



3D in geOrchestra MapStore features and data processing

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GeoSolutions



17th - 19th of June 2024 - geOcom



- **3D** functionalities in **MapStore geOrchestra**
- **3D data processing** toolbox, hints and overview of ongoing works

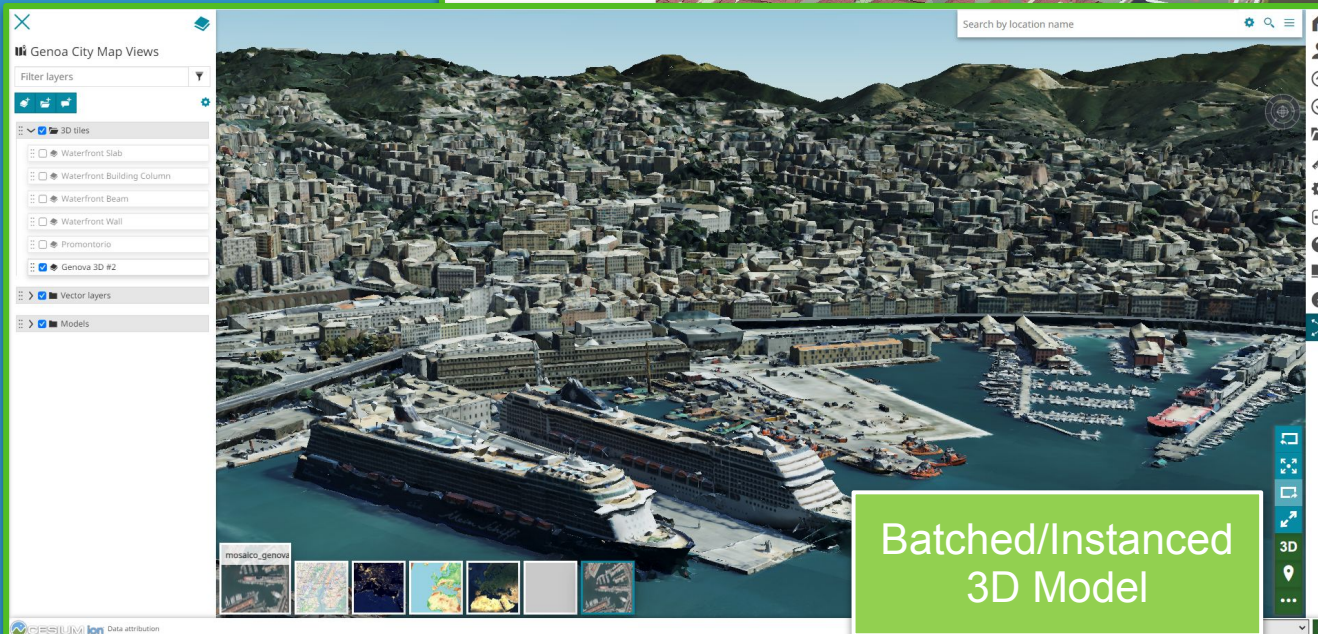
3D functionalities in MapStore geOrchestra

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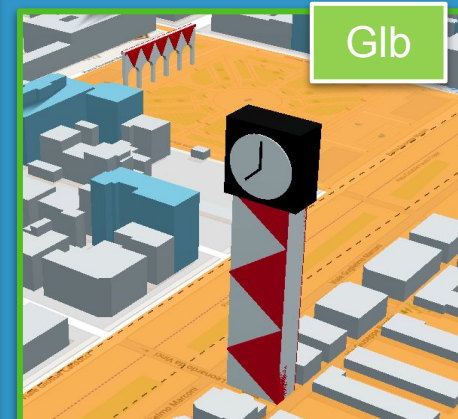
- Support to **3D Tiles** layers and **3D glTF/Glb Models** as a style symbolizers

Point Cloud

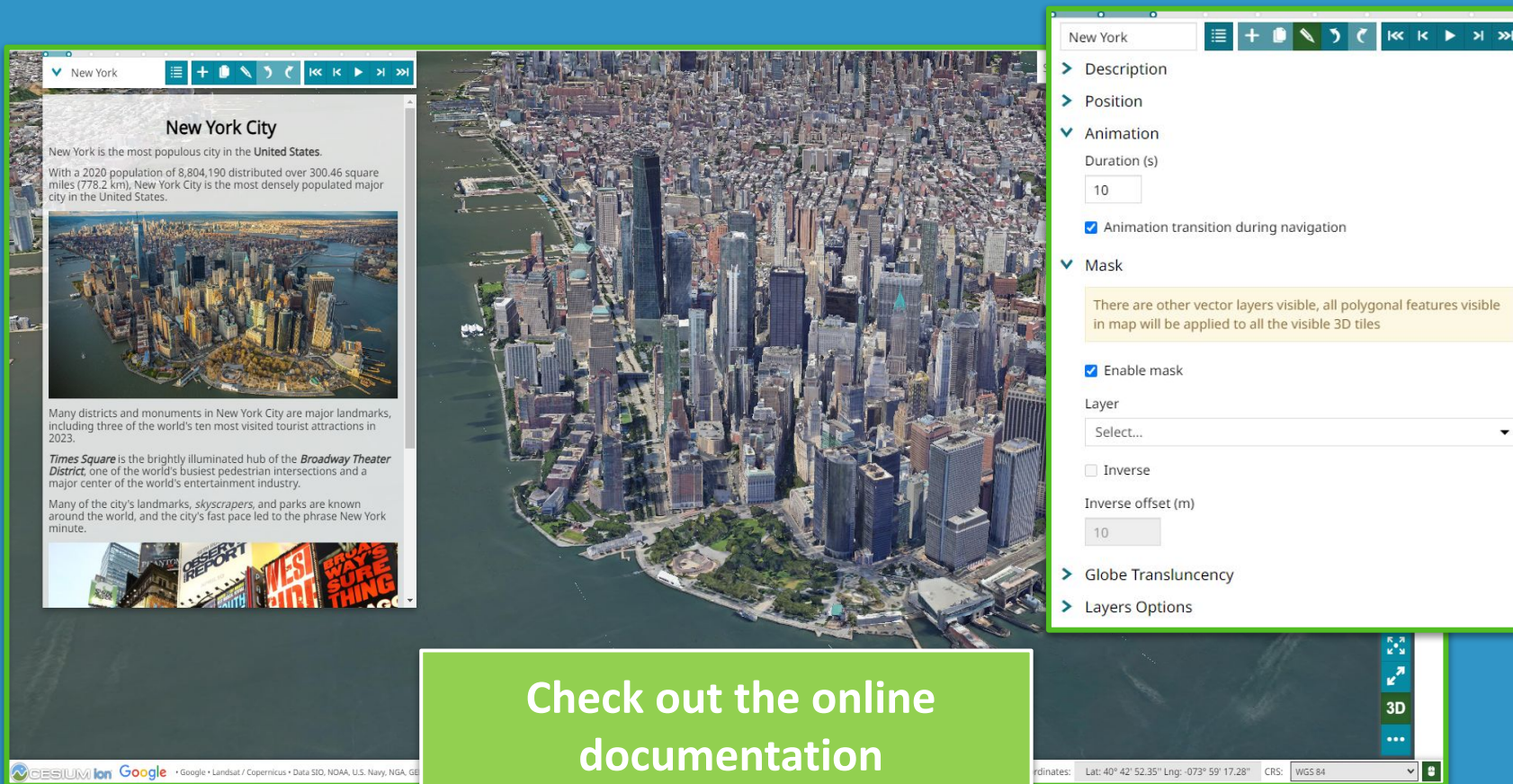


Batched/Instanced
3D Model

Glb

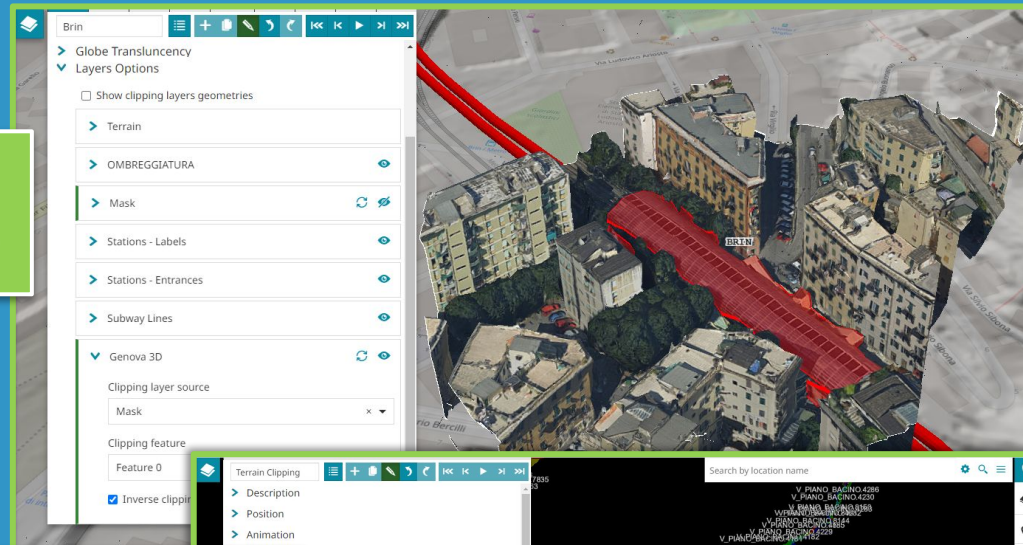


- Create your **immersive experience** within the **MapStore Viewer** using the new powerful **Views Tool**!

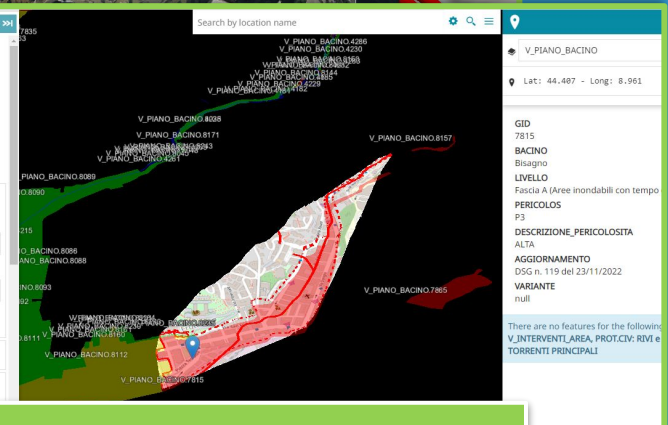


- Specific **advanced options** are available for the **3D mode**

Clip and Mask of 3D Tiles
(using WFS or Vector features)

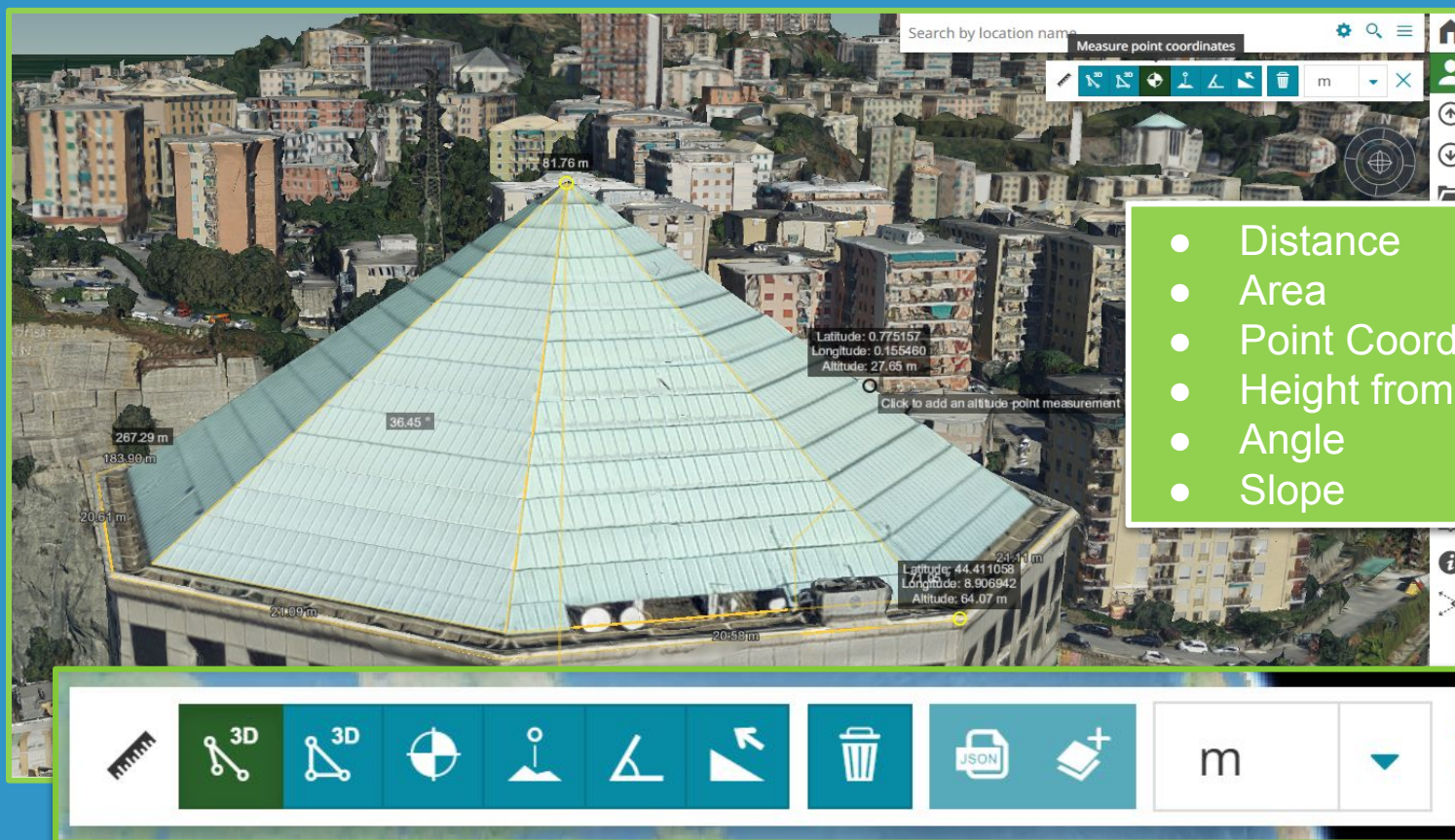


Clipping of Terrain Layers



Globe Translucency

- The **Measurement** tool is supported also in **3D mode** providing specific **measurement types**



- Distance
- Area
- Point Coordinates
- Height from terrain
- Angle
- Slope

The **new design** provides a Measurement tool more compact and flexible by improving also the **UX**!


- **Styling properties** specific for 3D mode with the inclusion of dedicated symbolizers!


3D Models as a new Point Symbolizer


Point

Code editor

Enter legend label

Shape 

Fill color 

Stroke color 

Stroke width 2 px


Radius 12 px

Rotation 0 °

Bring to front ☒ True ☐ False

Height reference from ground ☐ None ☒ Relative ☐ Clamp

Height Point height


Leader line color 

Leader line width 0 px


Line

Code editor

Enter legend label

Stroke color 

Stroke width 4 px

Line style 

Line cap ☐ Butt ☒ Round ☐ Square


Line join ☐ Bevel ☒ Round ☐ Miter


Clamp to ground ☒ True ☐ False

Polygon

Code editor

Enter legend label

Fill color 

Outline color 

Outline width 0 px

Clamp to ground ☒ True ☐ False

Clamp to ground reference ☐ 3D Tiles ☐ Terrain ☒ Both



3D Symbolizer based on **glTF** model support (raw **GLB** is also supported)

- **Terrain layers** supported with a dedicated layer type to configure different terrain providers for the 3D viewer

Supported providers: cesium, wms

Terrain layer served with static quantized-mesh also supported

```
{
  "type": "terrain",
  "provider": "wms",
  "url": "http://hot-sample/geoserver/wms",
  "name": "workspace:layername",
  "littleEndian": false,
  "visibility": true,
  "version": "1.3.0",
  "fixedHeight": null, // Map height. Max
  "fixedWidth": null, // Map width. Max va
  "crs": "CRS:84" // Supports only CRS:84
}
```

Now you can configure the preferred Terrain provider for each 3D map!

Look at

<https://docs.mapstore.geosolutionsgroup.com/en/v2024.01.01/developer-guide/maps-configuration/#terrain>

- Layers settings for 3D

LIDAR 2017 #3

Visibility limits ☒

Max value (excluded)
1 : 9028 x

Min value (included)
Select min value

Limits type
Scale

Format
Point Cloud

Height offset (m)
2 m

Visualization options

☒ Enable attenuation ?

Maximum attenuation
4 px

☒ Enable lighting ?

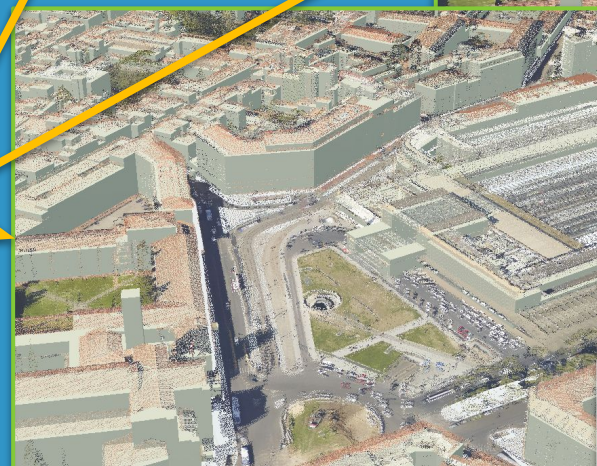
Lighting strength
2

Lighting radius
1

Attenuation and
Lighting

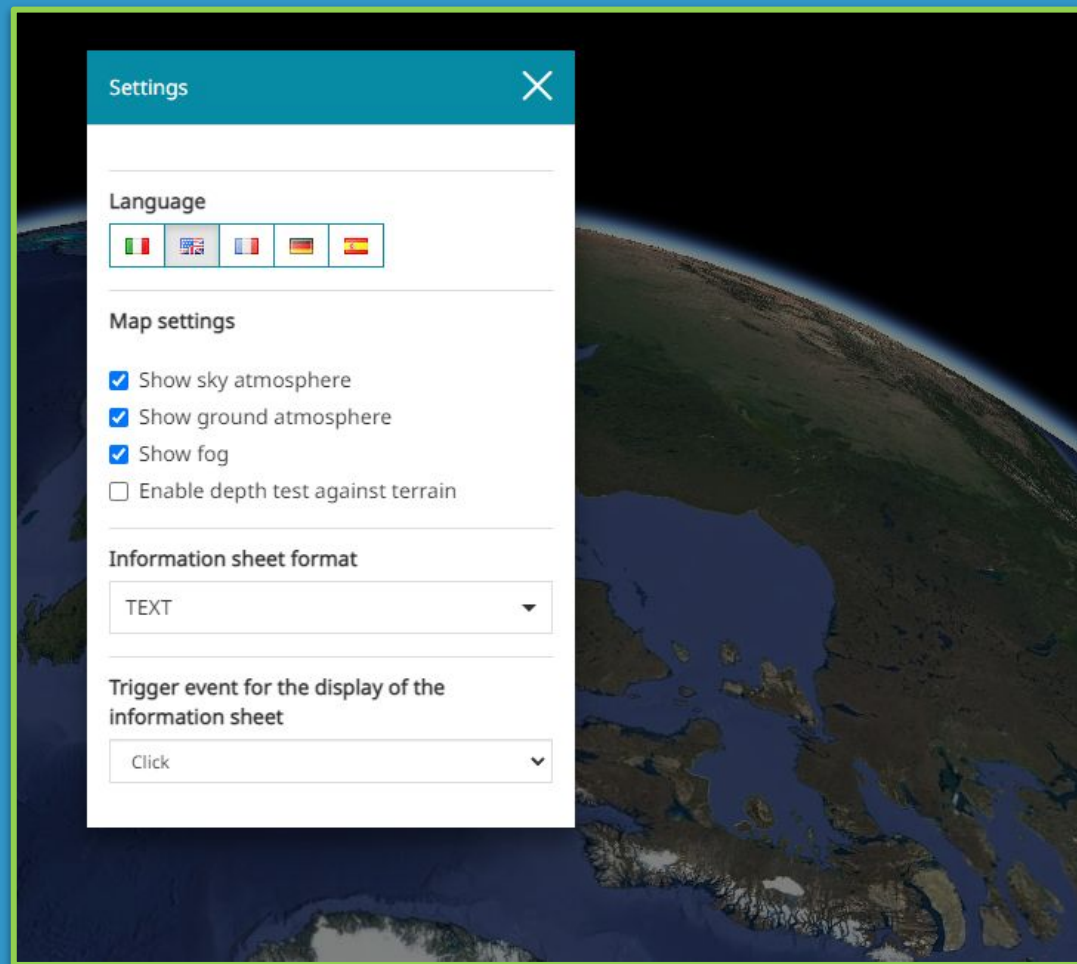


No Lighting

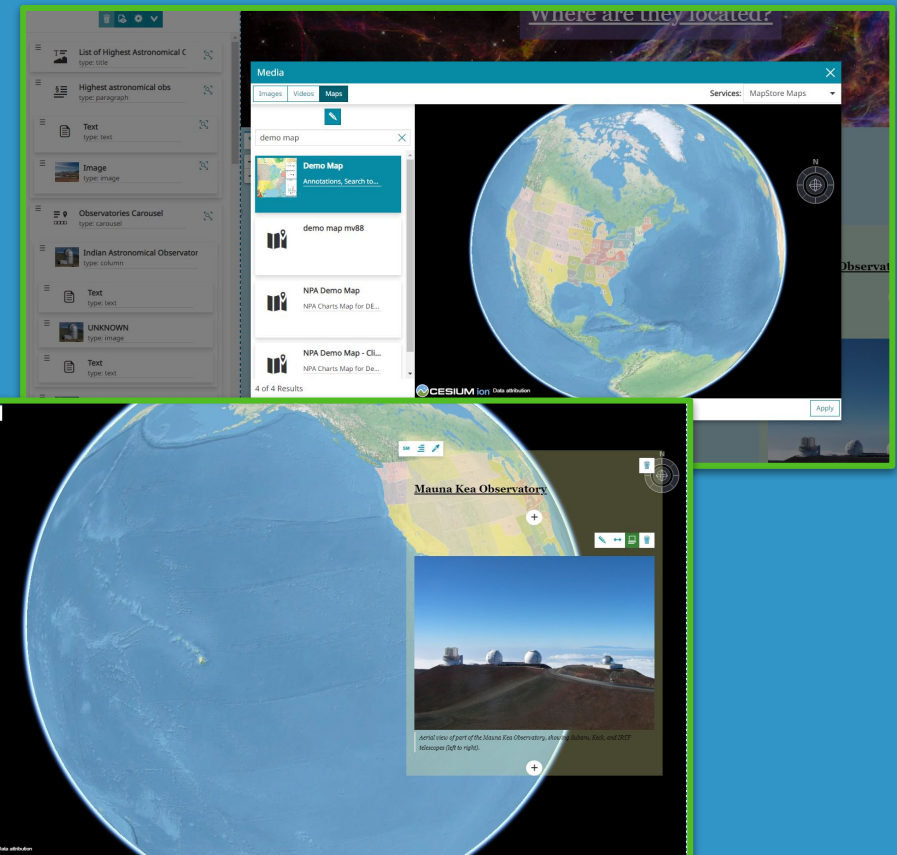
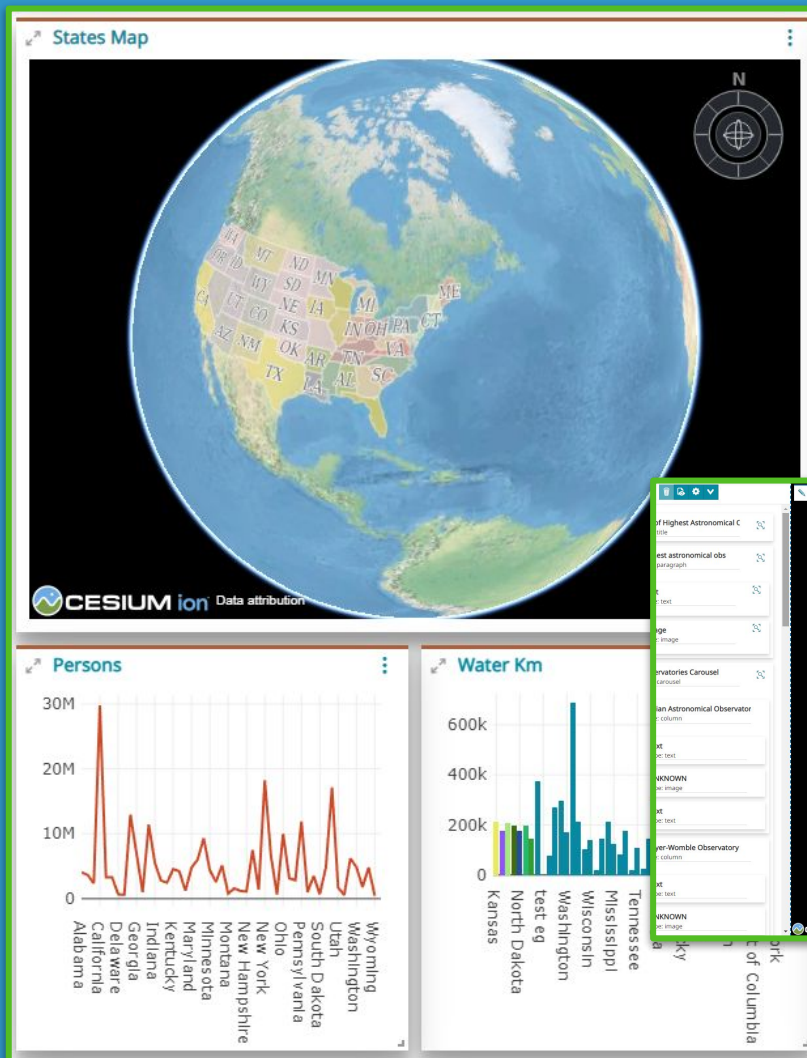


No Attenuation
and Lighting

- Specific **3D Map Options** related to the globe in Map Settings: enable atmosphere, enable fog and enable depth test



- Support of 3D maps also in **Dashboards** and **GeoStories**!



Digital Twin Toolbox, overview of ongoing works

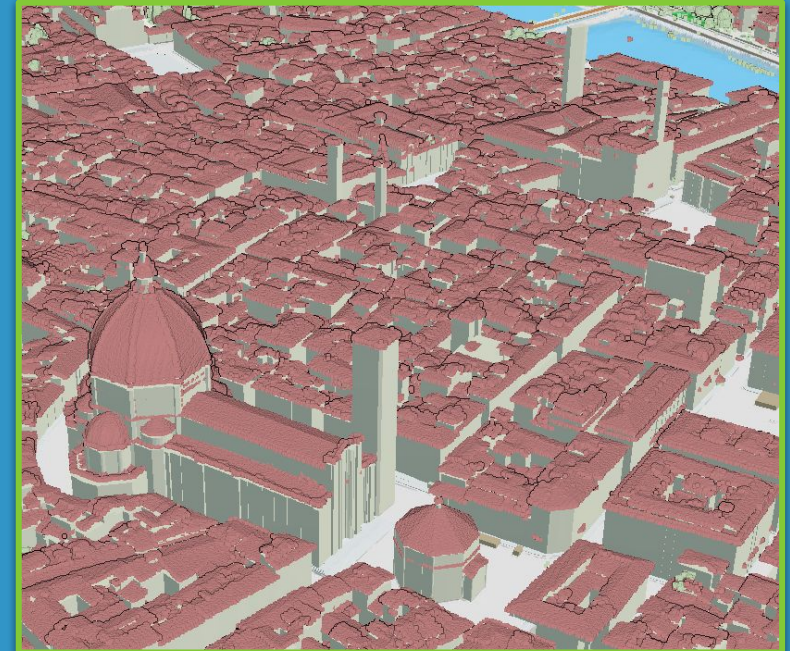
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Consuming **3D data** in WebGIS applications has increasingly become a requirement over the last years.

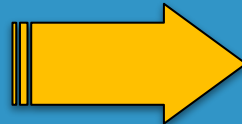
3D Tiles became one of the most common **OGC standards** for streaming and rendering 3D geospatial contents on the web such as:

- **Photogrammetry**
like LiDAR-derived meshes
- **3D Buildings**
(.obj, .gltf, .glb ...)
- **Point Clouds**
- and more ...



In response to **ever-growing and more specific needs** in this context, it is usually necessary to:

- Identify the **best tools** for **viewing 3D data** in 3D Tiles format, like using **MapStore**
- Identify tools for **converting datasets** into **3D Tiles format** in a correct and performing way



3DTiles™

but... what about doing that using
Open Source tools?



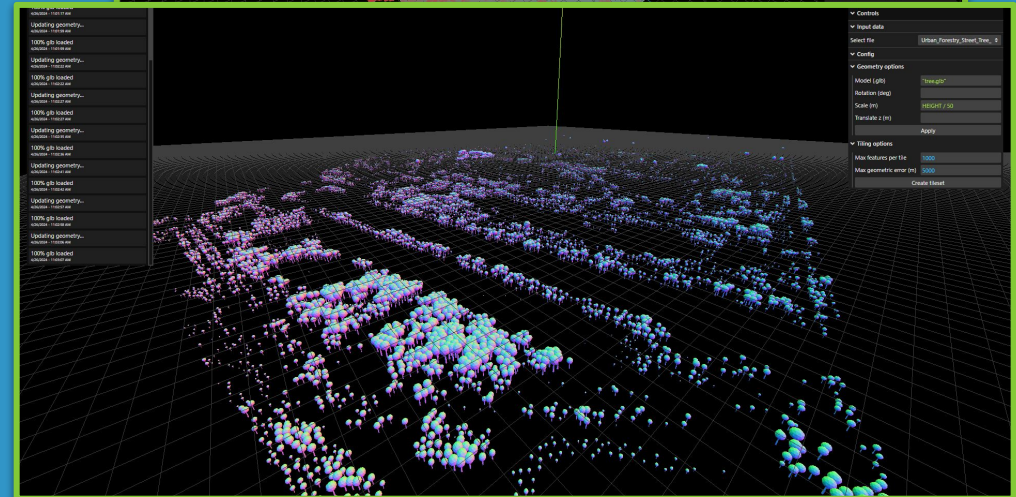
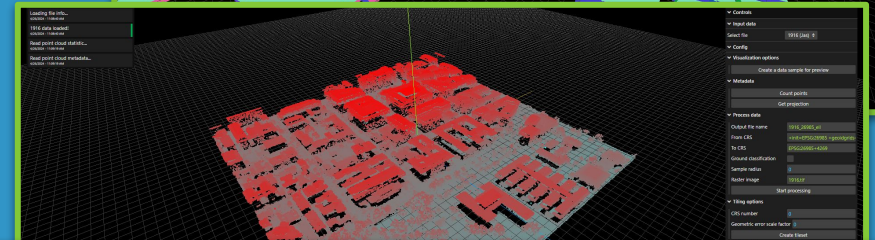
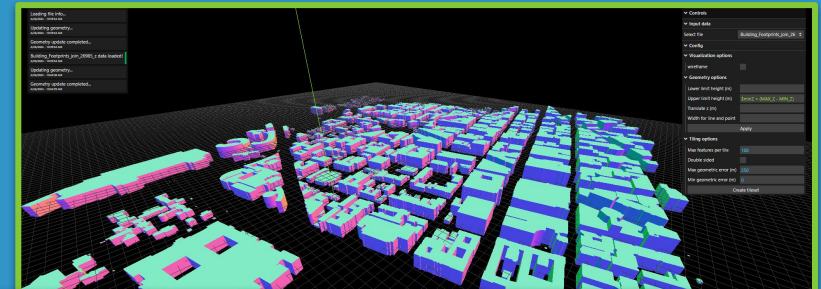
open source

The Digital Twin Toolbox is the
GeoSolutions' answer



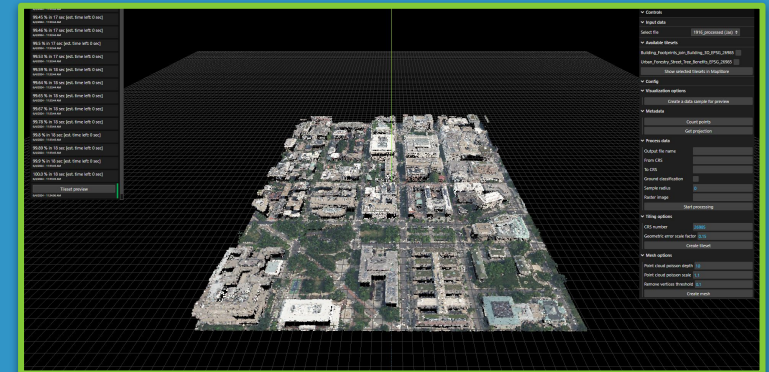
The **Digital Twin Toolbox** borns with the aim to support with the conversion processes to 3D Tiles:

- Pipelines for **SHP** and **LAS** files
- Necessary tools for **inspecting** and **assessing** datasets
- Management of **classification**, **colorization**, **resampling** ...
- Reliable tools for **tiling**, **CRS** and **georeferencing** tuning
- and many more...



Main objectives are:

- Collect the best OS tools and libraries to process common data sources in the urban environment (SHP and LAS files for now)
- Provide workflows to orchestrate a well-driven set of processing chains and methodologies to
 - Inspect and evaluate data
 - Prepare/process data
 - Convert input data in 3D Tiles
 - Preview data step by step
- Provide an user friendly UI to facilitate the work

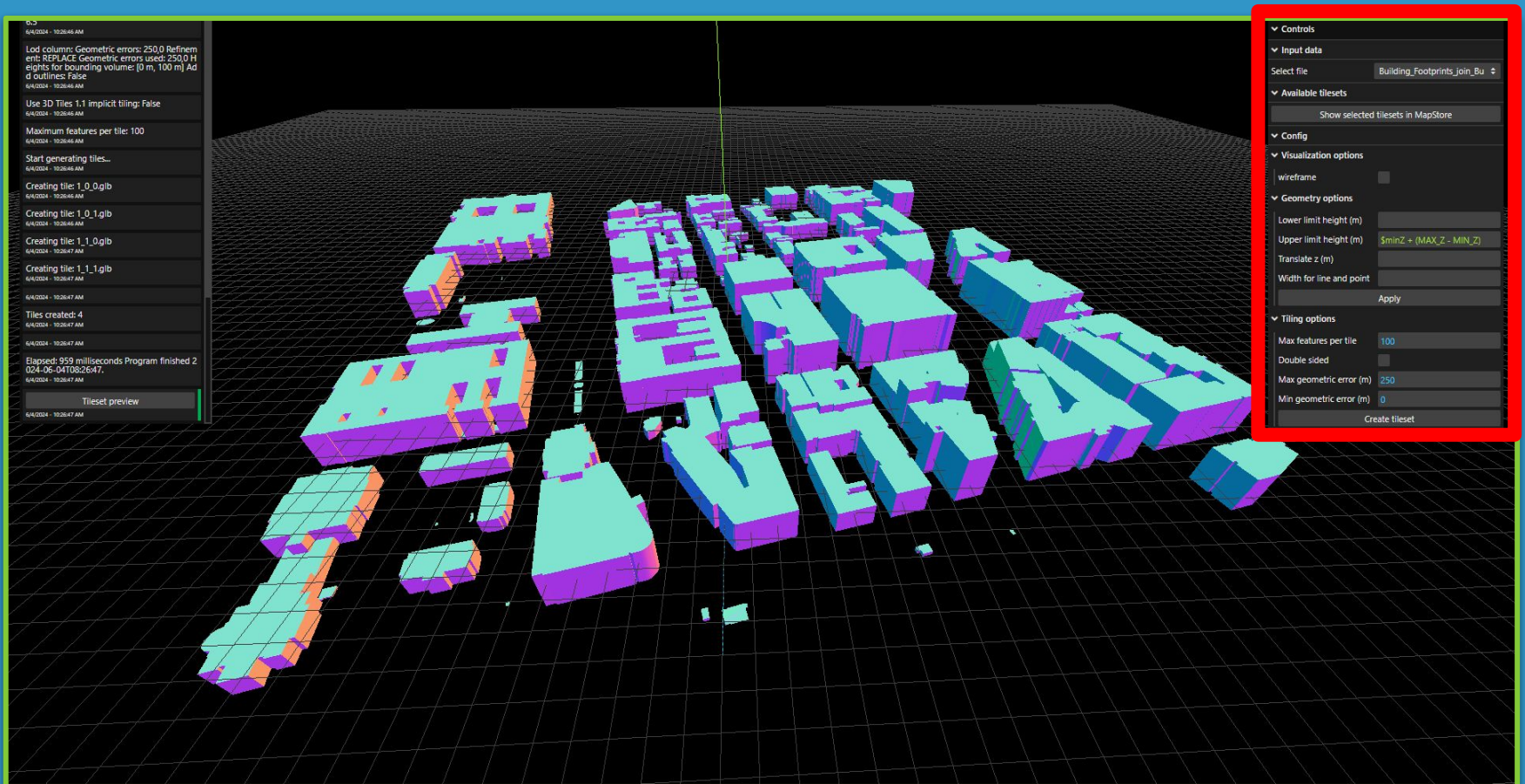


All in a Dockerized environment!



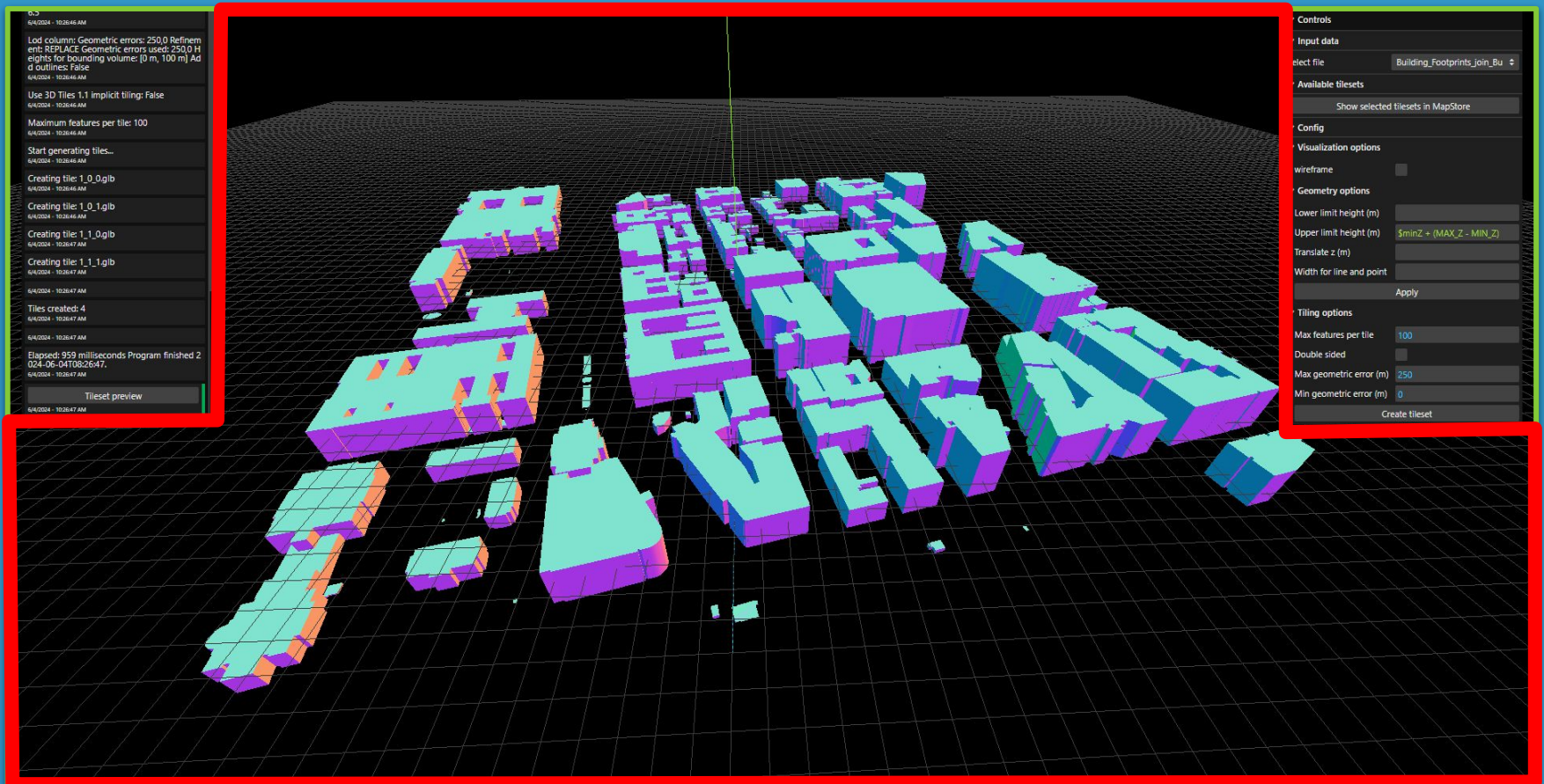
Controls:

- Located on the top right corner of the screen
- Change list of properties and action buttons based on the selected input file



Data preview:

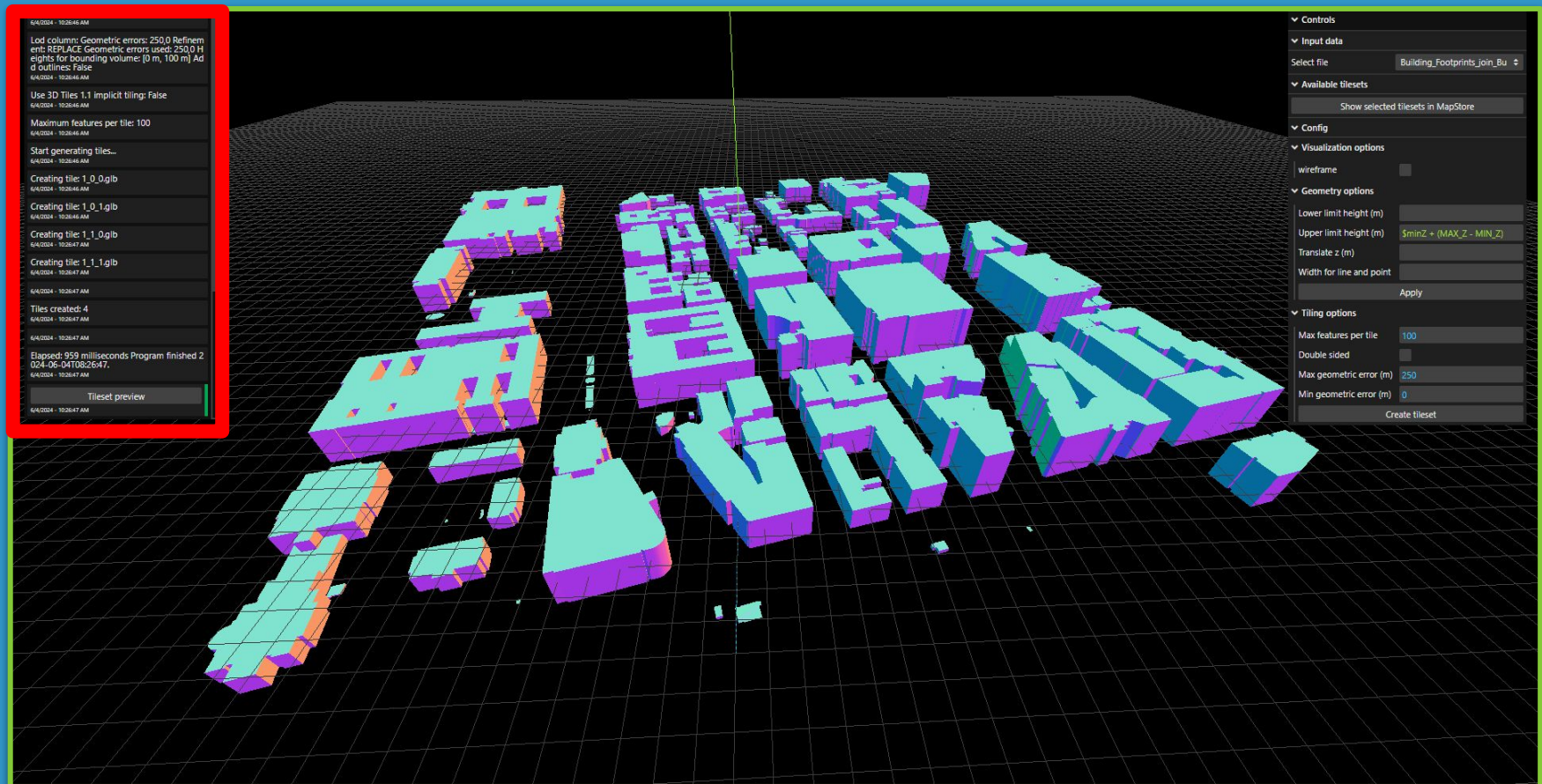
- Covers all the screen background
- Preview sample data in 3D
- Live update of geometries for Shapefiles



Digital Twin Toolbox - User Interface

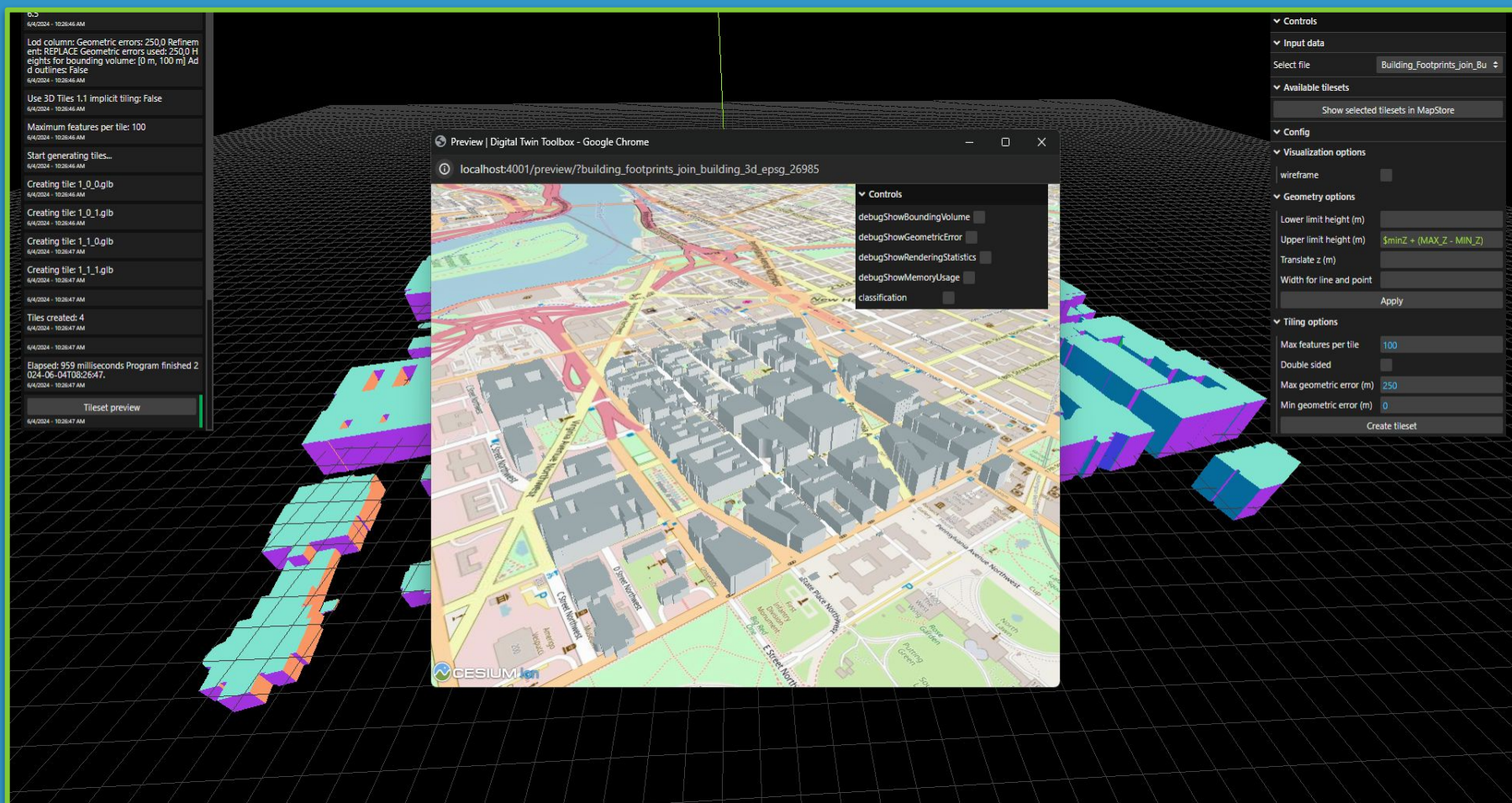
Process feedback:

- Located on the top left corner of the screen
- Shows logs for all the actions and processes initialized with the controls panel



Digital Twin Toolbox - User Interface

Tileset preview of generated 3D Tiles in Cesium.js available!



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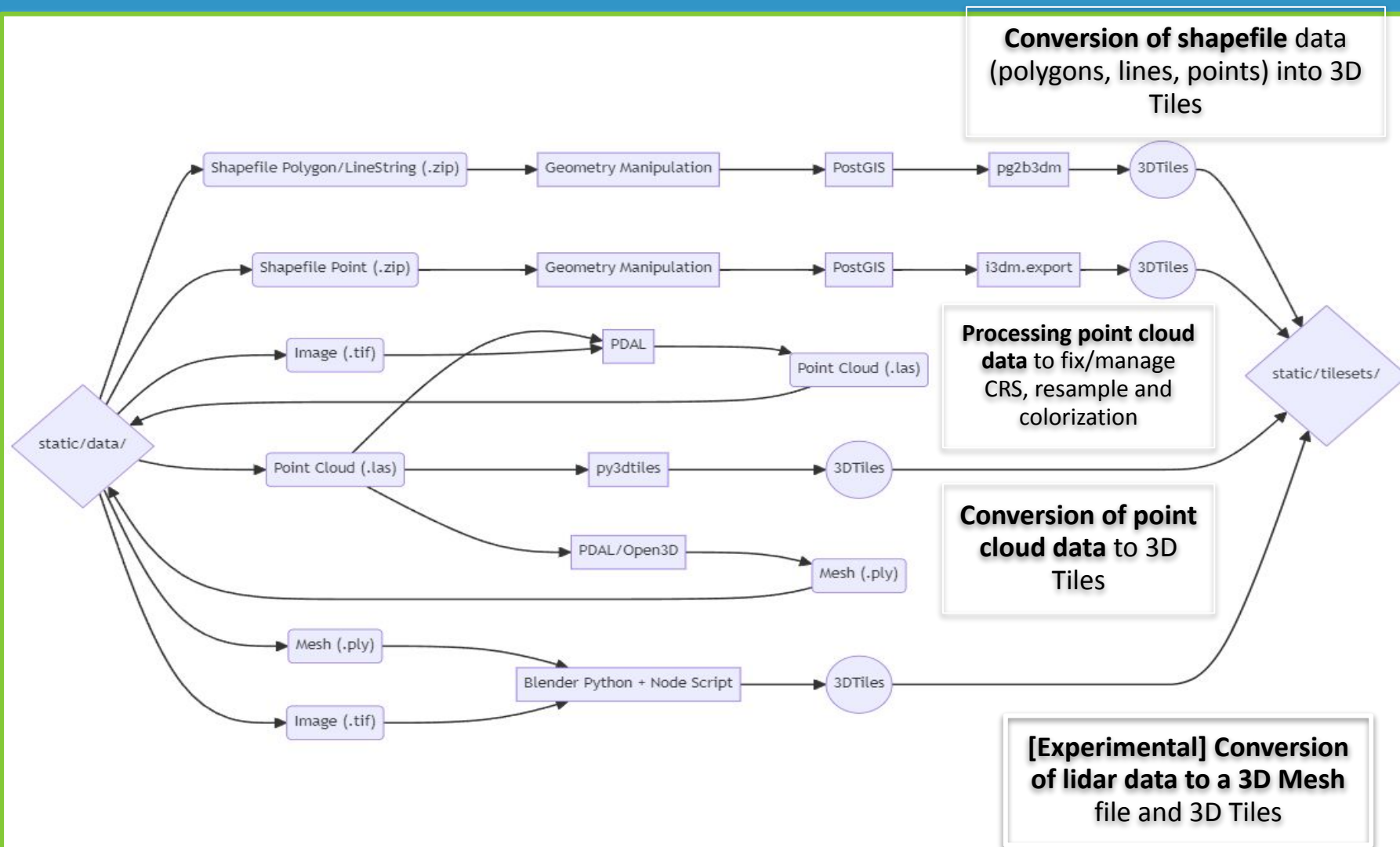
Final preview of generated 3D Tiles also available on a [embedded MapStore!](#)



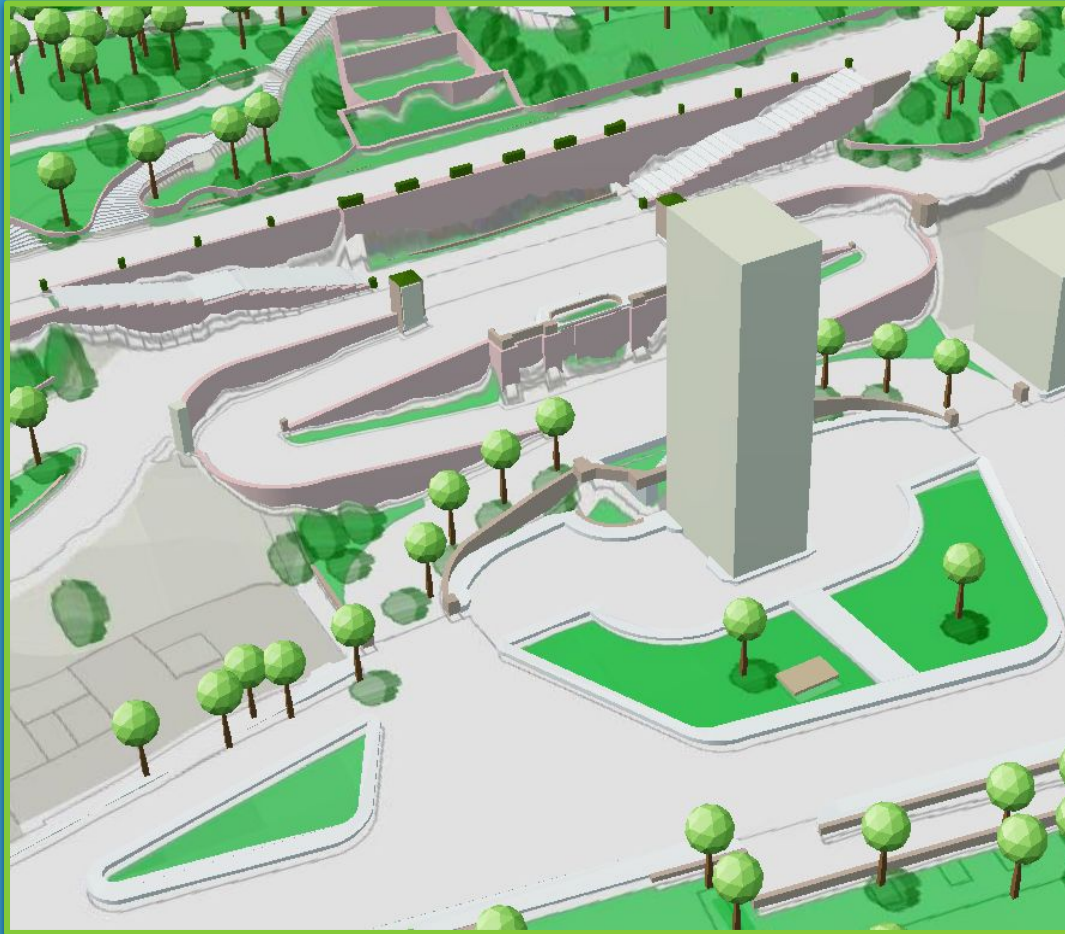
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Digital Twin Toolbox - Workflows

Available workflows and involved tools



Some examples of **3D Tiles** from the Municipality of Florence



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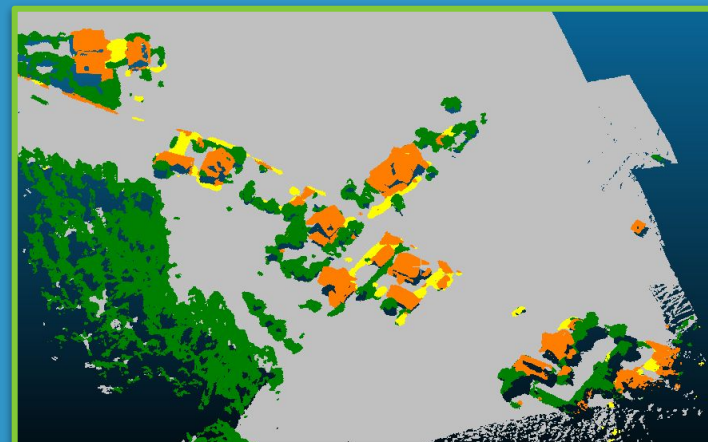
Digital Twin Toolbox - Future works

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We have in plan to work on a bunch of **significant functionalities** to enrich the toolbox capabilities:

1. Further improvement of **classification capabilities** of point cloud data (including UI support)
1. More advanced and complete support for **photogrammetry processes**
1. **Automation** of the processing chains
1. Support to include **LODs** and further improve the **Tiling System**



That's all for a **first release** of the
Digital Twin Toolbox this year!





Check it out on Github:

<https://github.com/geosolutions-it/digital-twin-toolbox>

Pre-Release at:

<https://github.com/geosolutions-it/digital-twin-toolbox/releases/tag/v1.0.0-rc>

Online Documentation:

<https://github.com/geosolutions-it/digital-twin-toolbox/wiki>

Tutorials are also available in the WIKI:

<https://github.com/geosolutions-it/digital-twin-toolbox/wiki/Tutorials>

Check out the webinar on Youtube:

https://youtu.be/owQW-AUjk0U?si=yc1j_KTiJHsXwUCL



Questions?

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