
Rasters are not Monsters
A Cloud Optimized GeoTIFF's story
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Introductions

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More Data

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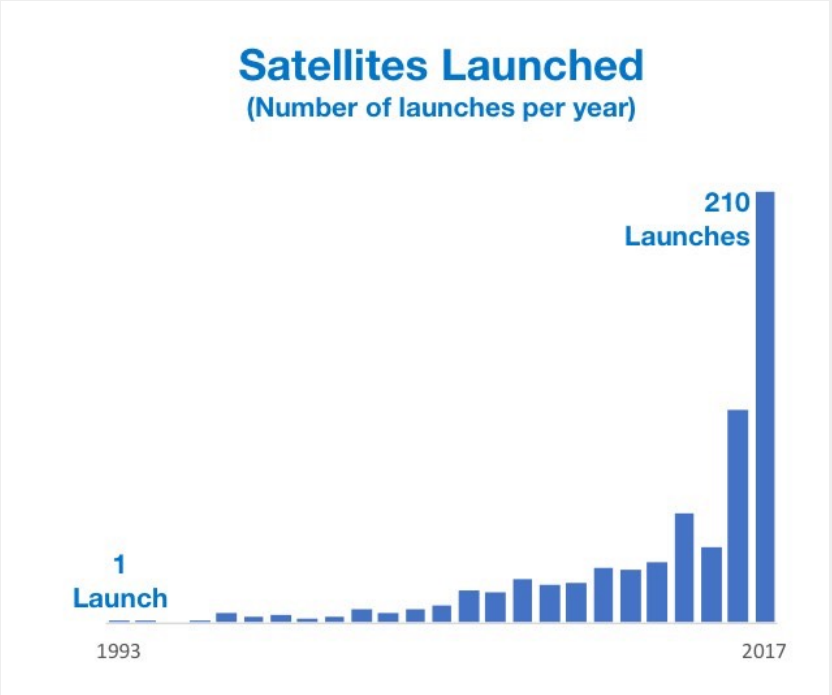
The Industry

- Earth Observation industry is growing
- Government are not the only one build and launching satellite



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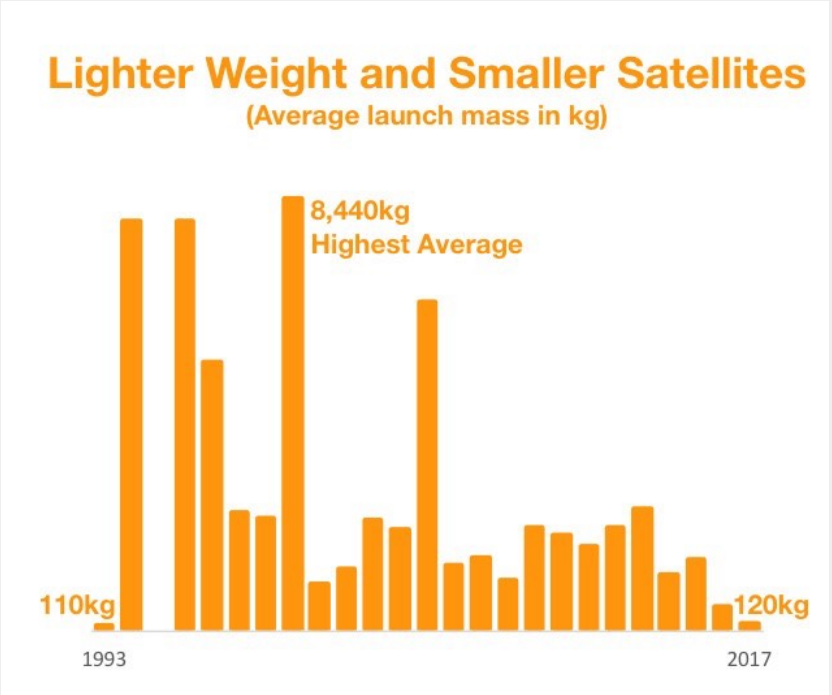
Lighter and Smaller

- Cheap to launch
- Faster iteration
- Increase temporal resolution



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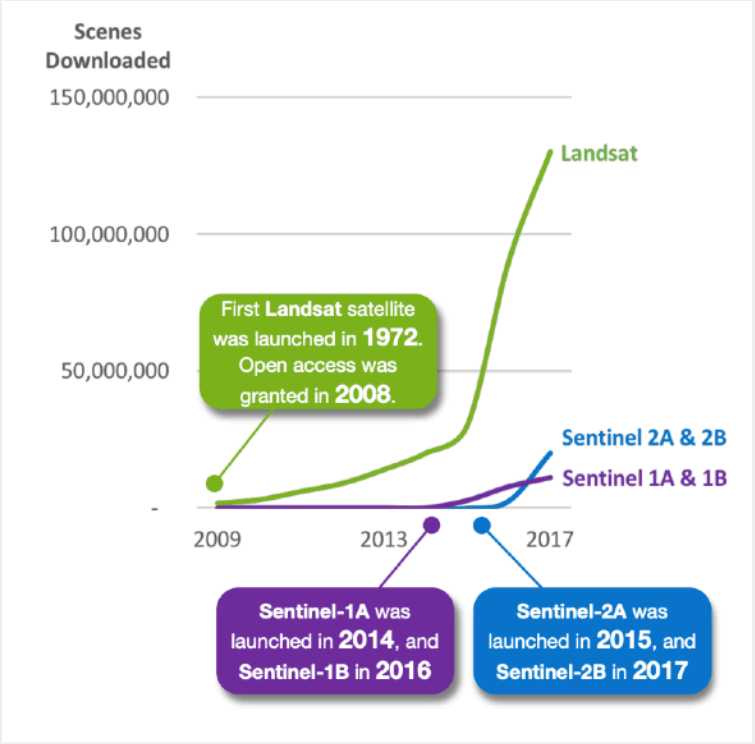
Data on the Cloud

- Cloud providers store the data for free



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https://registry.opendata.aws
https://developers.google.com/earth-engine/datasets/catalog/

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Cloud Optimized GeoTIFF - aka COG

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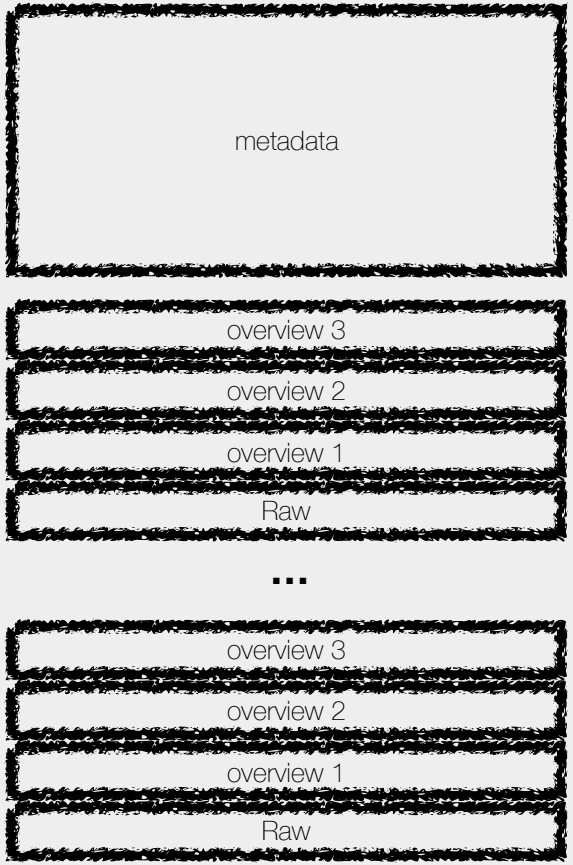
Definition

« A cloud optimized GeoTIFF is a regular GeoTIFF file, aimed at being hosted on a HTTP file server, **whose internal organization is friendly for consumption** by clients issuing HTTP GET range request ("bytes: start_offset-end_offset" HTTP header). »

https://github.com/cogeotiff/cog-spec/blob/master/spec.md



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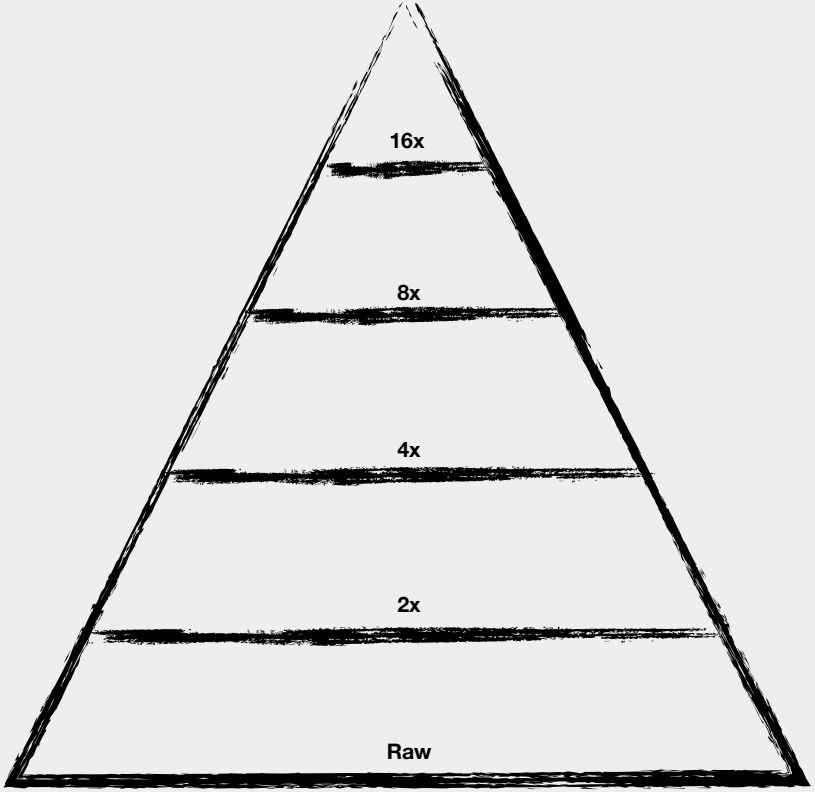
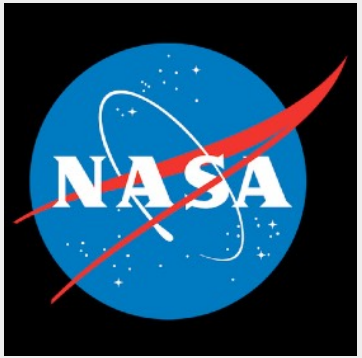
Features

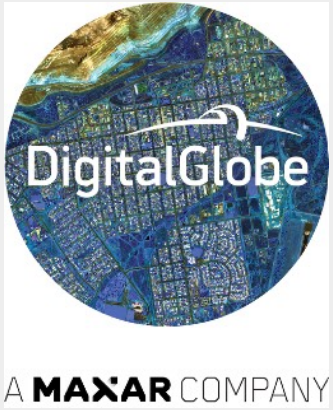
- Metadata header
- Internal tiling
- Internal overviews



Data

- Most of satellite providers now offer COG as default format





Usages

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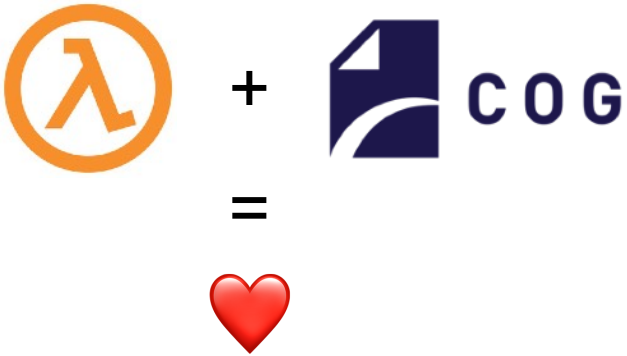
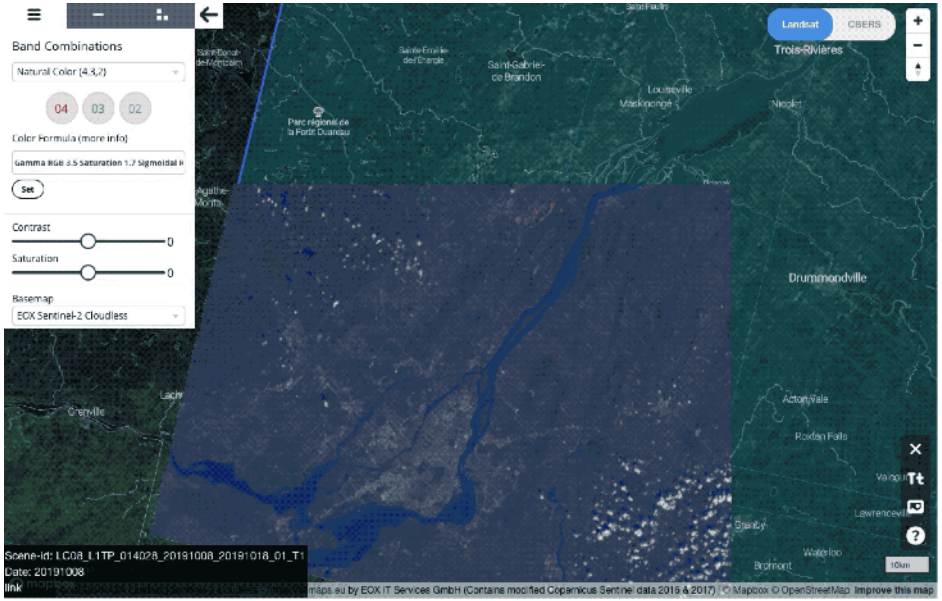
Storage and fast access

- Reduce data transfer (compression + Range Request)
- Fast preview (with overviews)

Dynamic Tiling

- Create Web Map tiles from COG
- Allow user interaction with RAW data
- Ease ML processing





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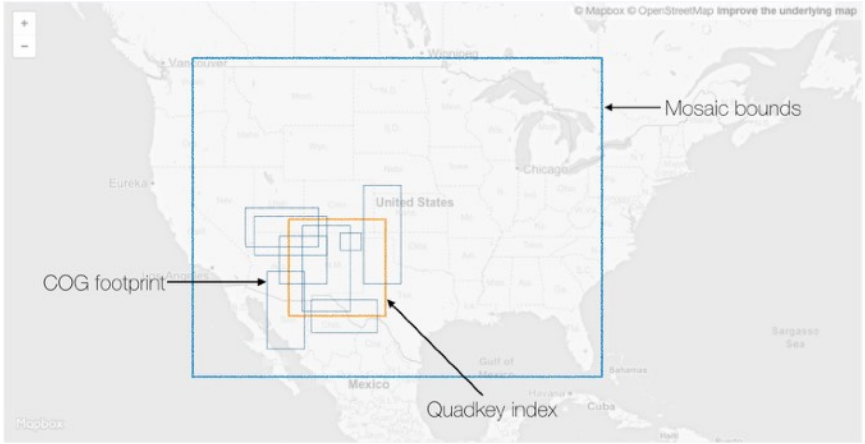
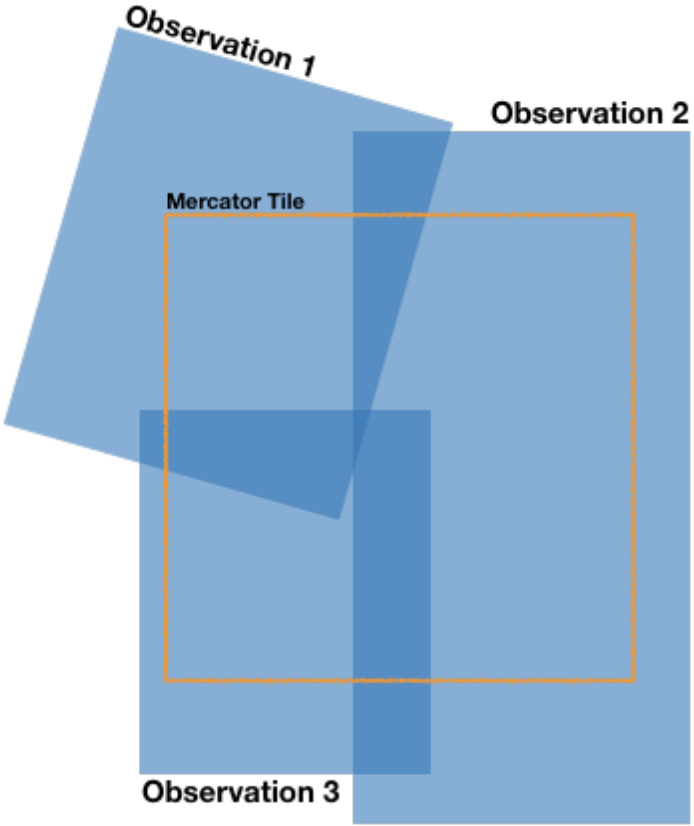
Mosaic

- mosaicJSON specification
- Spatial and temporal representation of a set of COG





https://github.com/developmentseed/mosaicjson-spec

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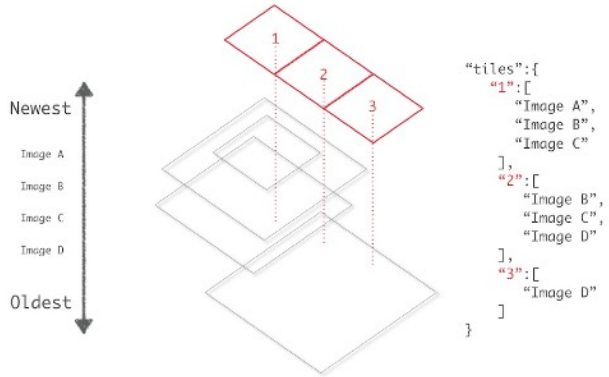
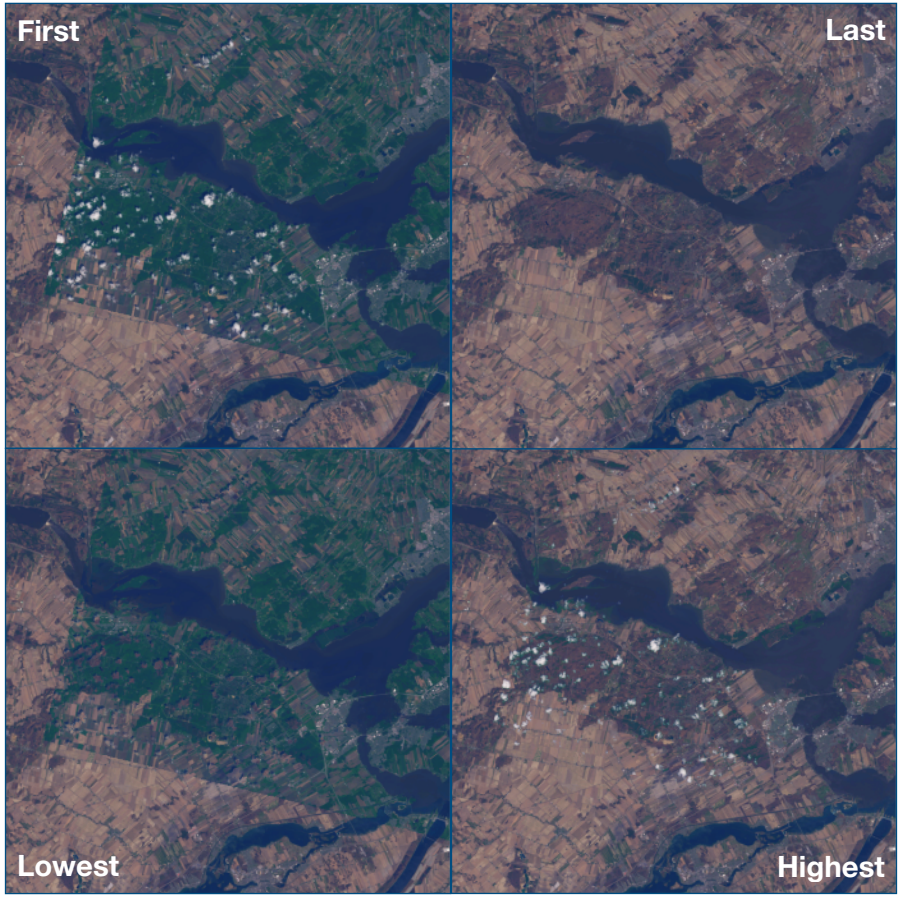
Mosaic

- Pixel selection on the fly
- Made for dynamic tiling





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Tools

Create and Validate

*$ pip instal **rio-cogeo***

$ rio cogeo create my_file.tif my_cog.tif

$ rio cogeo validate my_cog.tif

https://github.com/cogeotiff/rio-cogeo

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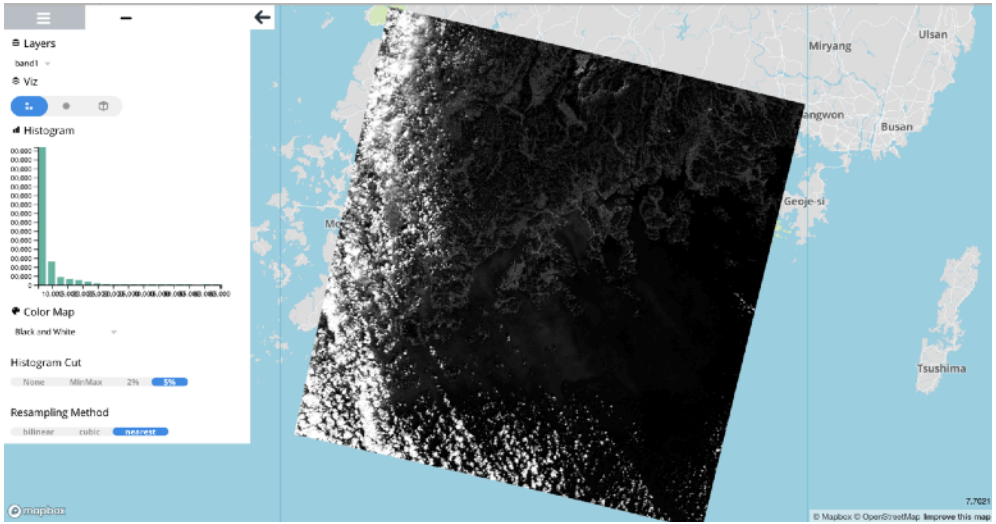
Visualize

- QGIS support COG creation/reading
- **rio-viz** python (rasterio) module



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

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Read

*$ pip instal **rio-tiler***

```
from rio_tiler import main

tile, mask = main.tile(
  'http://oin-hotosm.s3.amazonaws.com/5a95f32c2553e6000ce5ad2e/0/10edab38-1bdd-4c06-b83d-6e10ac532b7d.tif',
  691559,
  956905,
  21,
  tilesize=256
)
print(tile.shape)
> (3, 256, 256)

print(mask.shape)
> (256, 256)
```

https://github.com/cogeotiff/rio-tiler

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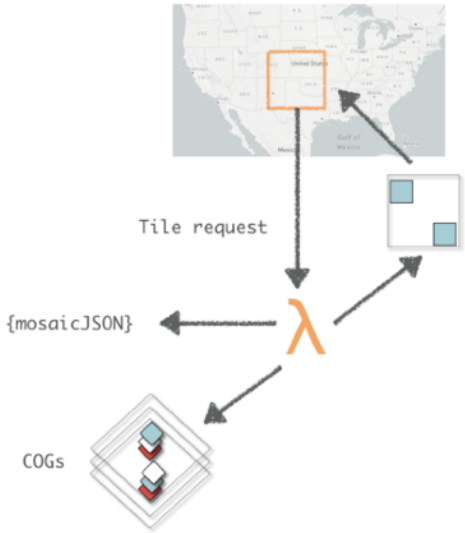
Mosaic

$ pip instal git+http://github.com/developmentseed/cogeo-mosaic

$ cat list_cog.txt | cogeo-mosaic create - -o mos.json



https://github.com/developmentseed/cogeo-mosaic

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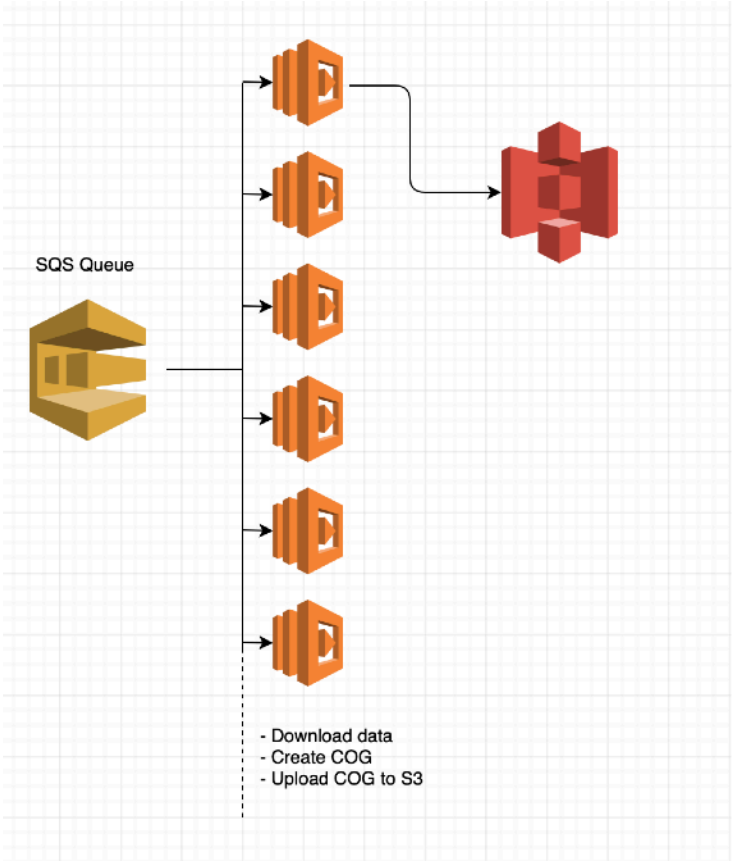
At Scale

- Serverless stack to create COG

https://github.com/developmentseed/cogeo-watchbot
https://github.com/developmentseed/cogeo-watchbot-light

- Serverless stack to create tiles

https://github.com/vincentsarago/lambda-tiler



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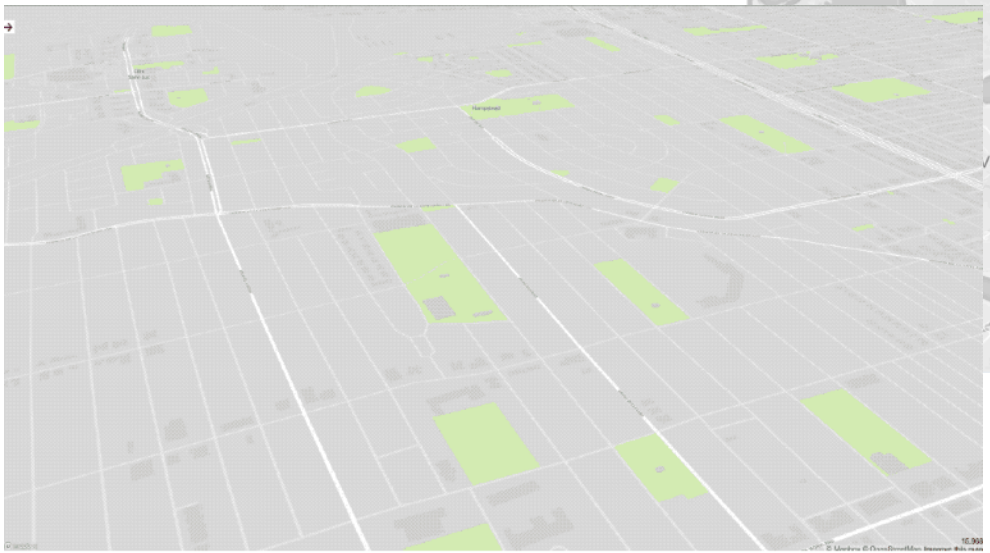
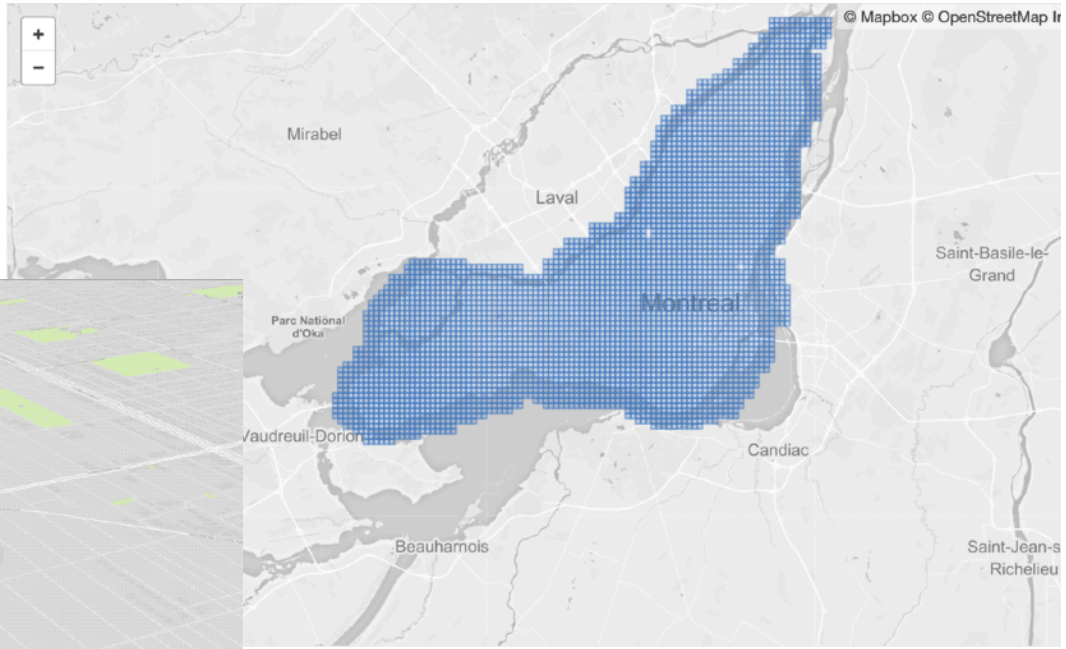
Demo





https://github.com/developmentseed/pointcloud-to-cog
https://bl.ocks.org/vincentsarago/517590c8e738afa98758db2957cee44b

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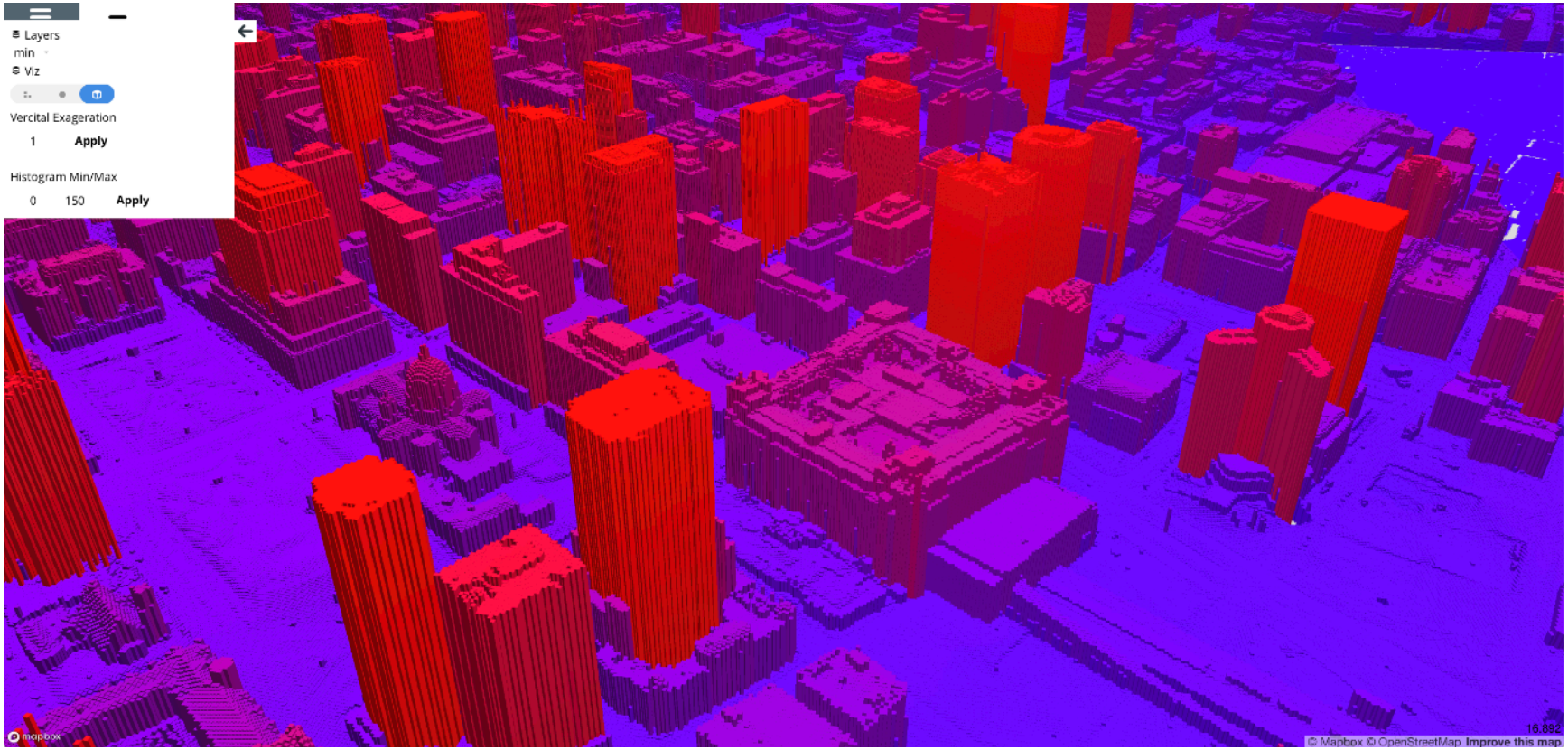

https://github.com/developmentseed/pointcloud-to-cog
https://bl.ocks.org/vincentsarago/517590c8e738afa98758db2957cee44b

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ABoVe: 31 Bands = 31 Years

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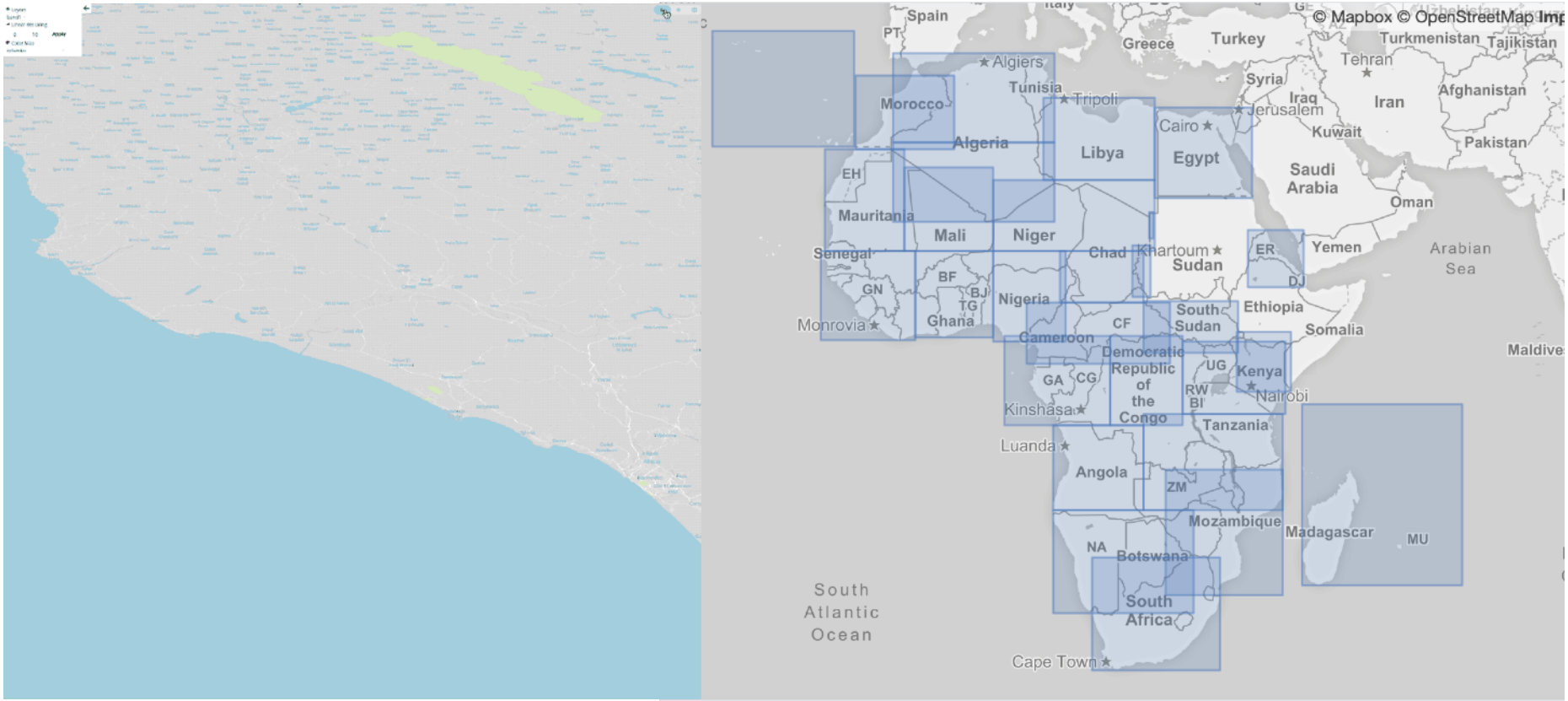

Facebook population dataset

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https://www.cogeo.org

http://github.com/cogeotiff

http://bit.ly/cogtalk