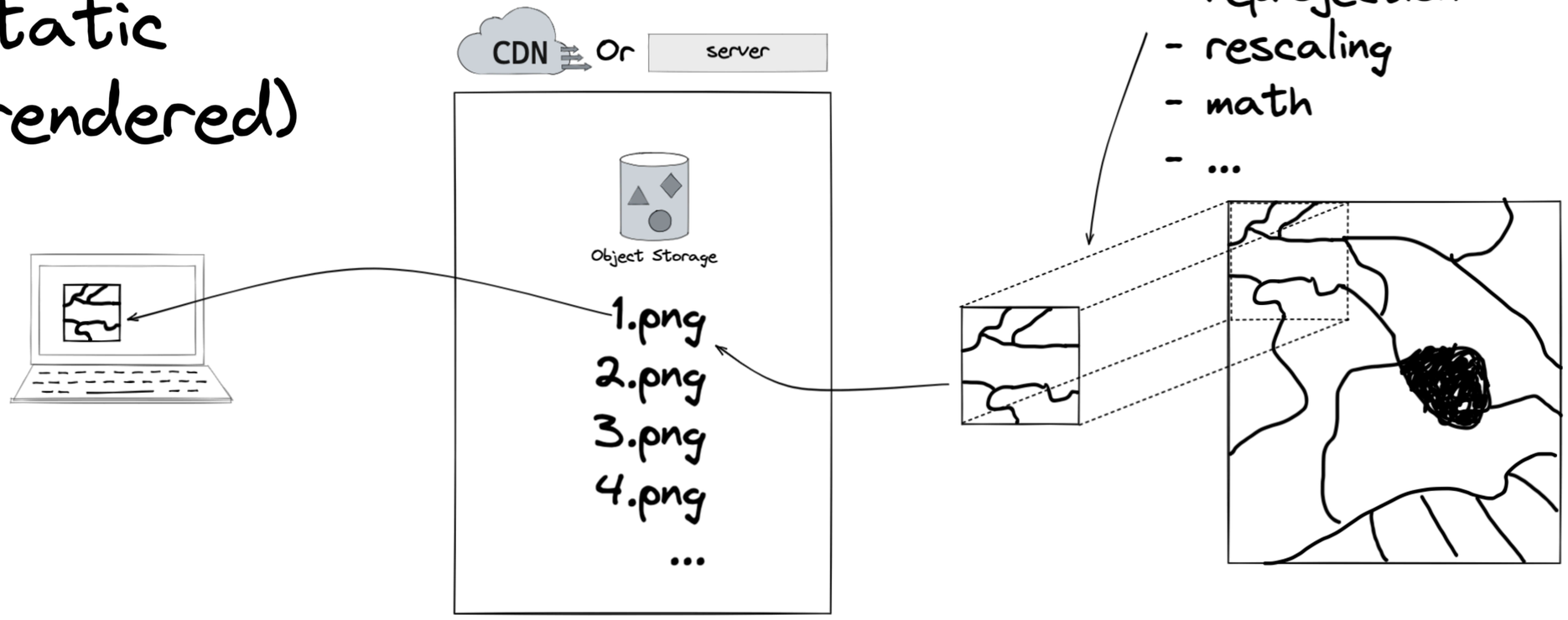
Map Tile
(raster)



PNG
JPEG
WEBP

Why?

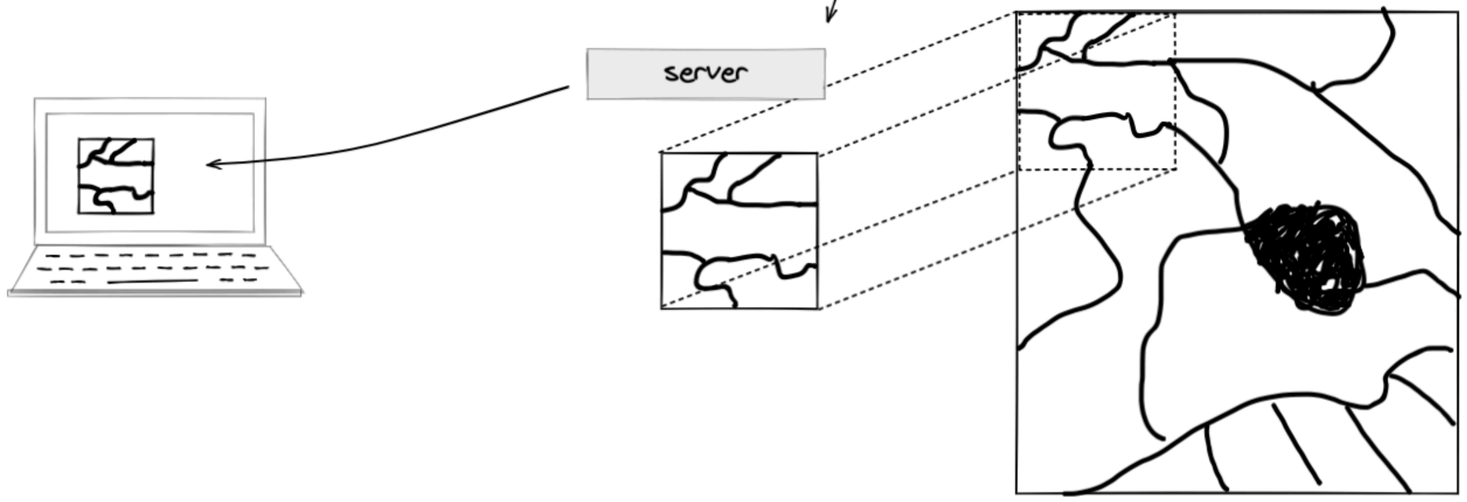
Static (pre-rendered)



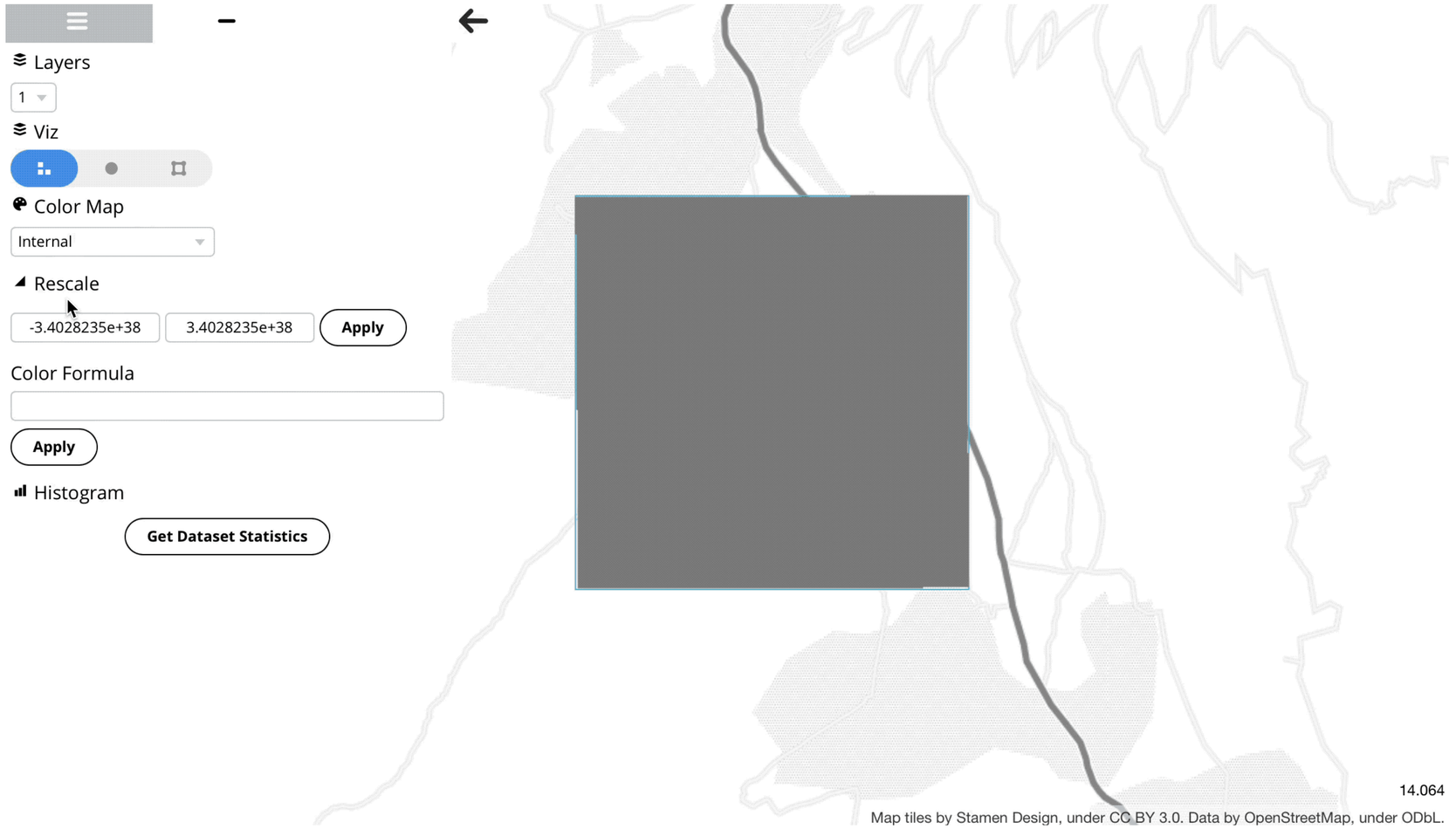
Why?

Dynamic
(rendering on-demand)

Processing:
- reprojection
- rescaling
- math
- ...



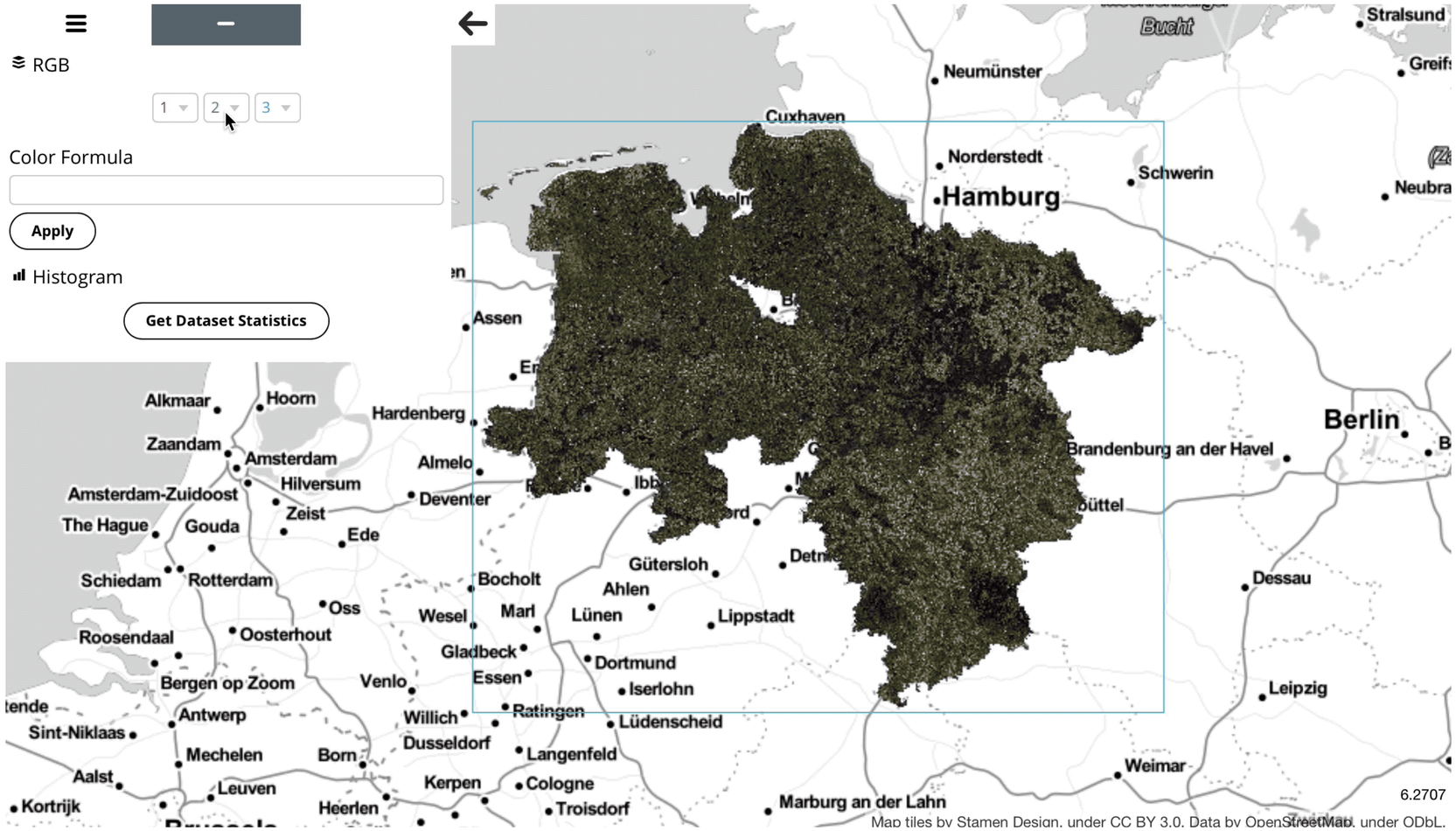
Why?



Rescaling and Colormap

https://github.com/developmentseed/rio-viz

Why?



Band Selection

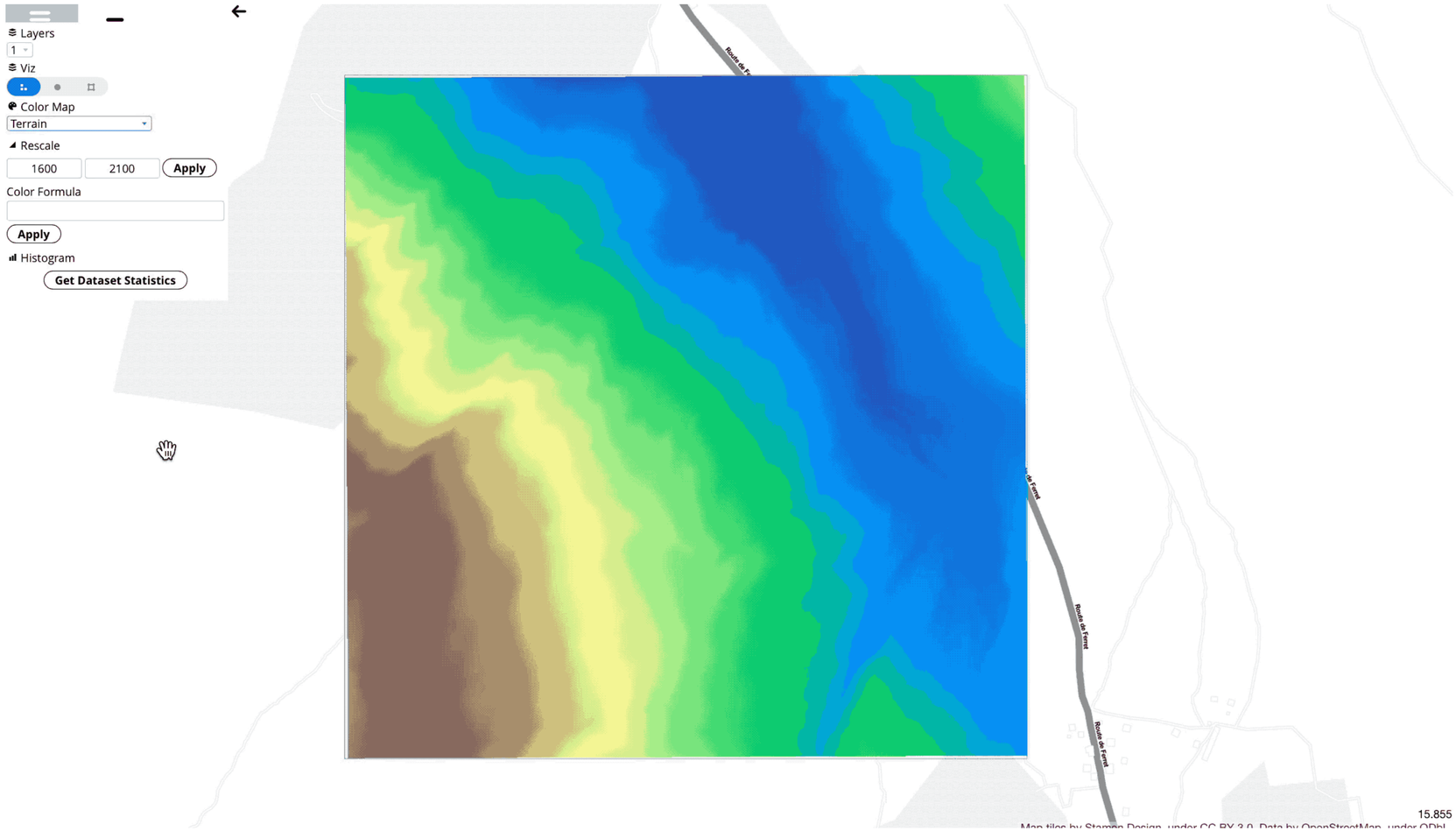
https://github.com/developmentseed/rio-viz

Why?

Mosaic

https://github.com/developmentseed/rio-viz

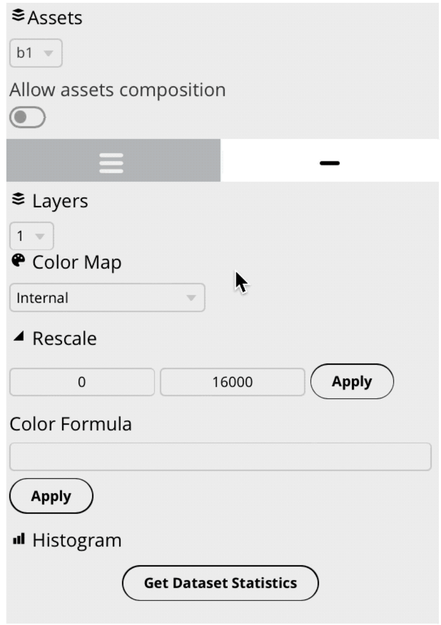
Why?

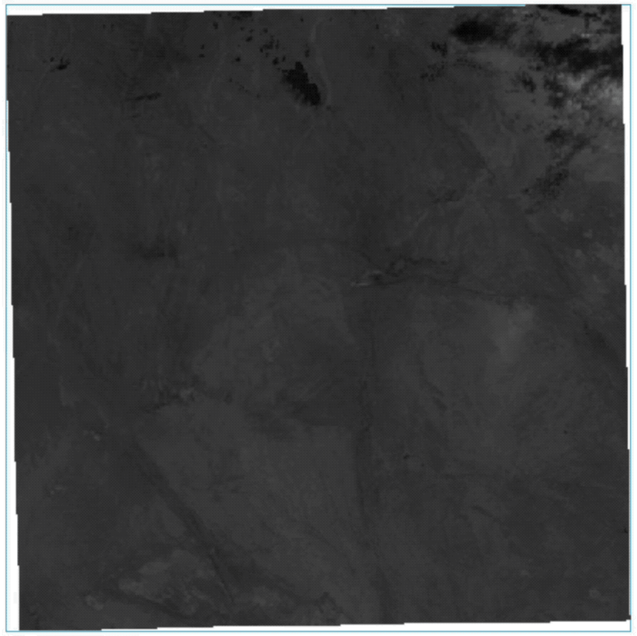


Pixel to Vector

https://github.com/developmentseed/rio-viz

Why?





8.3553

Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL.

Fusion

https://github.com/developmentseed/rio-viz

How?

Don't fork it, Import it!

```
pip install titiler.core
```

More:

```
pip install titiler.mosaic  # add Mosaic support
pip install titiler.application  # Demo app
pip install titiler.pgstac  # Dynamic Mosaic with PgSTAC
```

How?

Simple custom application

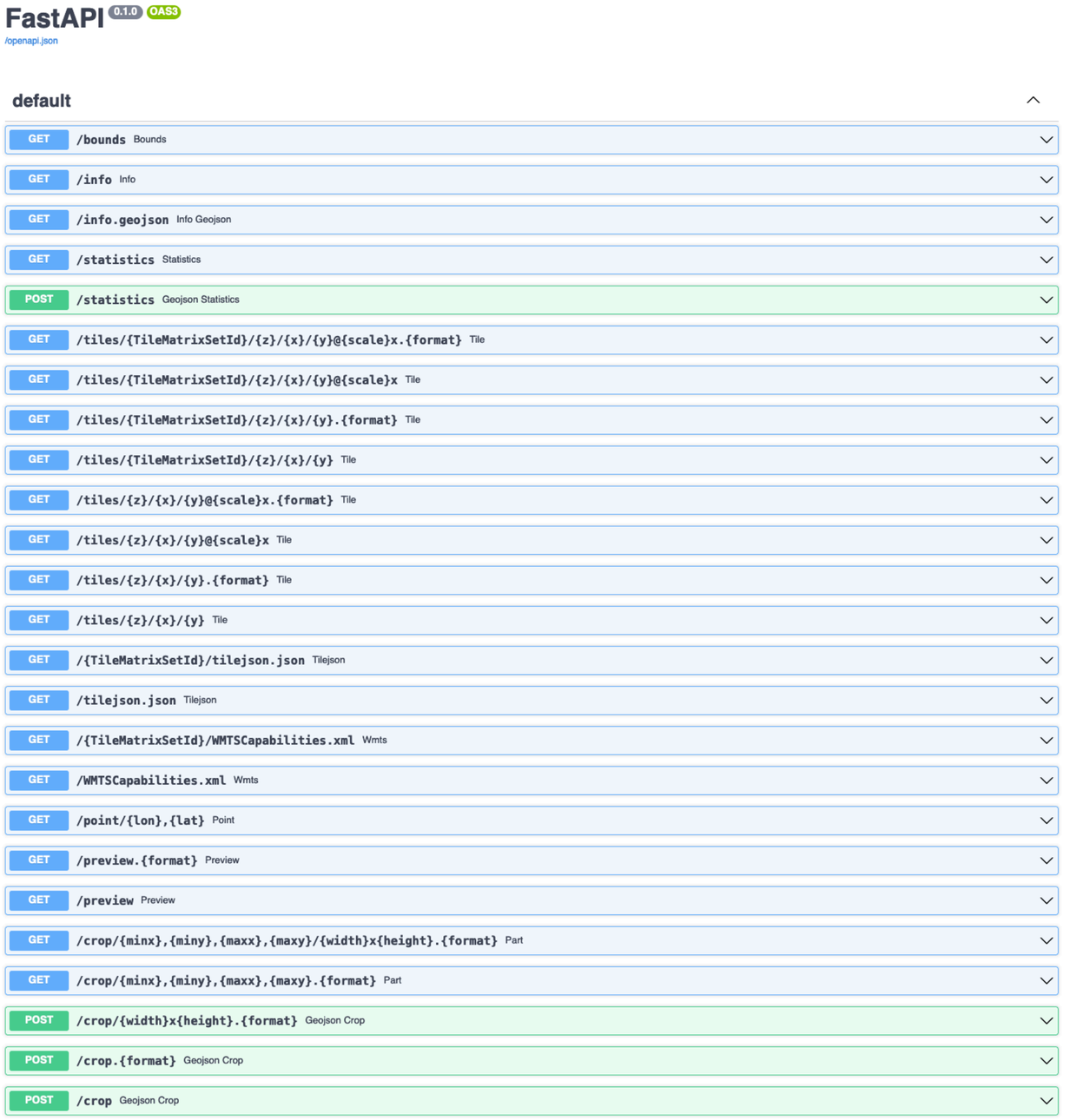
```python
import uvicorn
from fastapi import FastAPI
from titiler.core.factory import TilerFactory

# Create a FastAPI application
app = FastAPI()

# Create a TiTiler service endpoints (tiles, crop, info...)
cog = TilerFactory()

# Register the endpoints in the application
app.include_router(cog.router)

if __name__ == "__main__":
    uvicorn.run(app=app, host="0.0.0.0", port=8080)
```



How?

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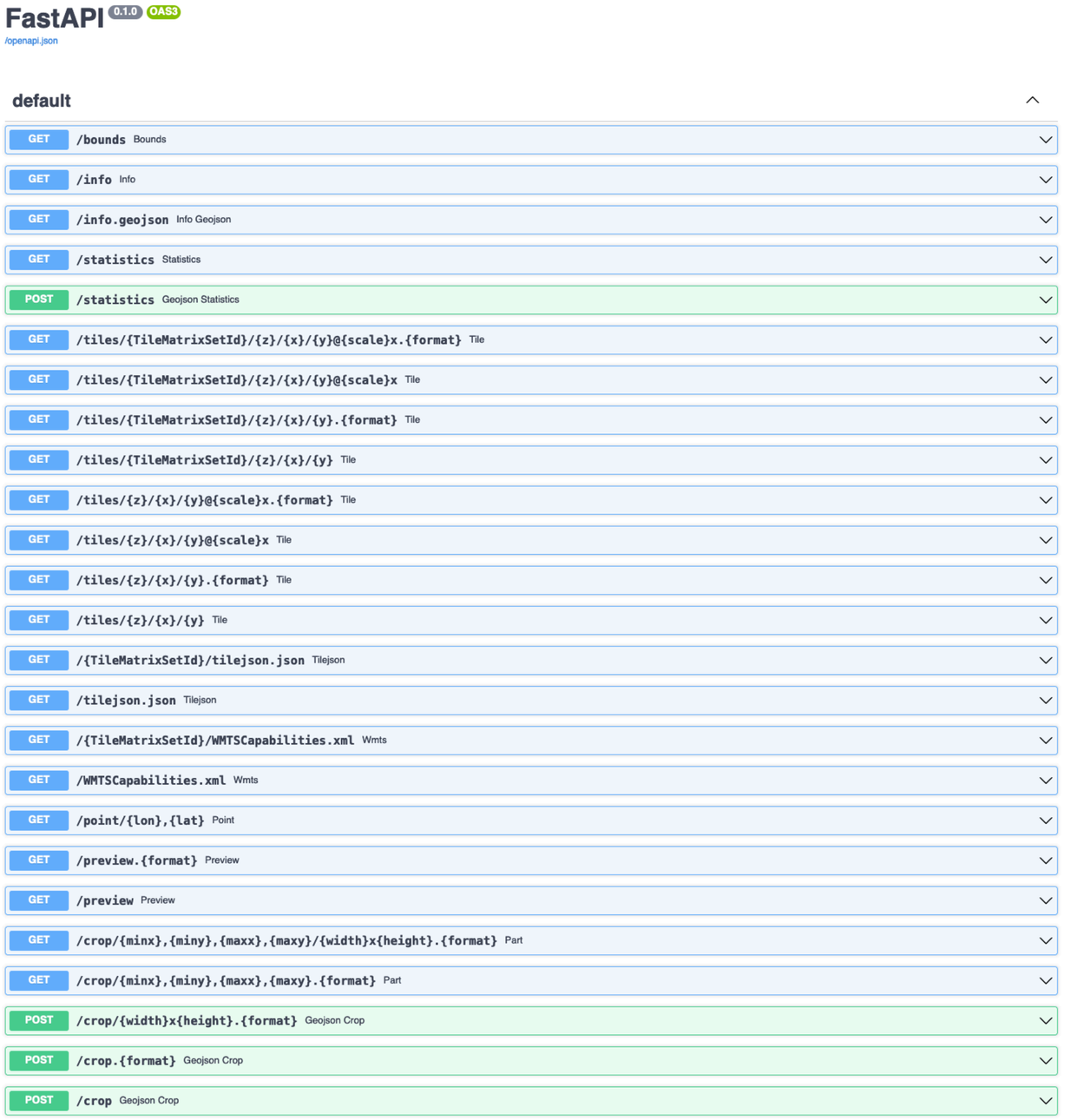
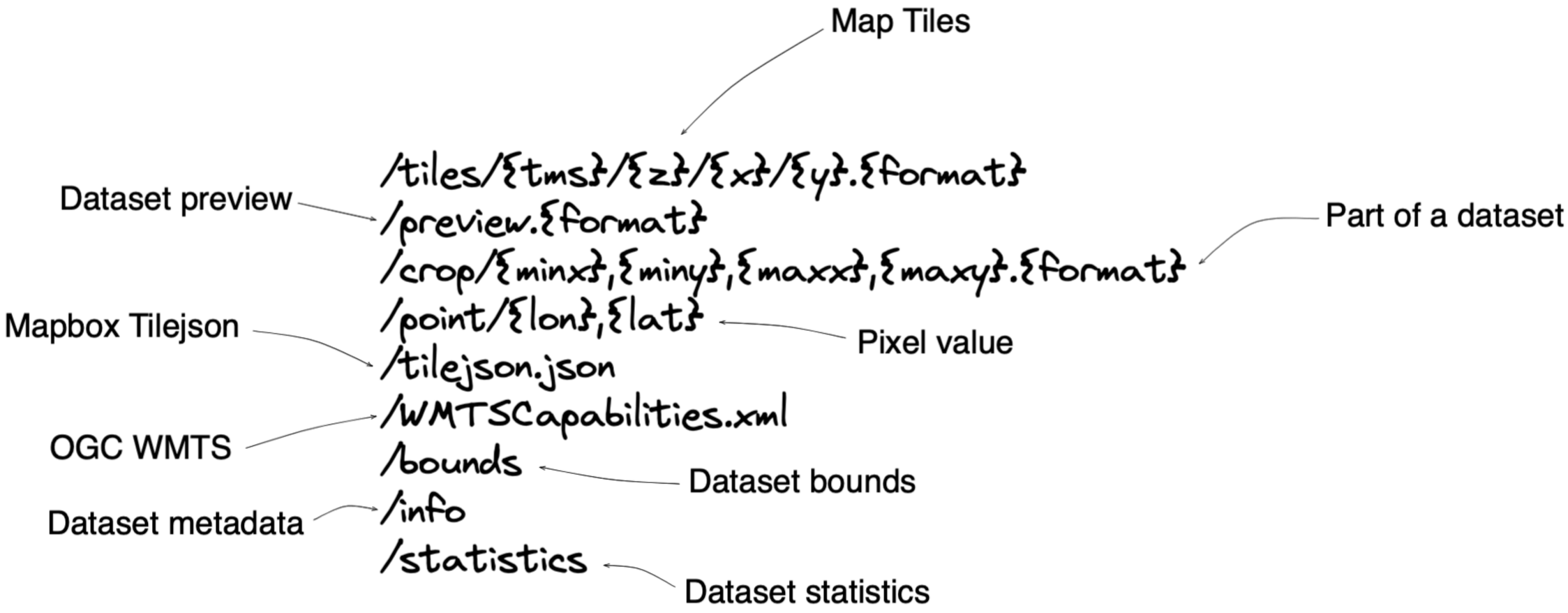
```

TiTiler's Factories are helper classes which build and register endpoint to a FastAPI router



How?

TilerFactory



How?

TilerFactory

band selection (e.g 'bidx=[1,2,3]')
band math expression (e.g '(b4-b1)/(b4+b1)')
matplotlib colormaps and custom
linear rescaling
rio-color formulas

How?

/info

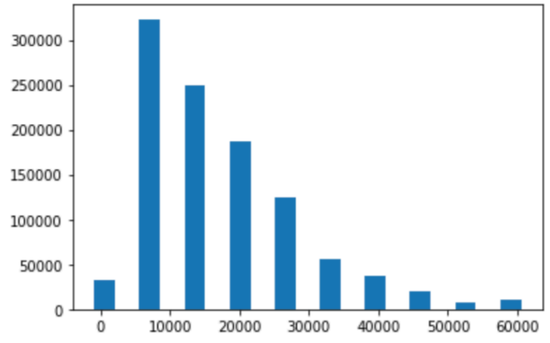
```
data = httpx.get(
    "https://titiler.xyz/cog/info",
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
    }
).json()
```

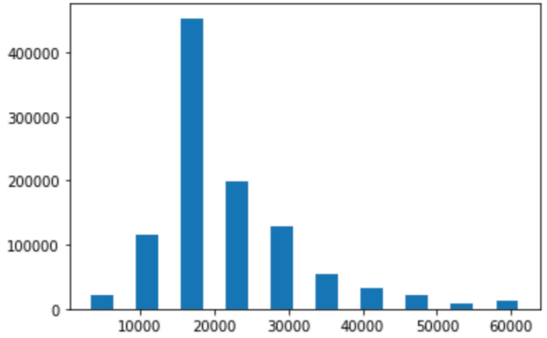

```
{
  "bounds": [-74.11091849437823, 40.69954173337543, -74.09280142563541, 40.713328767614236],
  "minzoom": 14,
  "maxzoom": 19,
  "band_metadata": [["1", {}], ["2", {}], ["3", {}], ["4", {}]],
  "band_descriptions": [["1", ""], ["2", ""], ["3", ""], ["4", ""]],
  "dtype": "uint16",
  "nodata_type": "None",
  "colorinterp": ["red", "green", "blue", "undefined"],
  "overviews": [2, 4, 8, 16],
  "count": 4,
  "height": 5000,
  "width": 5000,
  "driver": "GTiff"
}
```

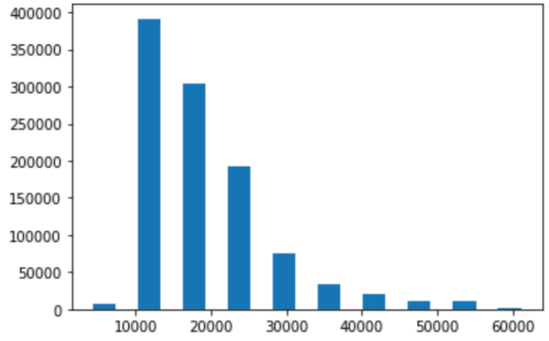
How?

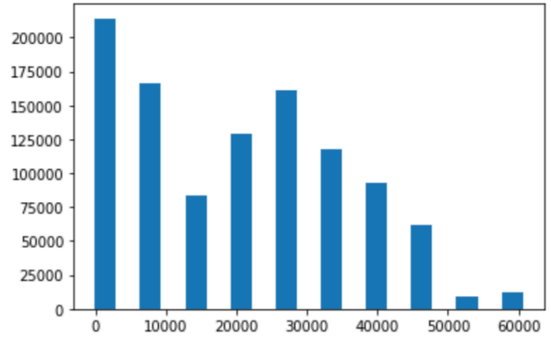
/statistics

```
data = httpx.get(
    "https://titiler.xyz/cog/statistics",
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
    }
).json()
```





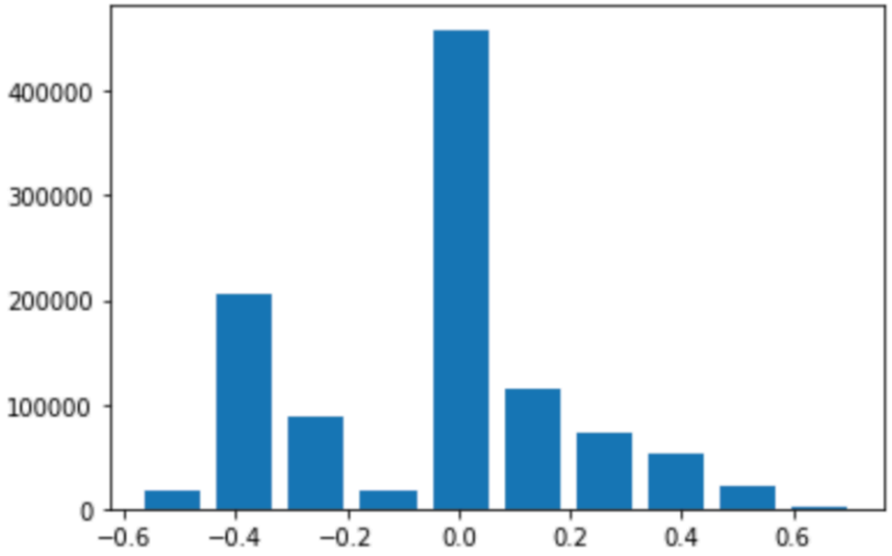




How?

/statistics

```
data = httpx.get(
    "https://titiler.xyz/cog/statistics",
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
        "expression": "(b4-b1)/(b4+b1)"
    }
).json()
```



How?

/point

```
data = httpx.get(
    "https://titiler.xyz/cog/point/-74.09510135650633,40.711015973018476",
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
    }
).json()
```


```
{
  "coordinates": [
    -74.09510135650633, 40.711015973018476
  ],
  "values": [
    18526,
    21300,
    18312,
    40987
  ]
}
```



```
{
  "coordinates": [
    -74.09510135650633, 40.711015973018476
  ],
  "values": [
    18526,
    21300,
    18312
  ]
}
```


```
bidx=[1,2,3]
```


```
{
  "coordinates": [
    -74.09510135650633, 40.711015973018476
  ],
  "values": [
    0.37741333826222845
  ]
}
```


```
expression=(b4-b1)/(b4+b1)
```

How?

/Preview

```
img = httpx.get(
    "https://titiler.xyz/cog/preview",
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
        "bidx": [1,2,3]
    }
)
```

bidx=[1,2,3]

bidx=[4,1,2]

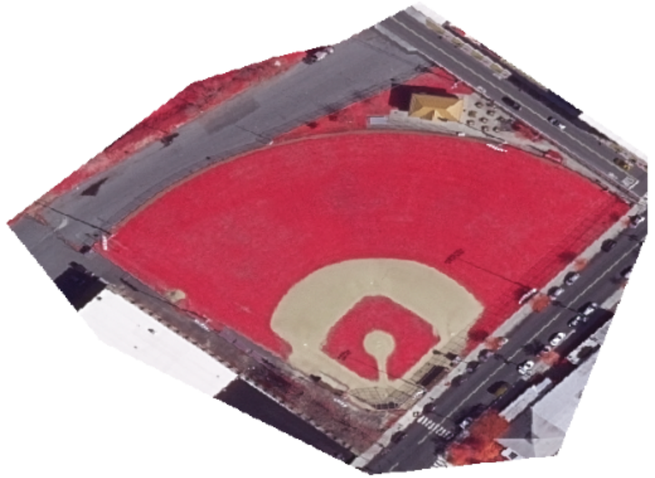
expression=(b4-b1)/(b4+b1)
rescale=0,1
colormap_name=viridis

How?

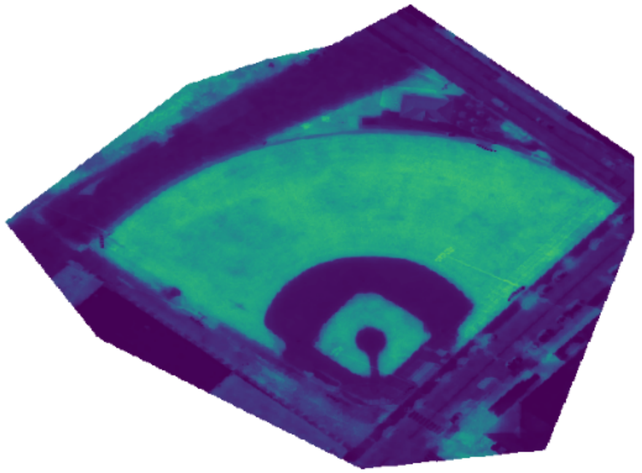
/crop

```
img = httpx.post(
    "https://titiler.xyz/cog/crop",
    data=json.dumps(feat),
    params={
        "url": "https://njogis-imagery.s3.us-west-2.amazonaws.com/2020/cog/K7A3.tif",
        "bidx": [1,2,3]
    }
)
```

bidx=[1,2,3]



bidx=[4,1,2]



expression=(b4-b1)/(b4+b1)
rescale=0,1
colormap_name=viridis

How?

Don't fork it, Import it!

titiler.application

/cog

/stac

/mosaicjson

Default

titiler-pgstac titiler-mvt

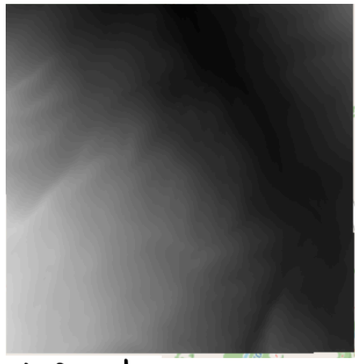
titiler-digitaltwin titiler-pds

rio-viz

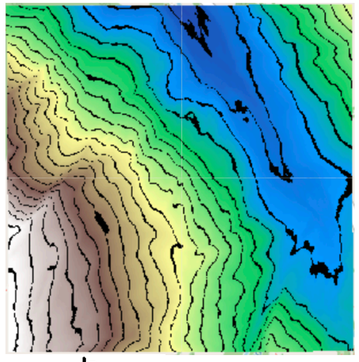
Custom

Next

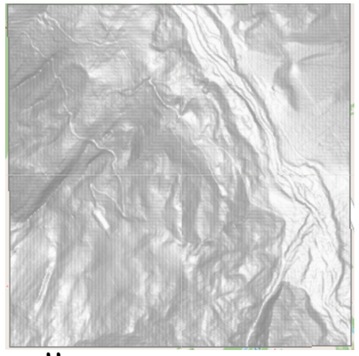
- rio-tiler V4 (Speed)
- enable complex post-process (e.g Shaded Relief)
- focus on user customization
- more documentation
- Zarr support
- Non Geo Data



default



contour



hillshade

TiTiler

Not Just a Tile Server

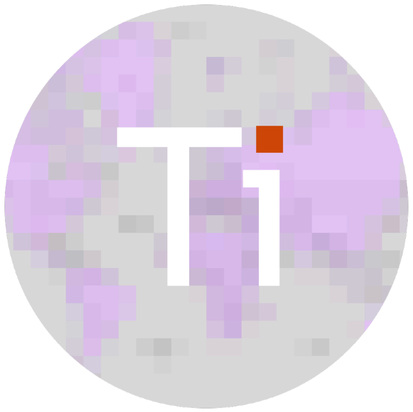
It's a Python module
It makes tiles from Cloud Optimized Dataset
You can customize/extend it
It's production ready (🙏 FastAPI)
It supports Mosaic and STAC
Preview / Crop / Points / Metadata
It's OPEN SOURCE

Ti...

python/FastAPI for everything!

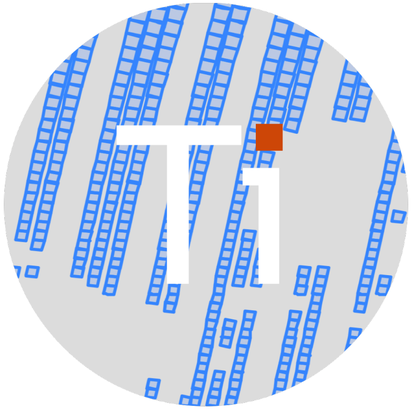
TiTiler
Raster Services

https://developmentseed.org/titiler/



TiMVT
Vector Tiles

https://developmentseed.org/timvt/



TiFeatures
OGC Features

https://developmentseed.org/tifeatures/

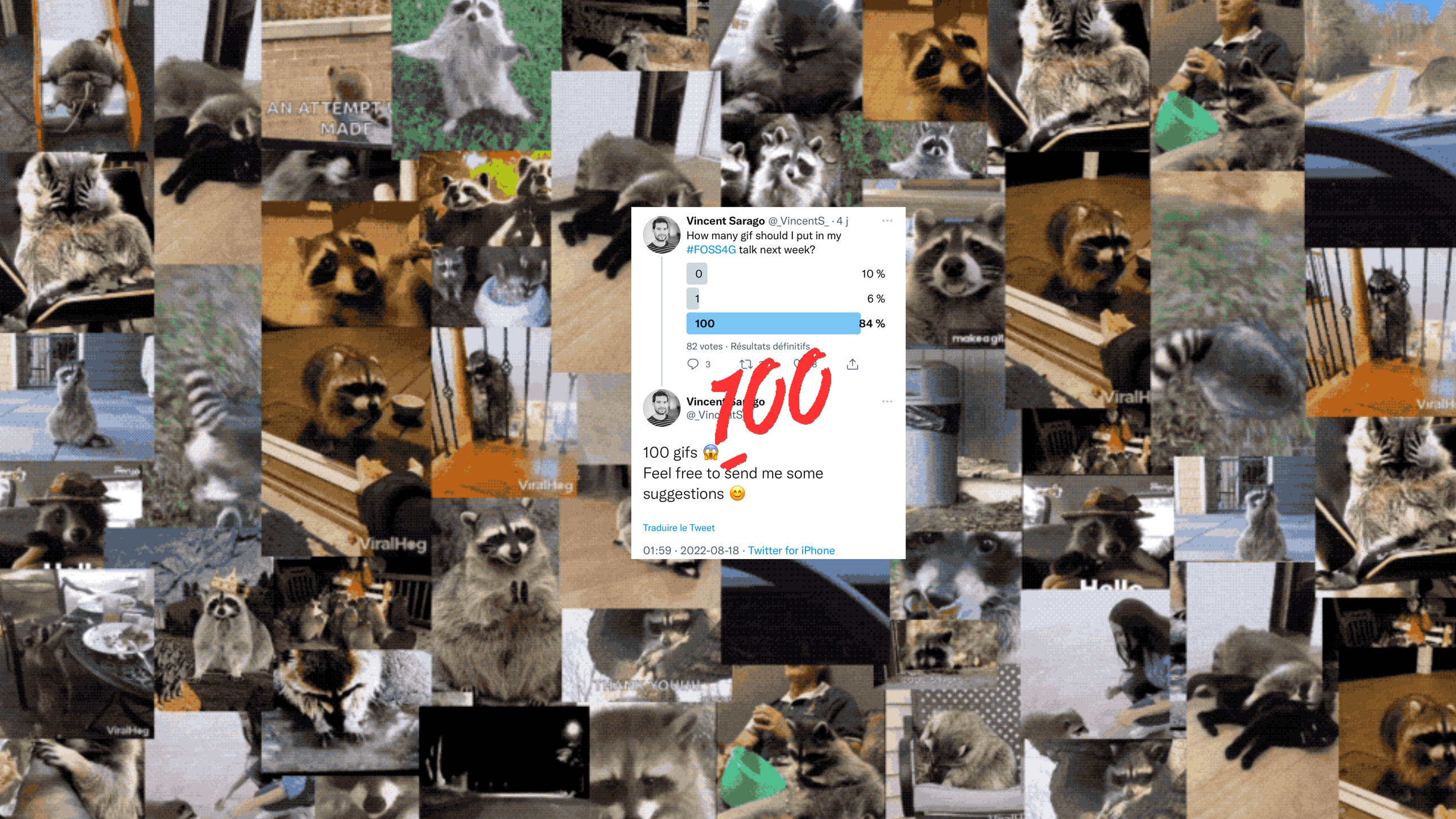
Ping Me!

@_VincentS_
@cogeotiff
@developmentseed

We have 🍪

Join the team & make a better planet.
https://developmentseed.org/careers

https://2022.satsummit.io/call-for-lightning-talks


Vincent Sarago @_VincentS_ · 4 j
How many gif should I put in my #FOSS4G talk next week?
0 10 %
1 6 %
100 84 %
82 votes · Résultats définitifs
3
100
100 gifs 😱
Feel free to send me some suggestions 😊
Traduire le Tweet
01:59 · 2022-08-18 · Twitter for iPhone