3D in geOrchestra MapStore features and data processing

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Agenda

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

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

**Point Cloud**

**Batched/Instanced 3D Model**

**Glb**

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

Check out the online documentation

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

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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 Subport Tunnel Project

Sample of GL3D model processed by GeoSolutions from data provided by the Municipality of Genoa

**NOTE:** An error occurred while processing the data. Please report the issue to the support team.

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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!

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3D functionalities in MapStore geOrchestra

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

3D Models as a new Point Symbolizer

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

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• **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.

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

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• **Layers settings** for 3D

**Visualizaion options**

- **Enable attenuation**
  - Maximum attenuation: 4 px

- **Enable lighting**
  - Lighting strength: 2
  - Lighting radius: 1

**Visibility limits**

- Max value (excluded): 1 : 9028
- Min value (included)
  - Select min value
- Limits type
  - Scale
- Format: Point Cloud
- Height offset (m): 2 m

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**Layers settings for 3D**

- No Attenuation and Lighting
- Attenuation and Lighting
- No Lighting

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Specific 3D Map Options related to the globe in Map Settings: enable atmosphere, enable fog and enable depth test.
3D functionalities in MapStore geOrchestra

- Support of 3D maps also in **Dashboards** and **GeoStories**!
Digital Twin Toolbox, overview of ongoing works
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 ...
Digital Twin Toolbox

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**?

The **Digital Twin Toolbox** is the GeoSolutions’ answer

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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…

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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
Data preview:

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

- Located on the top left corner of the screen
- Shows logs for all the actions and processes initialized with the controls panel
Tileset preview of generated 3D Tiles in Cesium.js available!
Final preview of generated 3D Tiles also available on a **embedded MapStore!**
Available **workflows** and involved **tools**

- **Conversion of shapefile data** (polygons, lines, points) into 3D Tiles
- **Conversion of lidar data** to a 3D Mesh file and 3D Tiles
- **Processing point cloud data** to fix/manage CRS, resample and colorization
Some examples of 3D Tiles from the Municipality of Florence
Some examples of 3D Tiles from the Municipality of Florence
Digital Twin Toolbox - Future works
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)
2. More advanced and complete support for photogrammetry processes
3. Automation of the processing chains
4. 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:

Check out the webinar on Youtube:
https://youtu.be/owQW-AUjk0U?si=yc1j_KTiJHsXwUCL

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That’s all folks!

Questions?

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