



3D in geOrchestra MapStore features and data processing

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GeoSolutions



17th - 19th of June 2024 - geOcom



Agenda



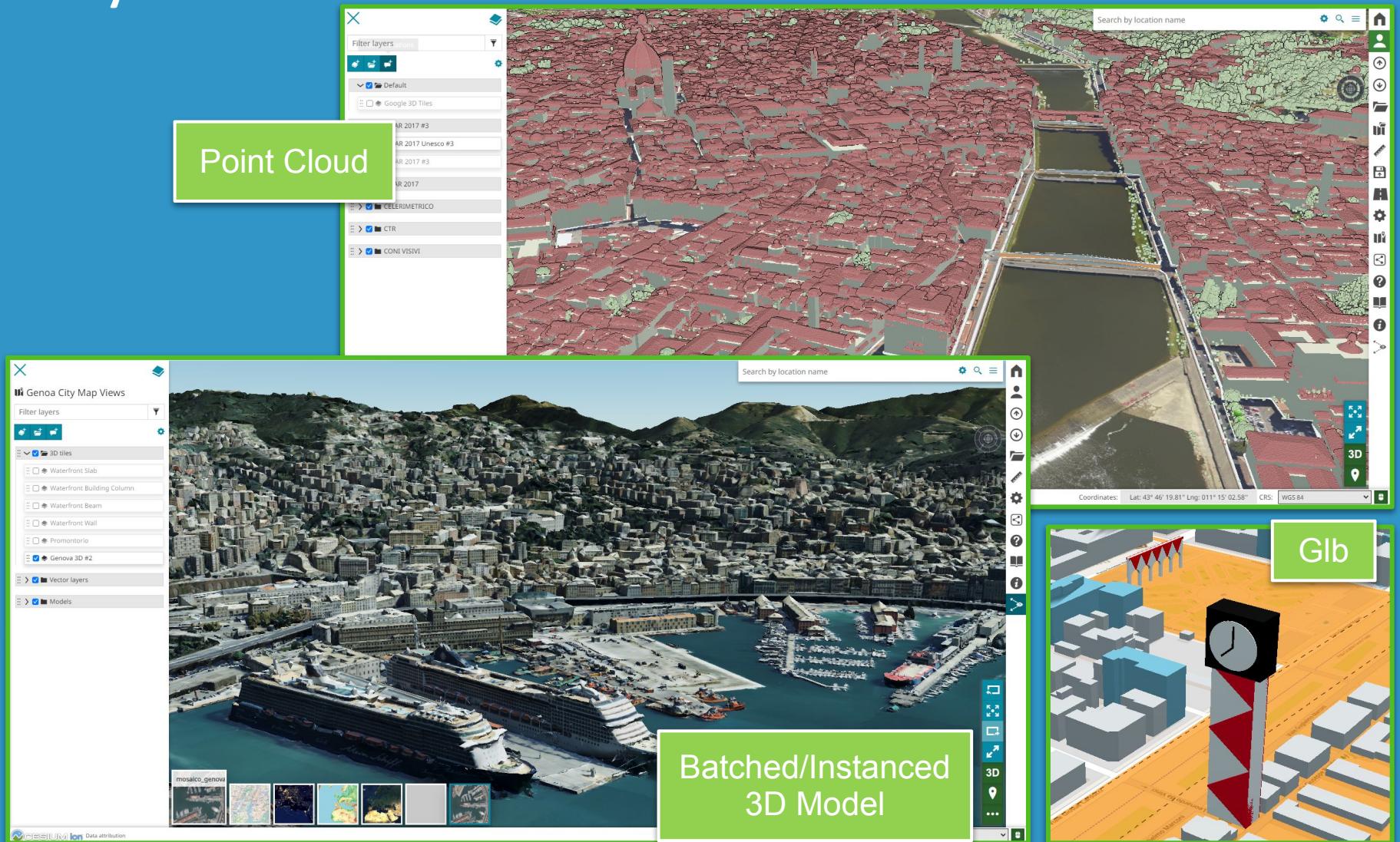
- 3D functionalities in **MapStore geOrchestra**
- 3D data processing toolbox, hints and overview of ongoing works

3D functionalities in MapStore geOrchestra

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



3D functionalities in MapStore geOrchestra



- Create your **immersive experience** within the **MapStore Viewer** using the new powerful [Views Tool](#)!

New York

New York City

New York is the most populous city in the United States. With a 2020 population of 8,804,190 distributed over 300.46 square miles (778.2 km), New York City is the most densely populated major city in the United States.

Many districts and monuments in New York City are major landmarks, including three of the world's ten most visited tourist attractions in 2023.

Times Square is the brightly illuminated hub of the Broadway Theater District, one of the world's busiest pedestrian intersections and a major center of the world's entertainment industry.

Many of the city's landmarks, skyscrapers, and parks are known around the world, and the city's fast pace led to the phrase New York minute.

Check out the online documentation

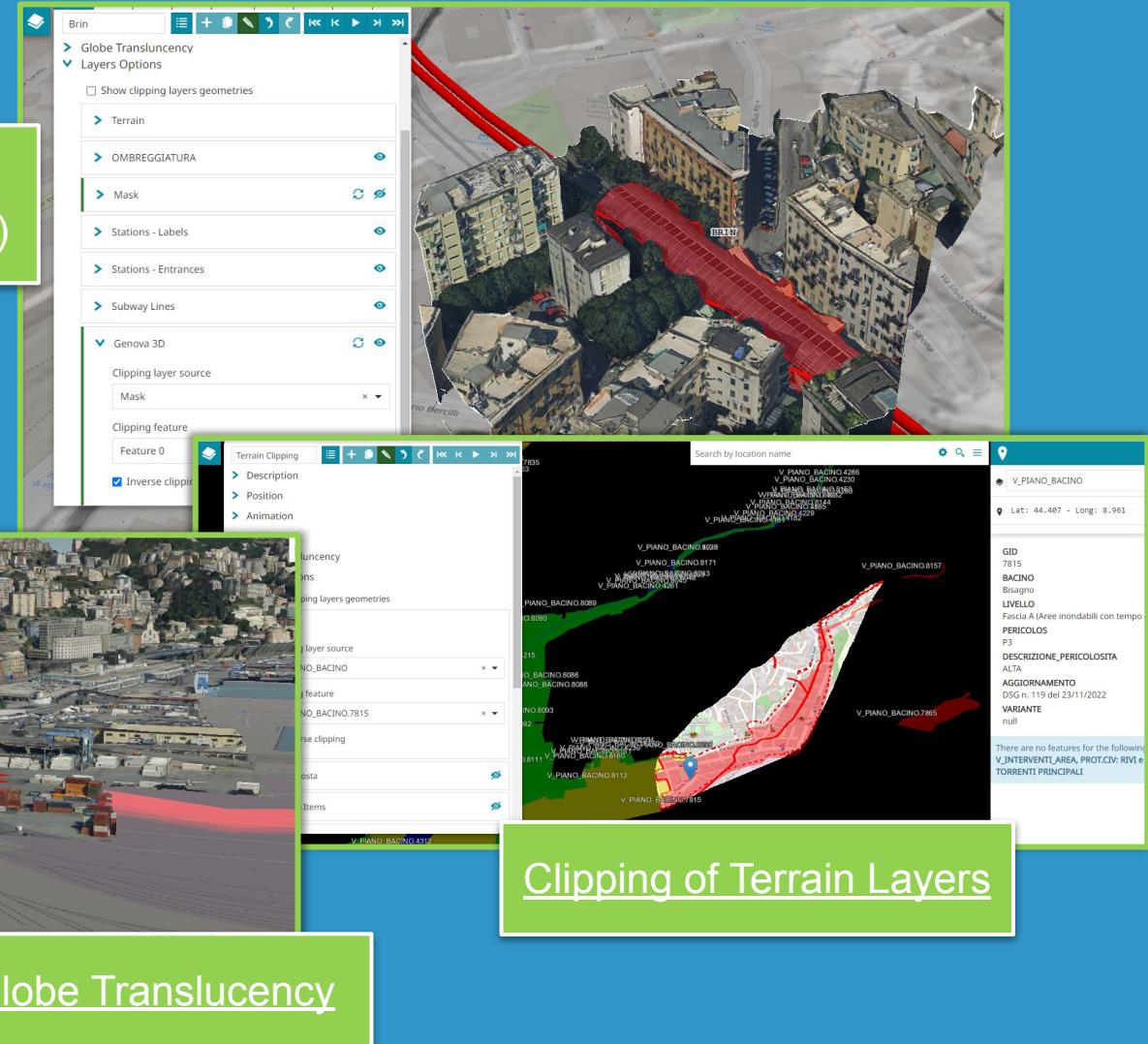
Coordinates: Lat: 40° 42' 52.35" Lng: -73° 59' 17.28" CRS: WGS 84

<https://docs.mapstore.geosolutionsgroup.com/en/v2024.01.01/user-guide/map-views/>

3D functionalities in MapStore geOrchestra

- Specific advanced options are available for the 3D mode

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



The screenshot displays three main windows illustrating 3D clipping and masking:

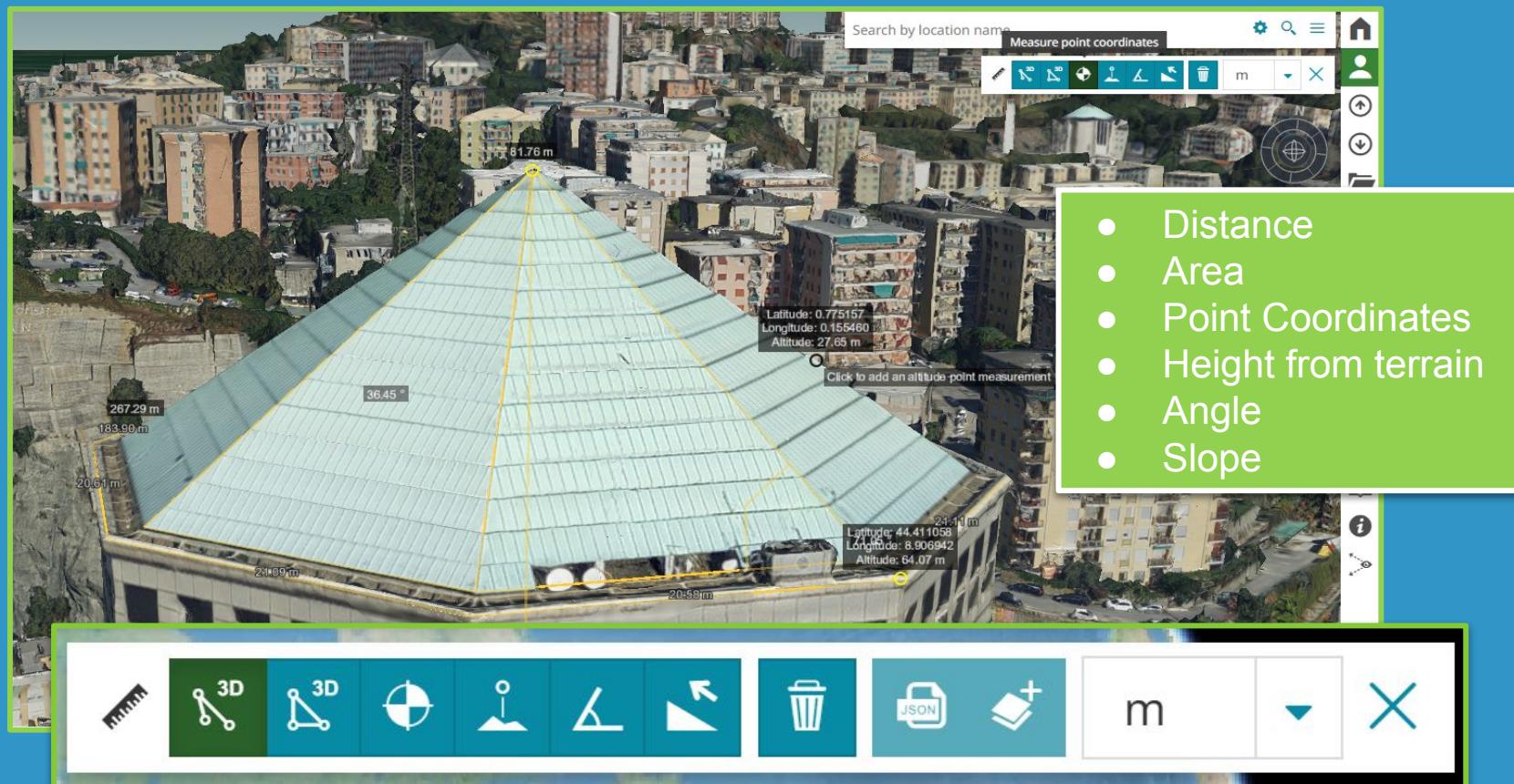
- Top Right:** A 3D view of a city street with buildings and a red polygonal mask applied to the terrain layer.
- Middle Left:** A configuration window titled "Brin" showing settings for "Clipping layer source" (set to "Mask") and "Clipping feature" (set to "Feature 0" with "Inverse clipper" checked).
- Bottom Left:** A 3D view of a port area with a red polygonal mask applied to the terrain layer, labeled "The Subport Tunnel Project".
- Bottom Center:** A configuration window titled "Terrain Clipping" showing settings for "Description", "Position", and "Animation".
- Bottom Right:** A map view showing a coastal area with a red polygonal mask applied to the terrain layer, with a detailed sidebar providing location information and project details.

Clipping of Terrain Layers

Globe Translucency

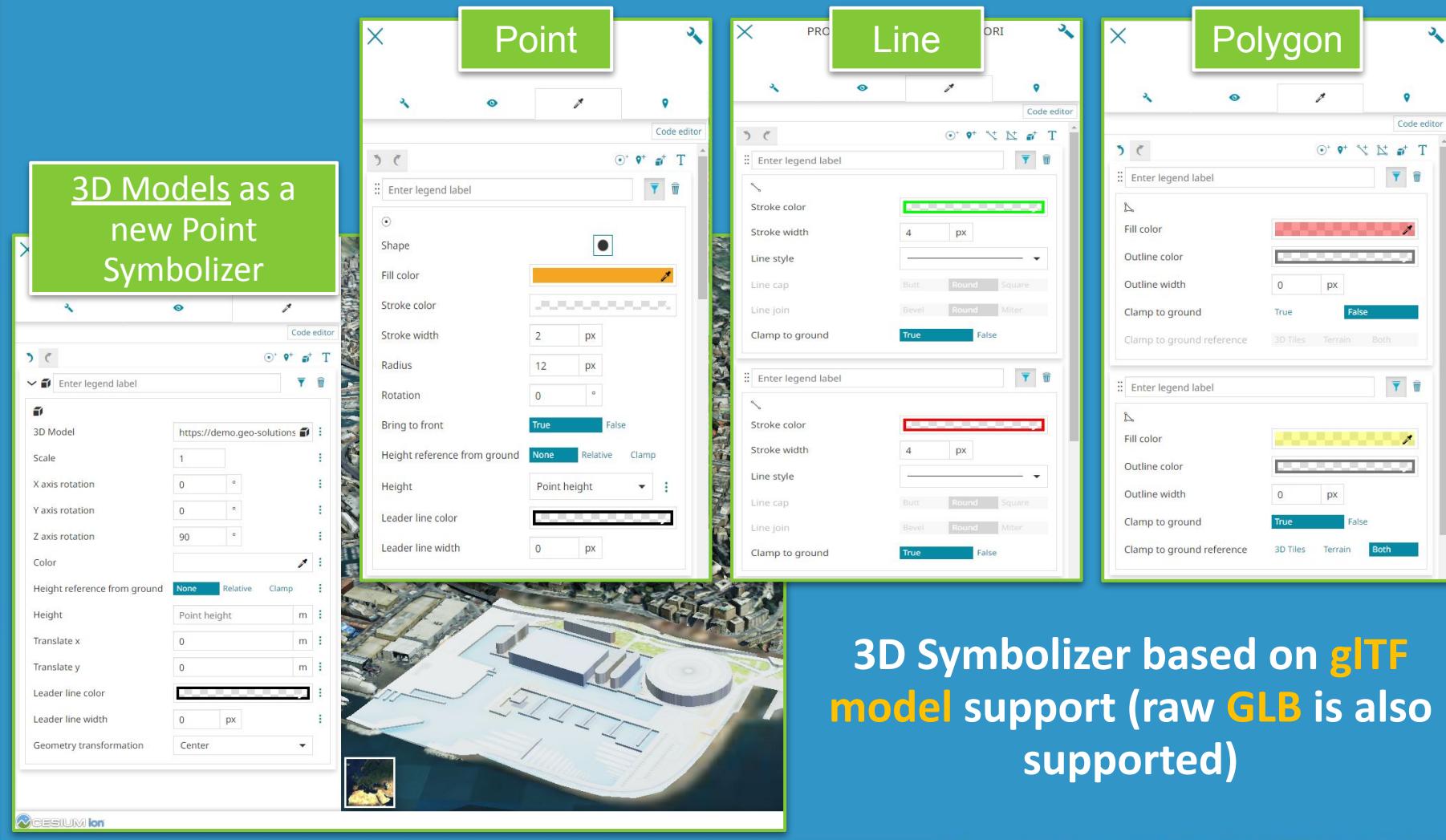


- The **Measurement tool** is supported also in 3D mode providing specific **measurement types**



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

Line

Polygon

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

3D functionalities in MapStore geOrchestra

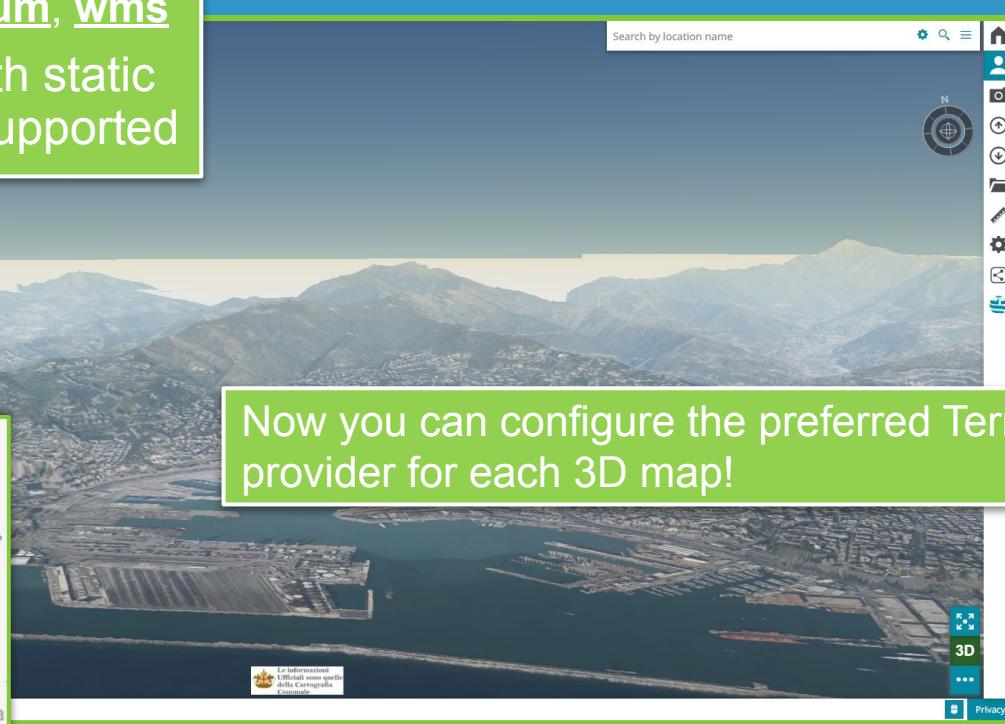
- Terrain layers supported with a dedicated layer type to configure different terrain providers for the 3D viewer

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!

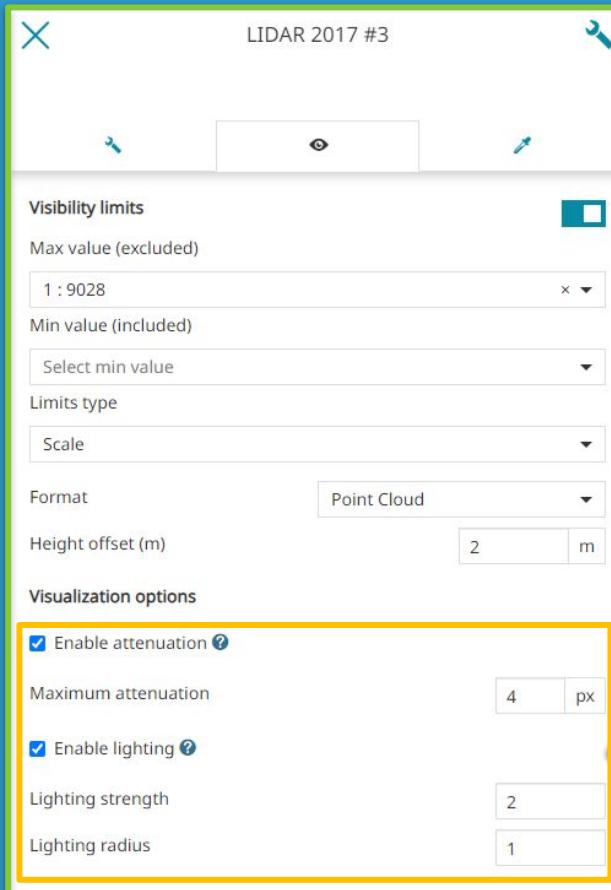


Look at

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

3D functionalities in MapStore geOrchestra

- Layers settings for 3D

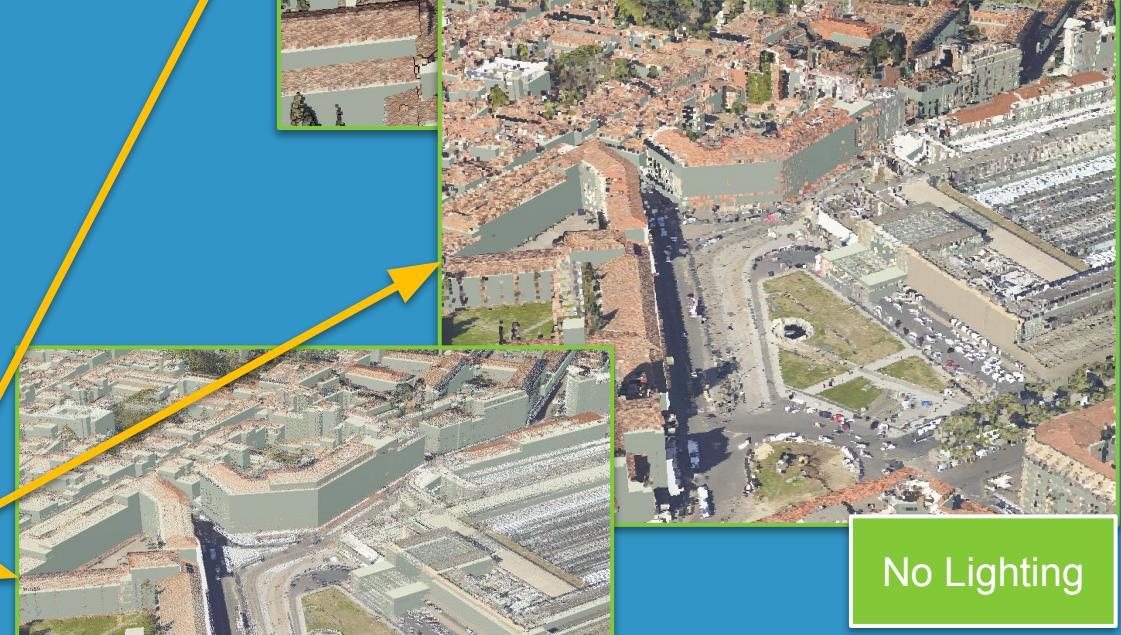


Attenuation and Lighting



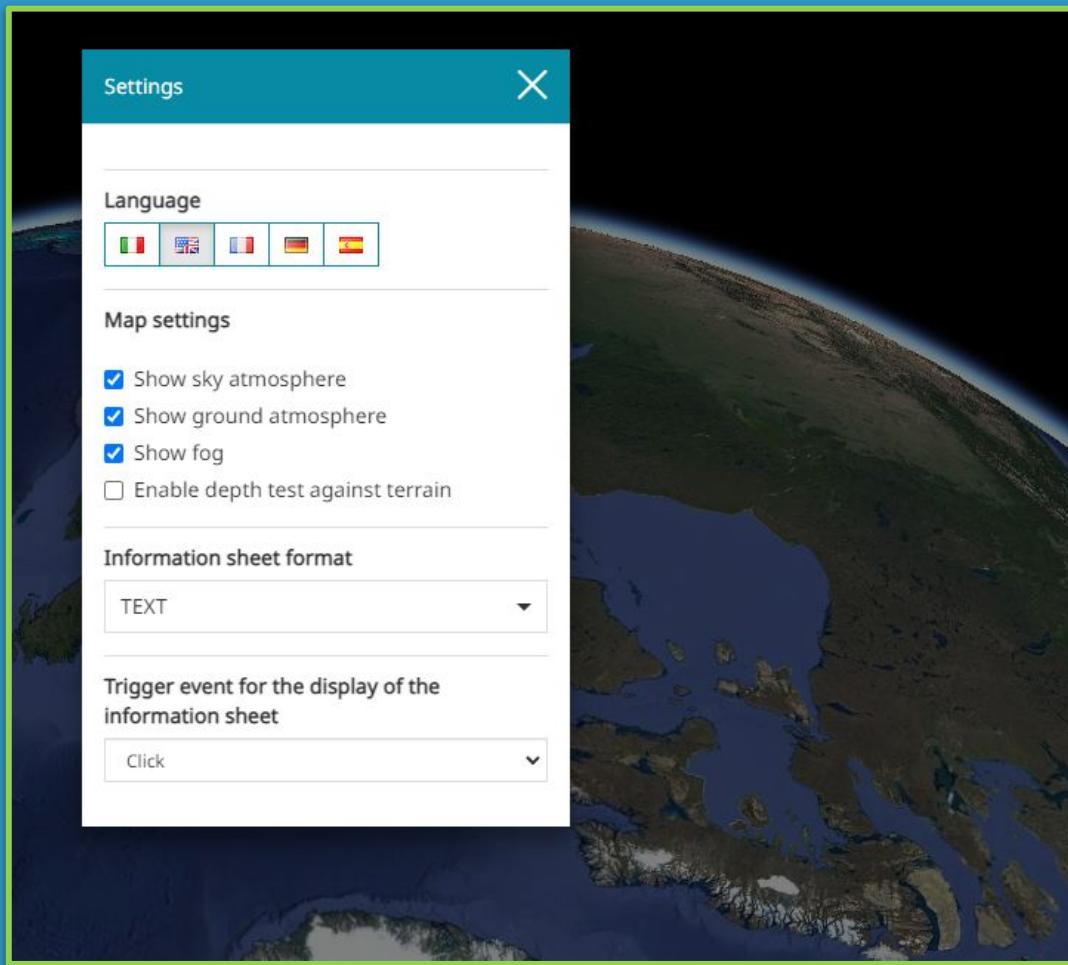
No Lighting

No Attenuation and Lighting



3D functionalities in MapStore geOrchestra

- 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!



The collage illustrates the integration of 3D map capabilities across different platforms:

- Top Left:** A 3D globe map of the United States titled "States Map" from the Cesium ion Data attribution.
- Top Right:** A screenshot of a dashboard or media library interface showing a 3D globe map of the world with the text "where are they located?" above it.
- Middle Left:** Two stacked charts: "Persons" (line graph) and "Water Km" (bar chart), both showing data for US states.
- Middle Right:** A screenshot of a dashboard or media library interface showing a 3D globe map of the world with a sidebar containing a "Media" section listing "demo map" and "NPA Demo Map".
- Bottom Left:** A screenshot of a dashboard or media library interface showing a 3D globe map of the world with a sidebar containing a "Media" section listing "demo map" and "NPA Demo Map".
- Bottom Center:** A screenshot of a dashboard or media library interface showing a 3D globe map of the world with a sidebar containing a "Media" section listing "demo map" and "NPA Demo Map".
- Bottom Right:** A screenshot of a dashboard or media library interface showing a 3D globe map of the world with a sidebar containing a "Media" section listing "demo map" and "NPA Demo Map".

Digital Twin Toolbox, overview of ongoing works

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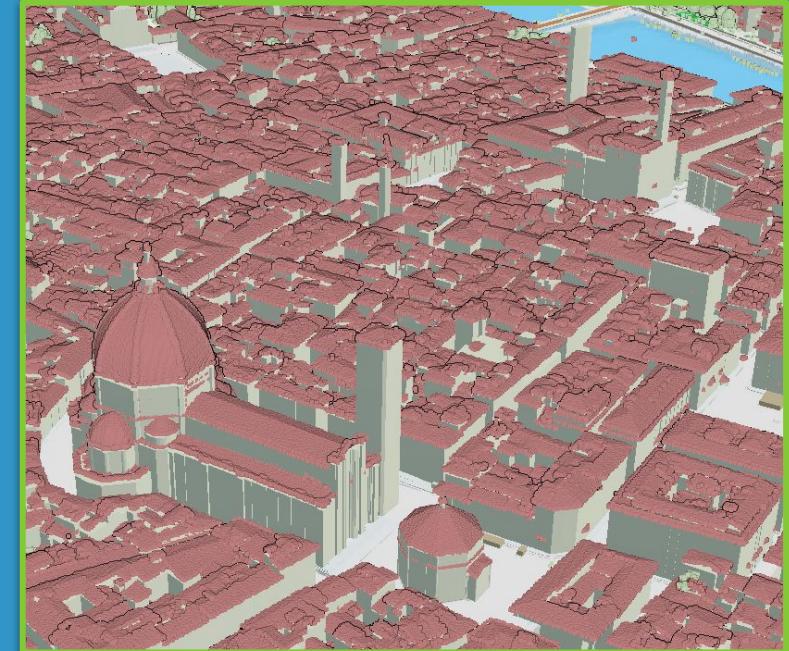


Digital Twin Toolbox

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

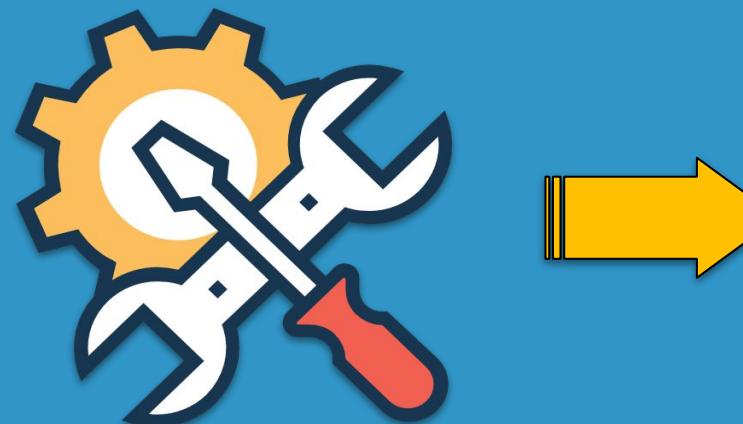
3D Tiles became one of the most common OGC standards for streaming and rendering 3D geospatial contents on the web such as:

- **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



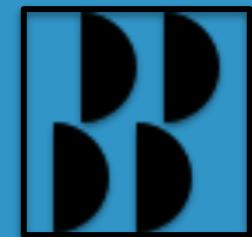


but... what about doing that using
Open Source tools?



open source

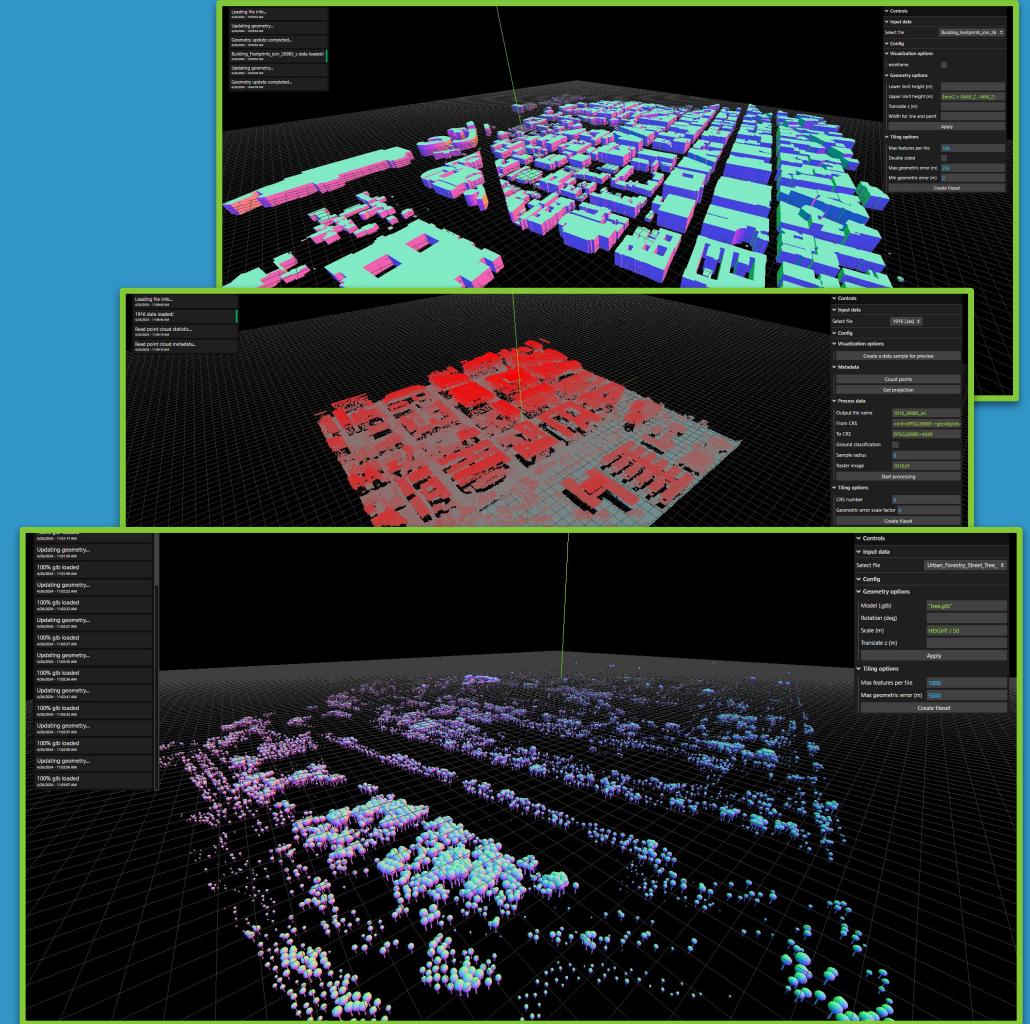
The Digital Twin Toolbox is the
GeoSolutions' answer



Digital Twin Toolbox

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...

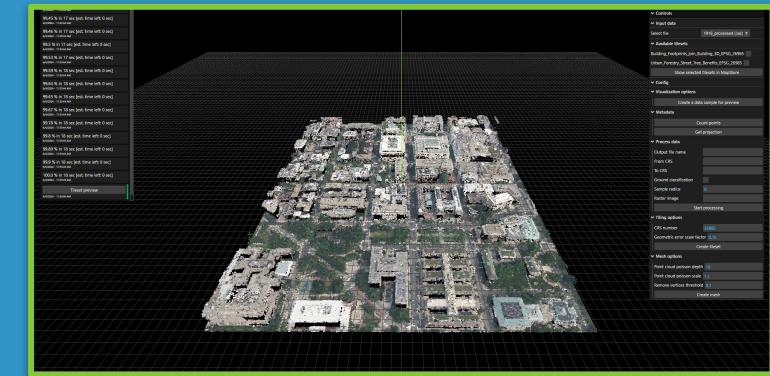


Digital Twin Toolbox



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!

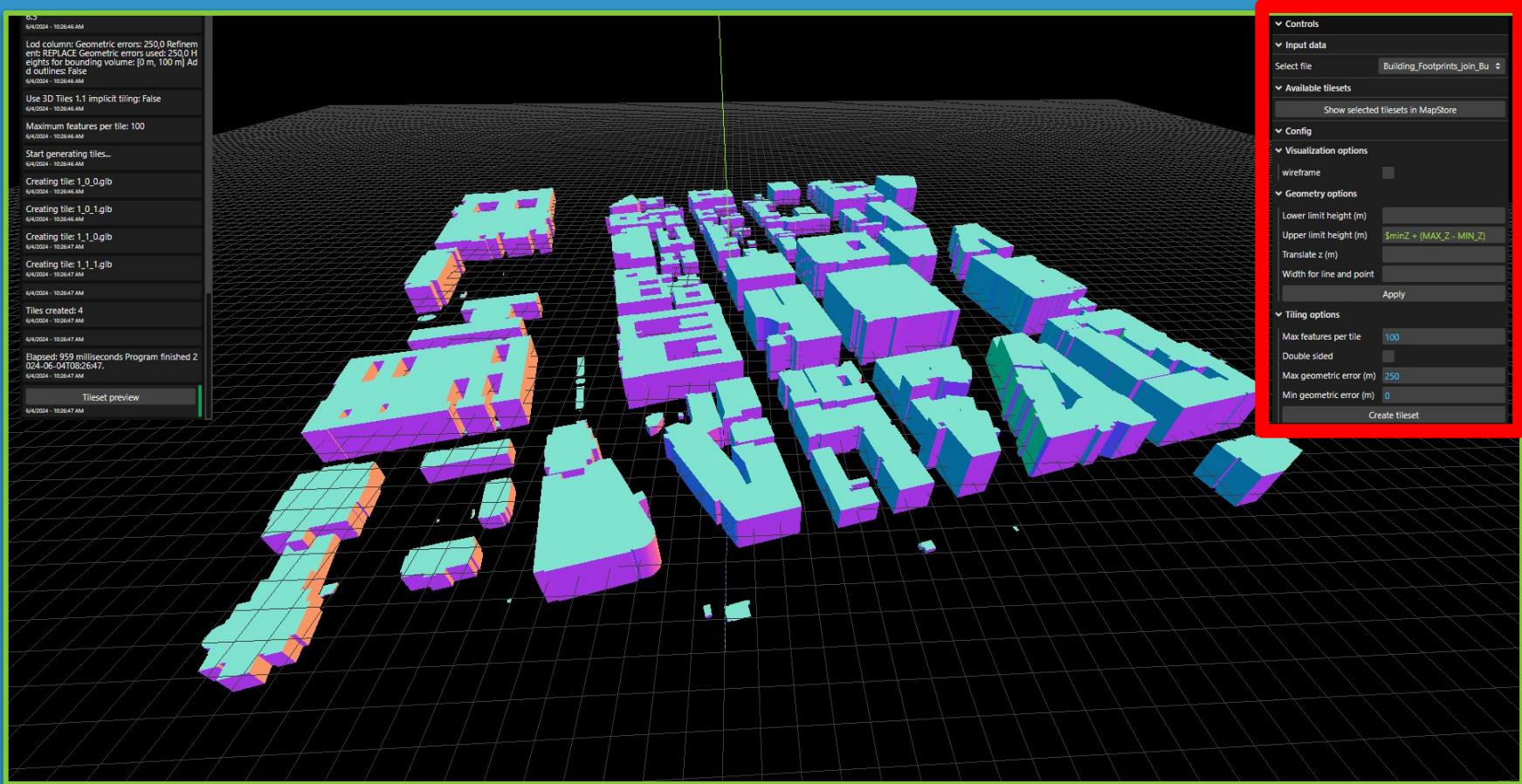


Digital Twin Toolbox - User Interface



Controls:

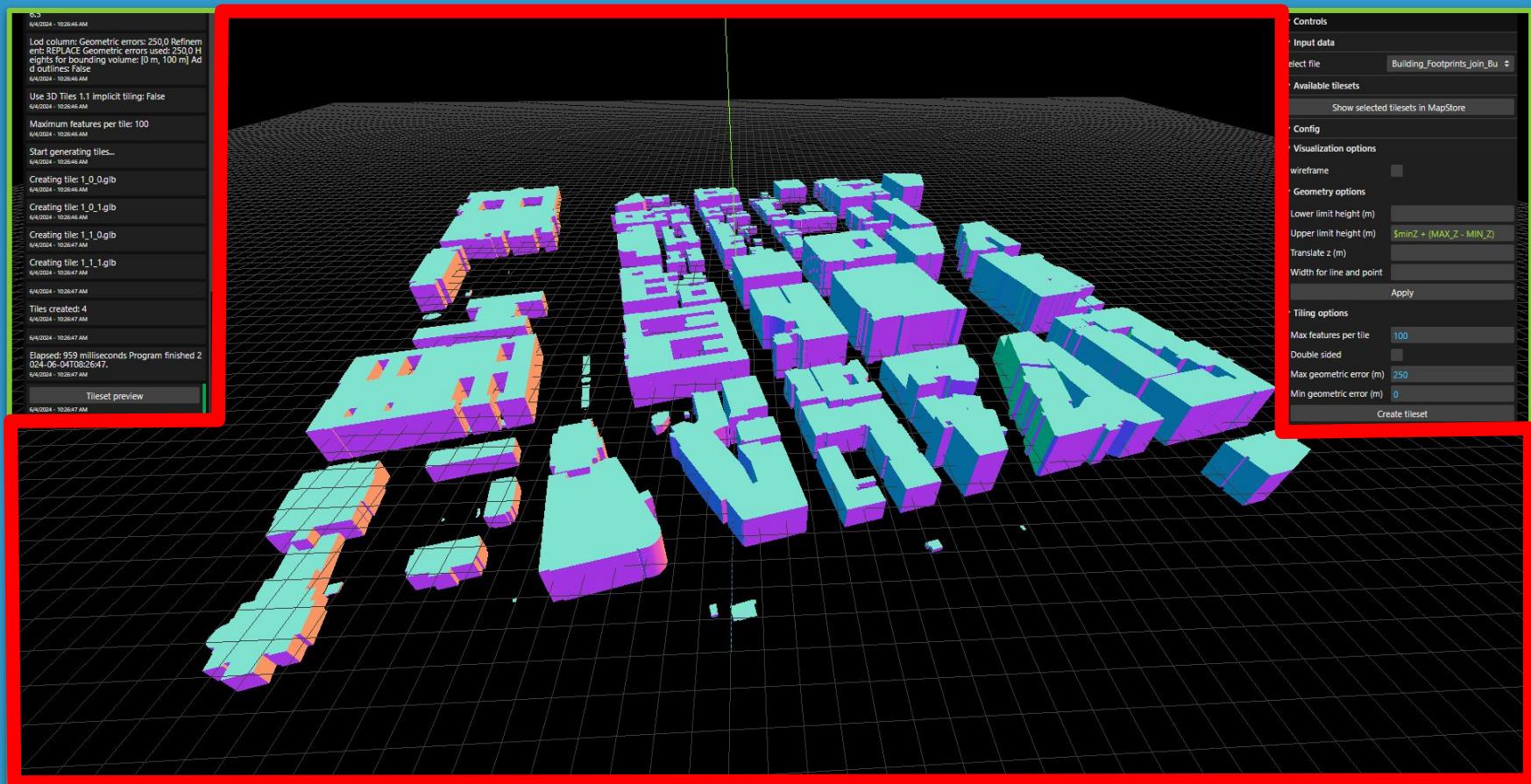
- Located on the top right corner of the screen
- Change list of properties and action buttons based on the selected input file



Digital Twin Toolbox - User Interface

Data preview:

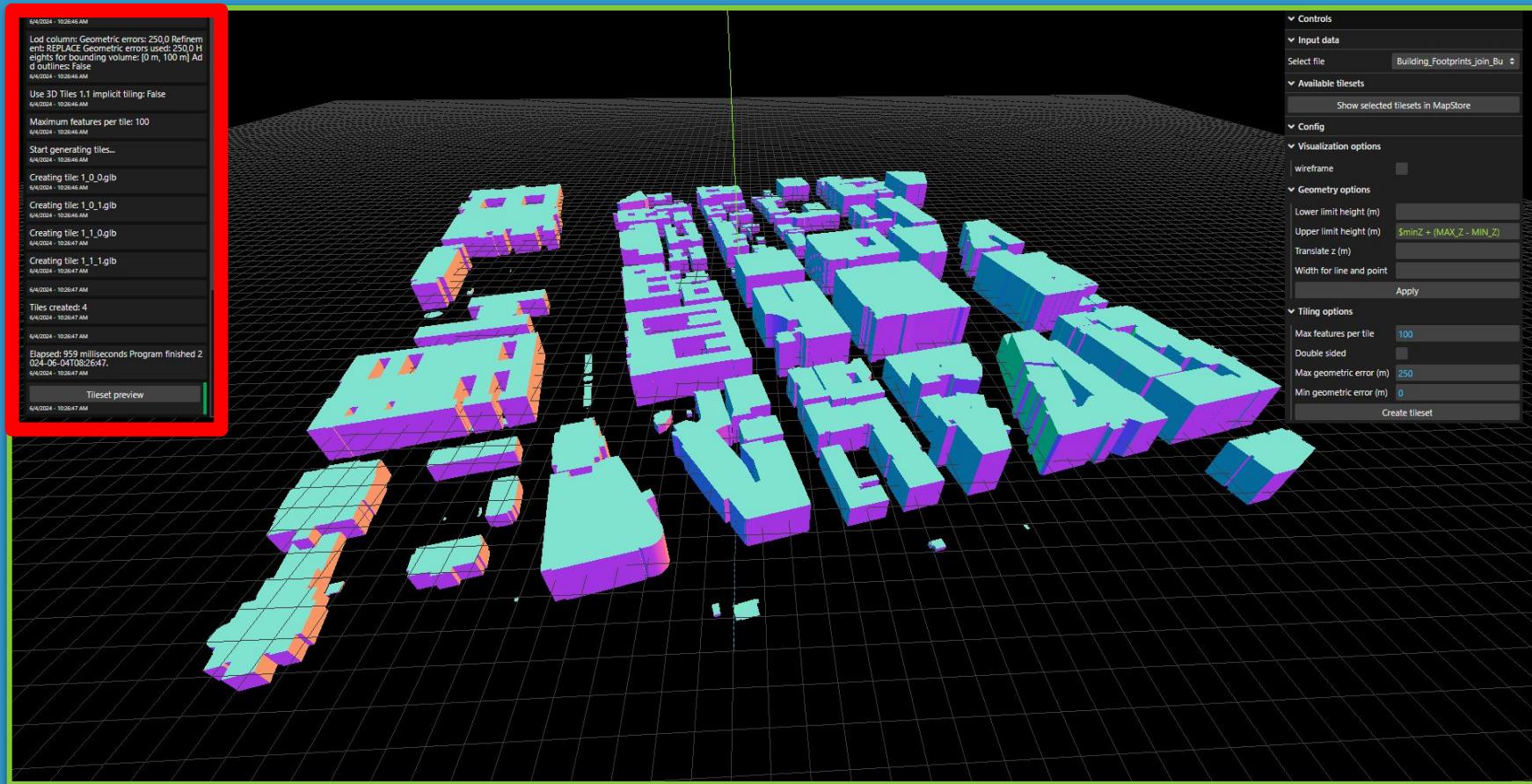
- Covers all the screen background
- Preview sample data in 3D
- Live update of geometries for Shapefiles



Digital Twin Toolbox - User Interface

Process feedback:

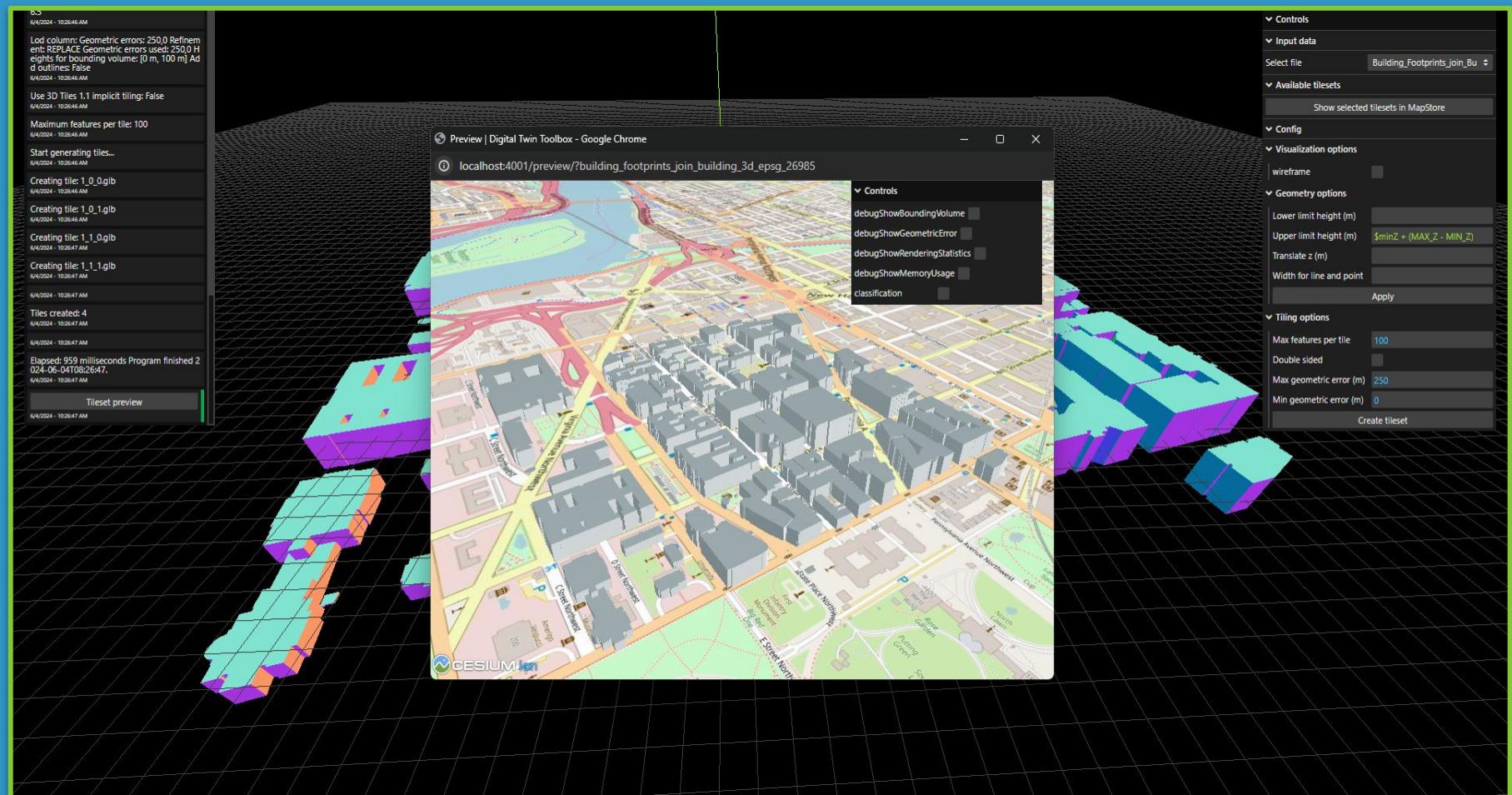
- Located on the top left corner of the screen
- Shows logs for all the actions and processes initialized with the controls panel



Digital Twin Toolbox - User Interface



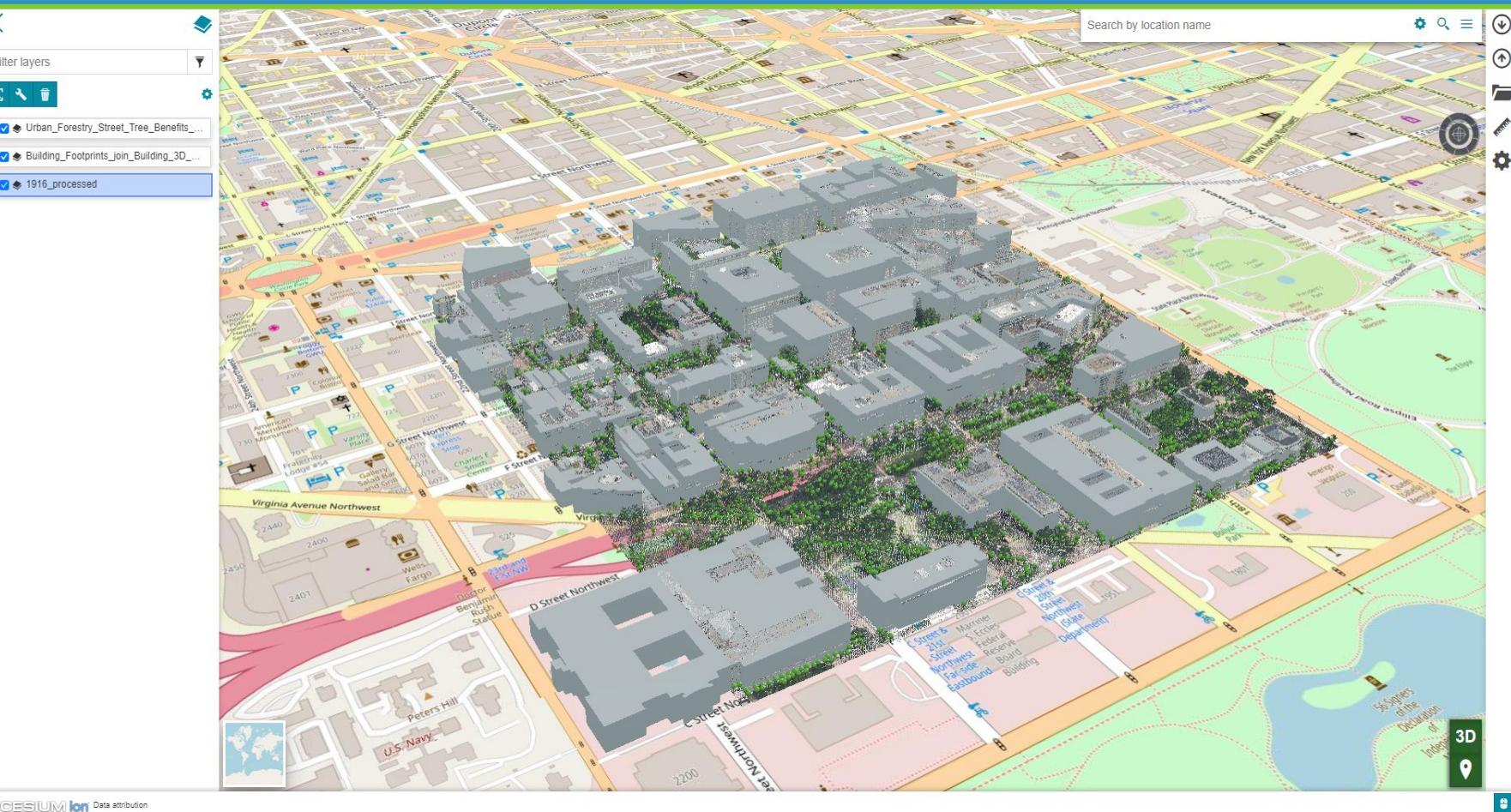
Tileset preview of generated 3D Tiles in Cesium.js available!



Digital Twin Toolbox - User Interface

GeoSolutions

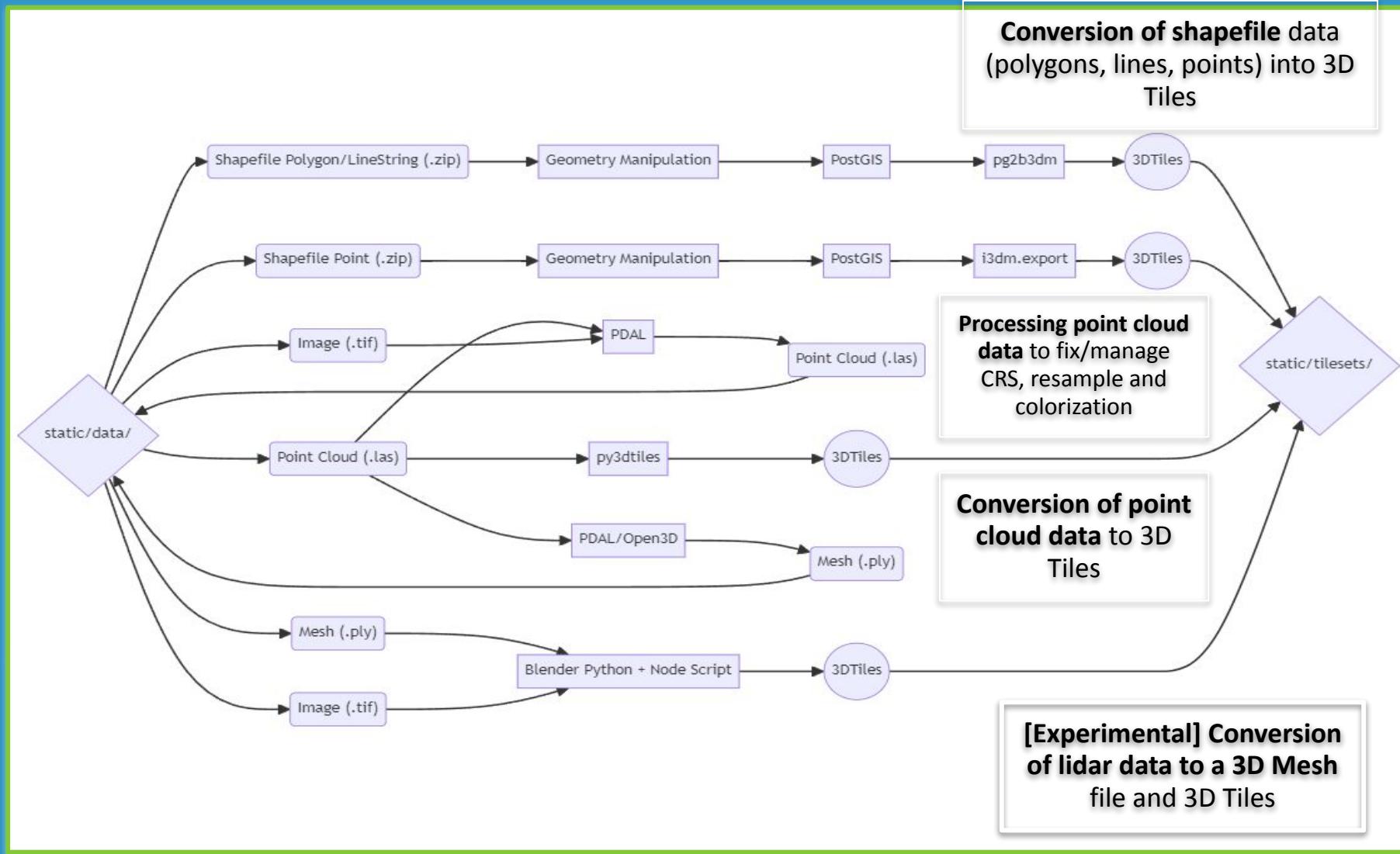
your one-stop-shop for geospatial open source software



Digital Twin Toolbox - Workflows

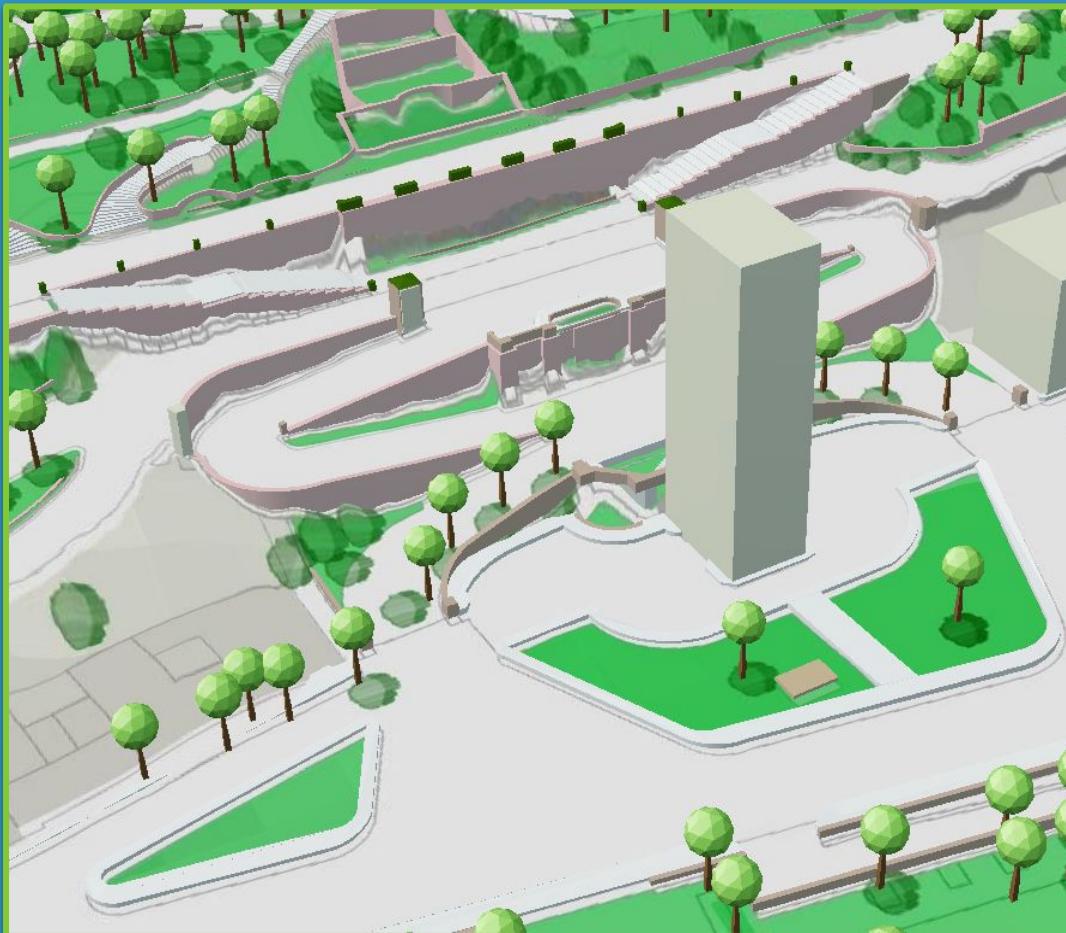


Available workflows and involved tools



Digital Twin Toolbox

Some examples of 3D Tiles from the
Municipality of Florence



Digital Twin Toolbox

Some examples of 3D Tiles from the
Municipality of Florence



Digital Twin Toolbox - Future works

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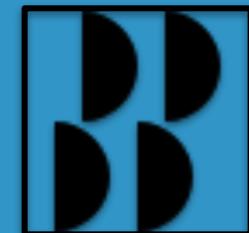
Digital Twin Toolbox - Future works

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

That's all folks!



Questions?

info@geosolutionsgroup.com