

# State of mago3DTiler & mago3DTerrainer

2025. 12. 05.

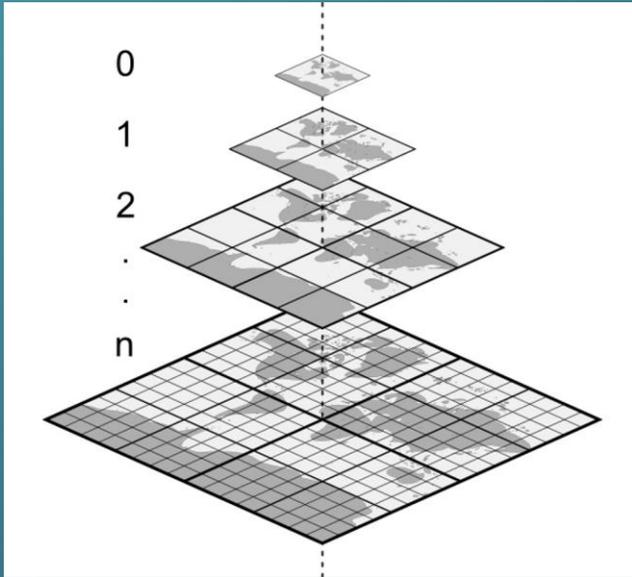
Sanghee Shin([shshin@gaia3d.com](mailto:shshin@gaia3d.com))  
Jinho Kim, Sungdo Son, Hakjoon Kim  
Gaia3D, Inc.



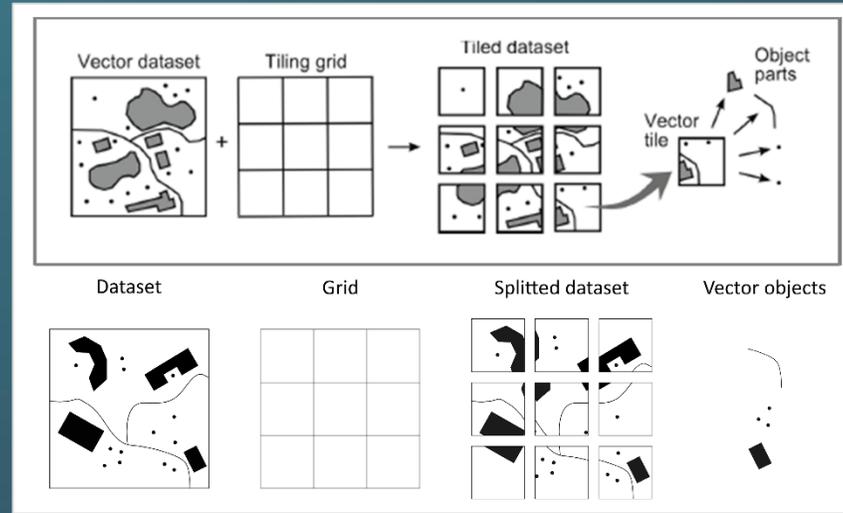
# Contents

1. Before We Begin
2. Originally Supported Features
3. Newly Supported Features
  - Supporting OGC 3DTiles Version 1.1
  - 2D vector conversion
  - Improvement Realistic mesh
  - Improvement Point Cloud
  - ECEF Data Tiling
4. Things to Do Moving Forward
5. Q & A

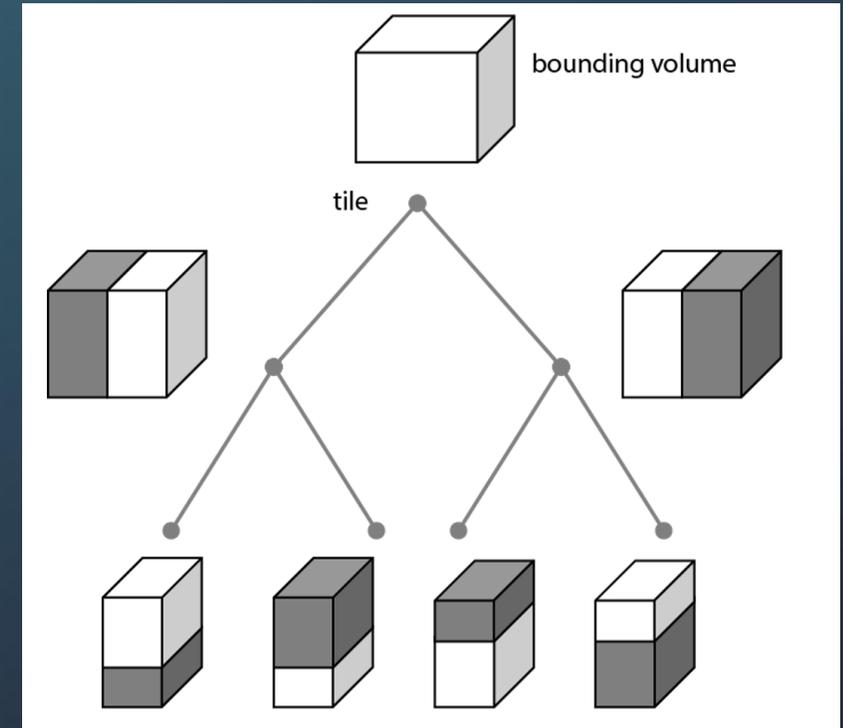
# 1. Before We Begin – 3D Tiles



<Tile Map Service>



<Vector Tile Service>



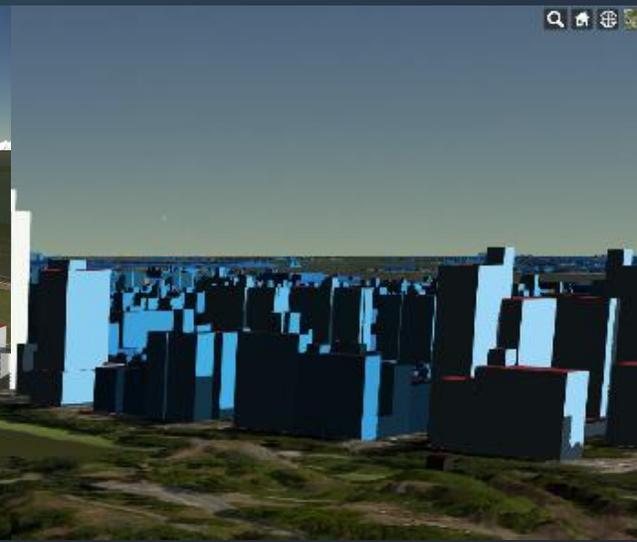
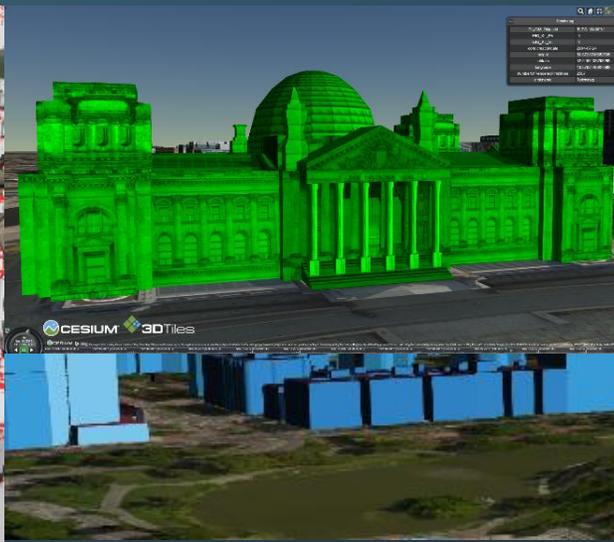
<3D Tiles>

# 1. Before We Begin – 3D Tiles

## 3D Tiles – OGC Community Standard

- Designed for streaming and rendering massive 3D geospatial content (3D Model, Points Cloud, Reality Mesh, etc.)
- Hierarchical data structure and a set of tile formats which deliver renderable contents

3D Tiles Specification



# Originally Supported Features

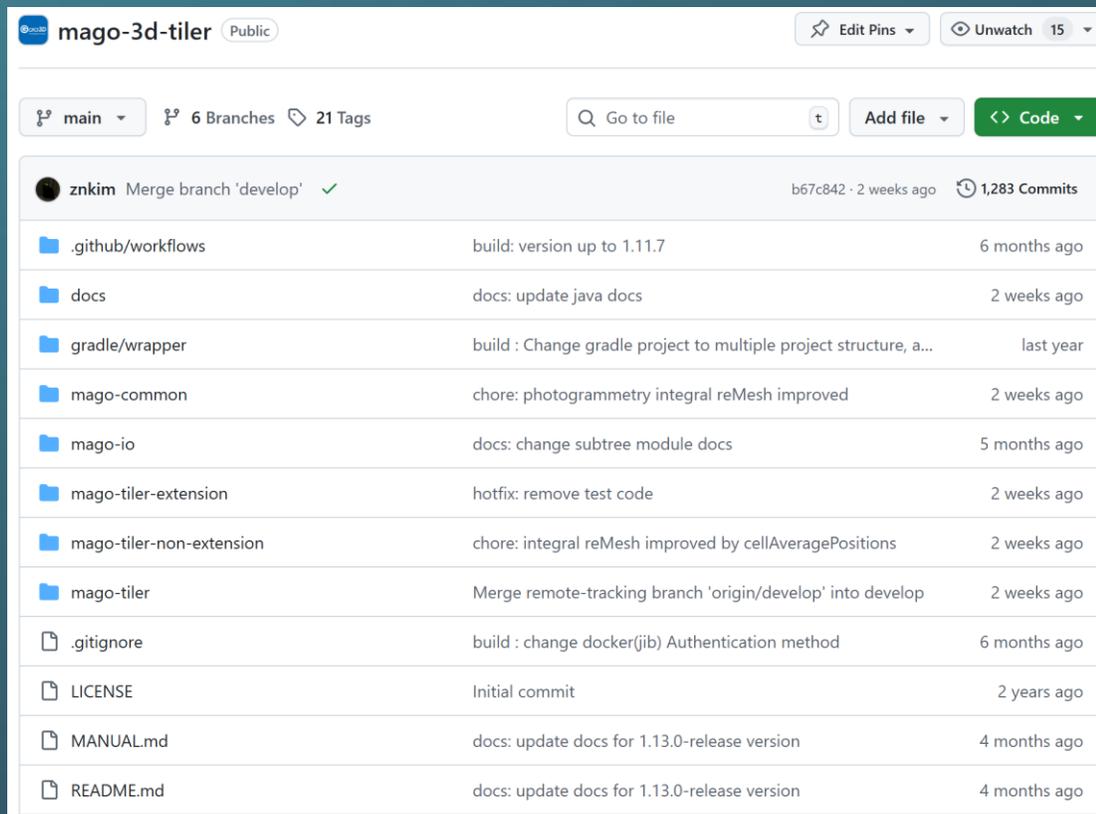
## 2. Originally Supported Features

# mago3DTiler

**mago 3DTiler** <https://github.com/Gaia3D/mago-3d-tiler>

: Java based open source OGC 3D Tiles maker developed by Gaia3D

<https://github.com/Gaia3D/mago-3d-tiler>

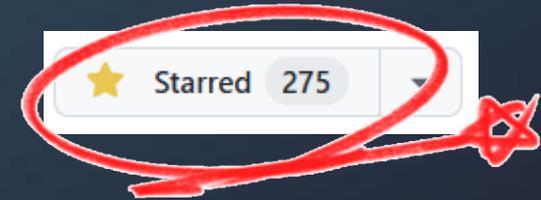


File/Folder	Commit Message	Time
.github/workflows	build: version up to 1.11.7	6 months ago
docs	docs: update java docs	2 weeks ago
gradle/wrapper	build : Change gradle project to multiple project structure, a...	last year
mago-common	chore: photogrammetry integral reMesh improved	2 weeks ago
mago-io	docs: change subtree module docs	5 months ago
mago-tiler-extension	hotfix: remove test code	2 weeks ago
mago-tiler-non-extension	chore: integral reMesh improved by cellAveragePositions	2 weeks ago
mago-tiler	Merge remote-tracking branch 'origin/develop' into develop	2 weeks ago
.gitignore	build : change docker(jib) Authentication method	6 months ago
LICENSE	Initial commit	2 years ago
MANUAL.md	docs: update docs for 1.13.0-release version	4 months ago
README.md	docs: update docs for 1.13.0-release version	4 months ago

<December 2023>



<December 2025>



Latest Version: 1.14

## 2. Originally Supported Features

# mag3DTiler

**mag3DTiler** <https://github.com/Gaia3D/mago-3d-tiler>

: Java based open source OGC 3D Tiles maker developed by Gaia3D

3D Tiles Specification



Open Source **No dependencies** on any specific company or technology

Portable & Scalable Offering excellent **interoperability, portability, and scalability** with other systems

SRS Conversion **Real-time SRS transformation** during 3D Tiles making

Fast Speed Fast 3D Tiles making with parallel processing and fast rendering with data optimization

Model Extrusion Support **Extruded 3D Tiles making** from 2D SHP, GeoJSON using attribute

**Various Formats Support** 3DS, OBJ, FBX, IFC, CityGML, IndoorGML, LAS, LAZ, SHP, GPKG, and others

Enhanced Debugging Easy debugging through detailed exception handling and logging features

The screenshot displays the GitHub repository for `mago-3d-tiler`. The interface includes a navigation bar with 'Code', 'Issues', 'Pull requests', 'Discussions', 'Actions', 'Security', and 'Insights'. Below this, there's a section for 'About' with a description: 'Official mago-3d-tiler repository. Java Version 3D Tiles Generator'. A list of files and folders is visible, including `.github/workflows`, `docs`, `gradle/wrapper`, `mago-common`, and `mago-io`. On the right, a terminal window shows the usage instructions for the `mago-3d-tiler` command, such as `-h, --help` for printing help and `-q, --quiet` for quiet mode. To the right of the terminal, there are six small images showing various 3D tileset renderings, including terrain, buildings, and urban environments.



# mag3DTiler

## Support for Various Formats

- 3DS, OBJ, COLLADA, IFC, FBX, PLY, Point Cloud(LAS, LAZ)
- All formats supported by ASSIMP (Open Asset Import Library, BSD3) can be theoretically supported.
- Polygon geometry + Height property described in SHP or GeoJSON formats is also supported.

## Support for Various Coordinate Systems

- Supports all coordinate systems provided by PROJ

# mag3DTiler

3D Tiles Specification



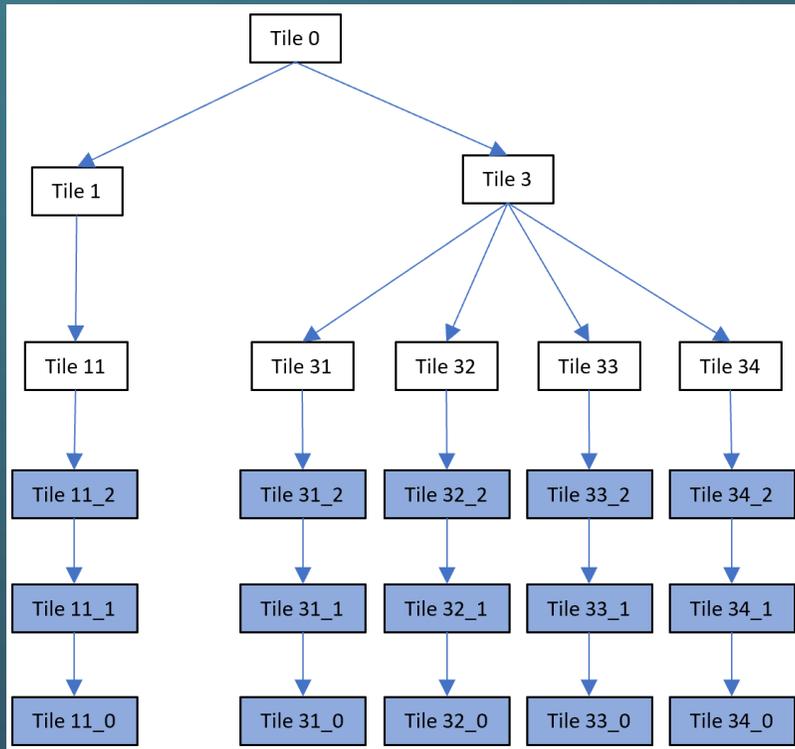
Open Geospatial Consortium

## mag3DTiler

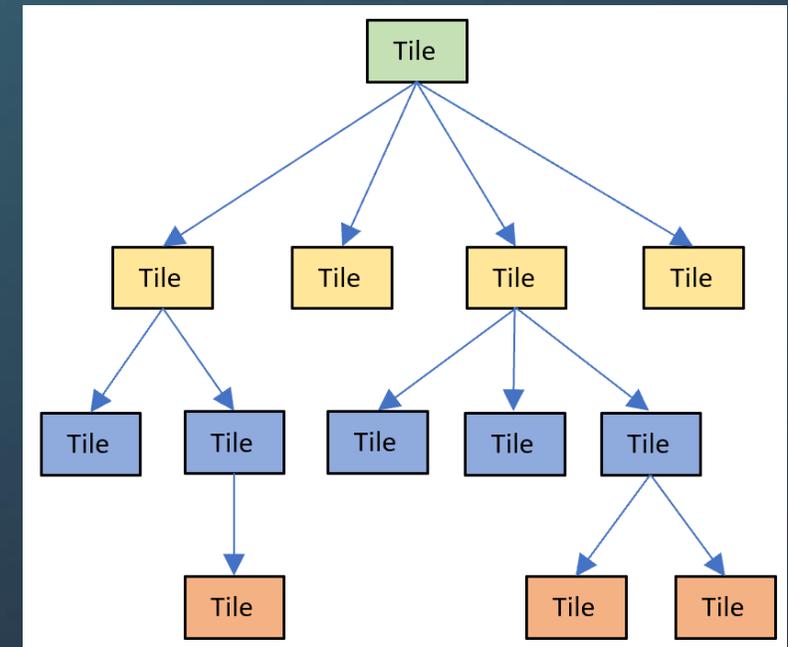
<https://github.com/Gaia3D/mago-3d-tiler>

: Java based open source OGC 3D Tiles maker developed by Gaia3D

>> ① Generate 3D Tiles with a more parent-child structure



<3D Tiles generated by other software>



<3D Tiles generated by mag3DTiler>

## 2. Originally Supported Features

# mago3DTiler

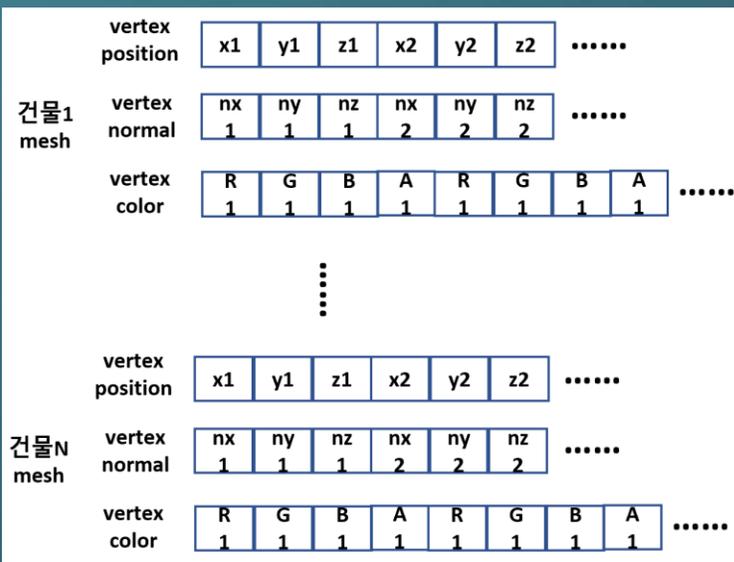


mago3DTiler

<https://github.com/Gaia3D/mago-3d-tiler>

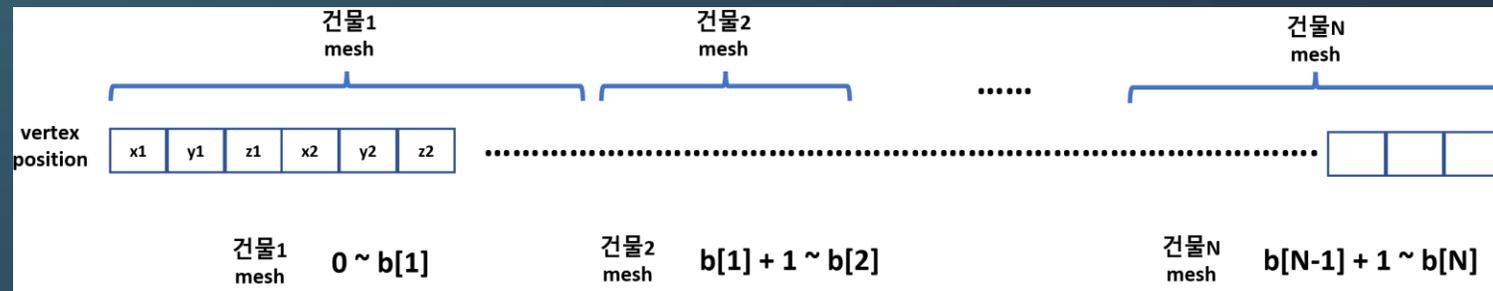
: Java based open source OGC 3D Tiles maker developed by Gaia3D

### >> ② Batching optimization



<3D Tiles generated by other software>

### Array Buffer Optimization



<3D Tiles generated by mago3DTiler>

# mag3DTiler

3D Tiles Specification



Open Geospatial Consortium

## mag3DTiler

<https://github.com/Gaia3D/mago-3d-tiler>

: Java based open source OGC 3D Tiles maker developed by Gaia3D

### >> ③ Texture Size Optimization

N Textures



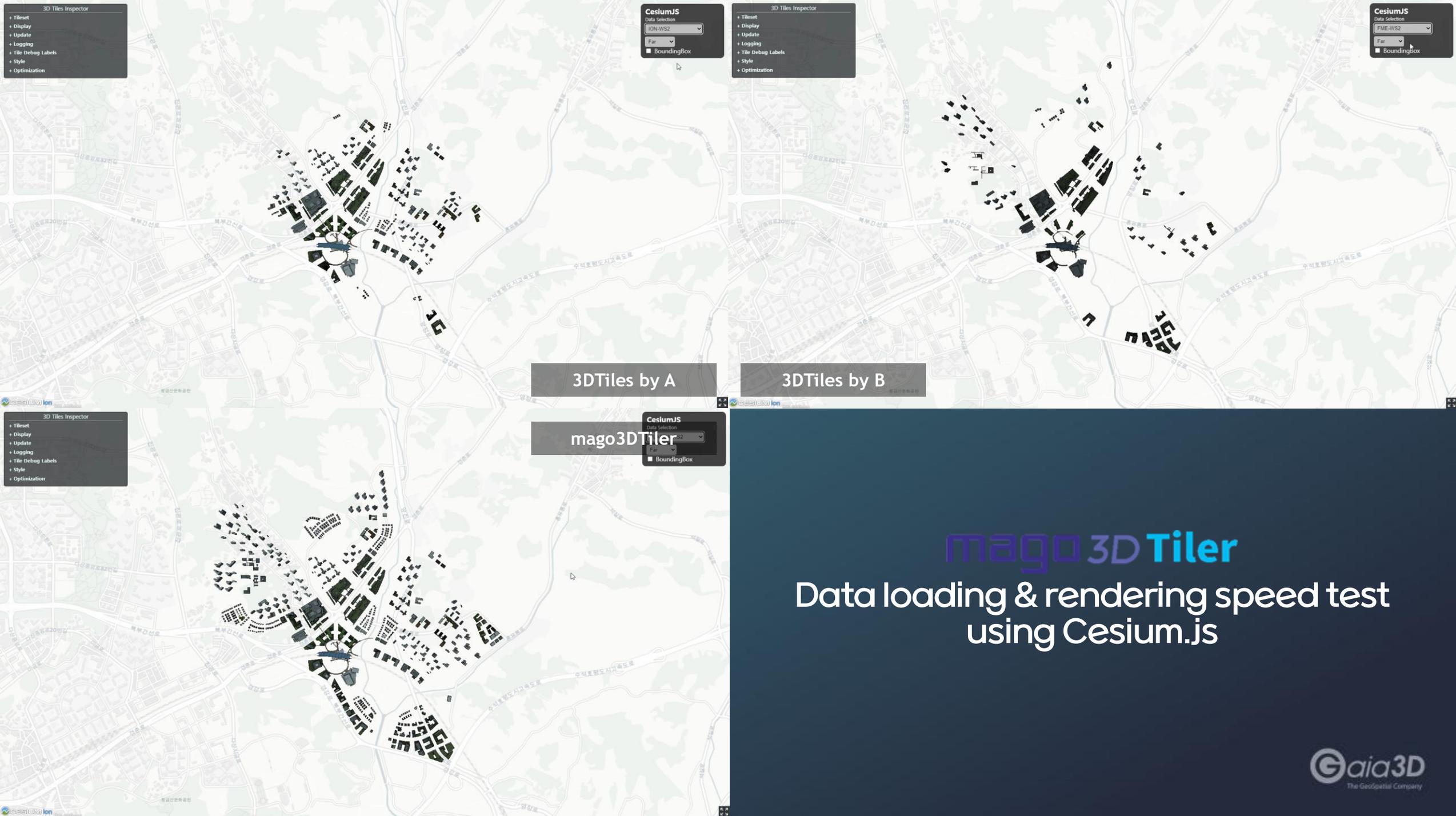
<3D Tiles generated by other software>



1 Texture



<3D Tiles generated by mag3DTiler>



3DTiles by A

3DTiles by B

mago3DTiler

**mago3DTiler**  
Data loading & rendering speed test  
using Cesium.js



Name	Status	Type	Initiator	Size	Time	Waterfall
tileset.json	200	xhr	Resource:is2256	92.9 kB	14 ms	
RC3.b3dm	200	xhr	Resource:is2256	6.5 MB	278 ms	
RC0.b3dm	200	xhr	Resource:is2256	2.9 MB	189 ms	
RC1.b3dm	200	xhr	Resource:is2256	3.3 MB	196 ms	
RC2.b3dm	200	xhr	Resource:is2256	1.2 MB	119 ms	

mago3DTiler



Name	Status	Type	Initiator	Size	Time	Waterfall
data0.b3dm	200	xhr	Resource:is2256	243 kB	12 ms	
data4.b3dm	200	xhr	Resource:is2256	5.4 kB	6 ms	
data7.b3dm	200	xhr	Resource:is2256	23.4 kB	9 ms	
data1.b3dm	200	xhr	Resource:is2256	269 kB	18 ms	
data23.b3dm	200	xhr	Resource:is2256	6.0 kB	6 ms	
data29.b3dm	200	xhr	Resource:is2256	157 kB	11 ms	
data28.b3dm	200	xhr	Resource:is2256	8.7 kB	6 ms	
data6.b3dm	200	xhr	Resource:is2256	237 kB	14 ms	
data3.b3dm	200	xhr	Resource:is2256	6.4 kB	5 ms	
data5.b3dm	200	xhr	Resource:is2256	4.7 kB	6 ms	
data2.b3dm	200	xhr	Resource:is2256	121 kB	10 ms	
data30.b3dm	200	xhr	Resource:is2256	114 kB	7 ms	
data20.b3dm	200	xhr	Resource:is2256	174 kB	12 ms	
data4.2.b3dm	200	xhr	Resource:is2256	331 kB	18 ms	
data2.2.b3dm	200	xhr	Resource:is2256	4.2 kB	7 ms	
data1.4.b3dm	200	xhr	Resource:is2256	197 kB	11 ms	
data5.3.b3dm	200	xhr	Resource:is2256	5.1 kB	8 ms	
data5.2.b3dm	200	xhr	Resource:is2256	3.4 kB	7 ms	
data5.1.b3dm	200	xhr	Resource:is2256	237 kB	15 ms	
data8.2.b3dm	200	xhr	Resource:is2256	5.7 kB	6 ms	
data1.b3dm	200	xhr	Resource:is2256	306 kB	20 ms	
data10.2.b3dm	200	xhr	Resource:is2256	3.8 kB	5 ms	
data10.1.b3dm	200	xhr	Resource:is2256	269 kB	19 ms	
data4.3.b3dm	200	xhr	Resource:is2256	6.7 kB	9 ms	
data4.2.b3dm	200	xhr	Resource:is2256	224 kB	16 ms	
data16.2.b3dm	200	xhr	Resource:is2256	5.7 kB	5 ms	
data16.1.b3dm	200	xhr	Resource:is2256	306 kB	20 ms	
data11.2.b3dm	200	xhr	Resource:is2256	3.8 kB	7 ms	
data11.1.b3dm	200	xhr	Resource:is2256	163 kB	16 ms	
data9.2.b3dm	200	xhr	Resource:is2256	3.6 kB	10 ms	
data9.1.b3dm	200	xhr	Resource:is2256	232 kB	17 ms	
data5.3.b3dm	200	xhr	Resource:is2256	5.5 kB	5 ms	
data4.3.b3dm	200	xhr	Resource:is2256	8.4 kB	8 ms	
data20.2.b3dm	200	xhr	Resource:is2256	85.7 kB	5 ms	
data20.1.b3dm	200	xhr	Resource:is2256	3.8 kB	5 ms	
data20.1.b3dm	200	xhr	Resource:is2256	265 kB	16 ms	
data3.4.b3dm	200	xhr	Resource:is2256	13.3 kB	5 ms	
data3.3.b3dm	200	xhr	Resource:is2256	117 kB	8 ms	
data5.2.b3dm	200	xhr	Resource:is2256	5.8 kB	8 ms	
data5.1.b3dm	200	xhr	Resource:is2256	303 kB	17 ms	
data4.3.b3dm	200	xhr	Resource:is2256	6.7 kB	7 ms	
data4.2.b3dm	200	xhr	Resource:is2256	165 kB	13 ms	
data1.3.b3dm	200	xhr	Resource:is2256	5.2 kB	8 ms	
data2.b3dm	200	xhr	Resource:is2256	136 kB	9 ms	
data10.3.b3dm	200	xhr	Resource:is2256	3.1 kB	7 ms	
data10.2.b3dm	200	xhr	Resource:is2256	106 kB	10 ms	
data4.2.b3dm	200	xhr	Resource:is2256	4.7 kB	7 ms	
data4.1.b3dm	200	xhr	Resource:is2256	289 kB	18 ms	
data5.3.b3dm	200	xhr	Resource:is2256	102 kB	10 ms	
data4.3.b3dm	200	xhr	Resource:is2256	20.2 kB	5 ms	
data4.2.b3dm	200	xhr	Resource:is2256	161 kB	16 ms	
data20.2.b3dm	200	xhr	Resource:is2256	4.4 kB	6 ms	
data20.1.b3dm	200	xhr	Resource:is2256	245 kB	18 ms	
data9.2.b3dm	200	xhr	Resource:is2256	3.8 kB	8 ms	
data9.1.b3dm	200	xhr	Resource:is2256	209 kB	16 ms	
data3.2.b3dm	200	xhr	Resource:is2256	5.7 kB	9 ms	
data3.1.b3dm	200	xhr	Resource:is2256	269 kB	16 ms	
data18.2.b3dm	200	xhr	Resource:is2256	3.8 kB	9 ms	
data18.1.b3dm	200	xhr	Resource:is2256	245 kB	18 ms	
data9.2.b3dm	200	xhr	Resource:is2256	5.9 kB	8 ms	
data2.1.b3dm	200	xhr	Resource:is2256	3.4 kB	8 ms	
data2.0.b3dm	200	xhr	Resource:is2256	244 kB	15 ms	
data7.3.b3dm	200	xhr	Resource:is2256	5.6 kB	8 ms	
data7.2.b3dm	200	xhr	Resource:is2256	143 kB	9 ms	
data0.2.b3dm	200	xhr	Resource:is2256	5.3 kB	8 ms	
data0.1.b3dm	200	xhr	Resource:is2256	145 kB	12 ms	
data3.2.b3dm	200	xhr	Resource:is2256	114 kB	5 ms	
data3.1.b3dm	200	xhr	Resource:is2256	127 kB	11 ms	
data2.2.b3dm	200	xhr	Resource:is2256	172 kB	17 ms	
data2.1.b3dm	200	xhr	Resource:is2256	140 kB	16 ms	
data2.0.b3dm	200	xhr	Resource:is2256	3.1 kB	14 ms	
data2.0.b3dm	200	xhr	Resource:is2256	78.7 kB	9 ms	
data4.2.b3dm	200	xhr	Resource:is2256	4.4 kB	7 ms	
data4.1.b3dm	200	xhr	Resource:is2256	251 kB	12 ms	
data5.2.b3dm	200	xhr	Resource:is2256	3.9 kB	11 ms	
data5.1.b3dm	200	xhr	Resource:is2256	193 kB	14 ms	
data4.2.b3dm	200	xhr	Resource:is2256	16.9 kB	7 ms	
data4.1.b3dm	200	xhr	Resource:is2256	117 kB	11 ms	
data4.2.b3dm	200	xhr	Resource:is2256	157 kB	15 ms	
data4.1.b3dm	200	xhr	Resource:is2256	17.6 kB	6 ms	
data5.4.b3dm	200	xhr	Resource:is2256	13.4 kB	7 ms	
data5.3.b3dm	200	xhr	Resource:is2256	85.7 kB	9 ms	
data4.2.b3dm	200	xhr	Resource:is2256	3.8 kB	8 ms	
data4.1.b3dm	200	xhr	Resource:is2256	253 kB	13 ms	
data10.2.b3dm	200	xhr	Resource:is2256	5.7 kB	8 ms	
data10.1.b3dm	200	xhr	Resource:is2256	306 kB	13 ms	

3DTiles by A



Name	Status	Type	Initiator	Size	Time	Waterfall
data29.b3dm	200	xhr	Resource:is2256	154 kB	12 ms	
data48.b3dm	200	xhr	Resource:is2256	699 kB	46 ms	
data72.b3dm	200	xhr	Resource:is2256	299 kB	31 ms	
data17.b3dm	200	xhr	Resource:is2256	366 kB	27 ms	
data23.b3dm	200	xhr	Resource:is2256	147 kB	37 ms	
data29.b3dm	200	xhr	Resource:is2256	516 kB	37 ms	
data28.b3dm	200	xhr	Resource:is2256	263 kB	18 ms	
data153.b3dm	200	xhr	Resource:is2256	459 kB	44 ms	
data167.b3dm	200	xhr	Resource:is2256	431 kB	38 ms	
data172.b3dm	200	xhr	Resource:is2256	364 kB	35 ms	
data173.b3dm	200	xhr	Resource:is2256	619 kB	39 ms	
data103.b3dm	200	xhr	Resource:is2256	296 kB	21 ms	
data151.b3dm	200	xhr	Resource:is2256	549 kB	34 ms	
data747.b3dm	200	xhr	Resource:is2256	227 kB	28 ms	
data749.b3dm	200	xhr	Resource:is2256	300 kB	25 ms	
data448.b3dm	200	xhr	Resource:is2256	152 kB	18 ms	
data106.b3dm	200	xhr	Resource:is2256	275 kB	26 ms	
data64.b3dm	200	xhr	Resource:is2256	326 kB	37 ms	
data101.b3dm	200	xhr	Resource:is2256	758 kB	53 ms	
data121.b3dm	200	xhr	Resource:is2256	631 kB	66 ms	
data194.b3dm	200	xhr	Resource:is2256	1.8 MB	100 ms	
data1103.b3dm	200	xhr	Resource:is2256	196 kB	12 ms	
data1033.b3dm	200	xhr	Resource:is2256	775 kB	43 ms	
data195.b3dm	200	xhr	Resource:is2256	1.9 MB	100 ms	
data205.b3dm	200	xhr	Resource:is2256	273 kB	39 ms	
data211.b3dm	200	xhr	Resource:is2256	308 kB	16 ms	
data2161.b3dm	200	xhr	Resource:is2256	297 kB	26 ms	
data161.b3dm	200	xhr	Resource:is2256	452 kB	18 ms	
data166.b3dm	200	xhr	Resource:is2256	369 kB	21 ms	
data199.b3dm	200	xhr	Resource:is2256	2.2 MB	100 ms	
data204.b3dm	200	xhr	Resource:is2256	390 kB	30 ms	
data213.b3dm	200	xhr	Resource:is2256	773 kB	42 ms	
data2153.b3dm	200	xhr	Resource:is2256	606 kB	56 ms	
data141.b3dm	200	xhr	Resource:is2256	264 kB	24 ms	
data232.b3dm	200	xhr	Resource:is2256	369 kB	28 ms	
data813.b3dm	200	xhr	Resource:is2256	682 kB	30 ms	
data810.b3dm	200	xhr	Resource:is2256	903 kB	49 ms	
data813.b3dm	200	xhr	Resource:is2256	5.7 MB	367 ms	
data152.b3dm	200	xhr	Resource:is2256	333 kB	37 ms	
data147.b3dm	200	xhr	Resource:is2256	340 kB	30 ms	
data41.b3dm	200	xhr	Resource:is2256	553 kB	30 ms	
data42.b3dm	200	xhr	Resource:is2256	2.3 MB	100 ms	
data40.b3dm	200	xhr	Resource:is2256	138 kB	13 ms	
data145.b3dm	200	xhr	Resource:is2256	535 kB	26 ms	
data143.b3dm	200	xhr	Resource:is2256	139 kB	12 ms	
data144.b3dm	200	xhr	Resource:is2256	479 kB	20 ms	
data146.b3dm	200	xhr	Resource:is2256	293 kB	69 ms	
data118.b3dm	200	xhr	Resource:is2256	726 kB	46 ms	
data119.b3dm	200	xhr	Resource:is2256	2.2 MB	111 ms	
data120.b3dm	200	xhr	Resource:is2256	1.5 MB	79 ms	
data107.b3dm	200	xhr	Resource:is2256	1.7 MB	60 ms	
data209.b3dm	200	xhr	Resource:is2256	335 kB	15 ms	
data210.b3dm	200	xhr	Resource:is2256	765 kB	30 ms	
data206.b3dm	200	xhr	Resource:is2256	534 kB	26 ms	
data208.b3dm	200	xhr	Resource:is2256	519 kB	24 ms	
data207.b3dm	200	xhr	Resource:is2256	813 kB	70 ms	
data100.b3dm	200	xhr	Resource:is2256	905 kB	81 ms	
data65.b3dm	200	xhr	Resource:is2256	989 kB	76 ms	
data86.b3dm	200	xhr	Resource:is2256	1.6 MB	129 ms	
data168.b3dm	200	xhr	Resource:is2256	1.9 MB	75 ms	
data168.b3dm	200	xhr	Resource:is2256	1.7 MB	123 ms	
data171.b3dm	200	xhr	Resource:is2256	378 kB	26 ms	
data170.b3dm	200	xhr	Resource:is2256	365 kB	26 ms	
data116.b3dm	200	xhr	Resource:is2256	393 kB	18 ms	
data112.b3dm	200	xhr	Resource:is2256	476 kB	31 ms	
data117.b3dm	200	xhr	Resource:is2256	100 kB	15 ms	
data110.b3dm	200	xhr	Resource:is2256	373 kB	18 ms	
data190.b3dm	200	xhr	Resource:is2256	357 kB	27 ms	
data111.b3dm	200	xhr	Resource:is2256	124 kB	11 ms	
data109.b3dm	200	xhr	Resource:is2256	123 kB	10 ms	
data94.b3dm	200	xhr	Resource:is2256	308 kB	27 ms	
data99.b3dm	200	xhr	Resource:is2256	464 kB	24 ms	
data67.b3dm	200	xhr	Resource:is2256	454 kB	33 ms	
data91.b3dm	200	xhr	Resource:is2256	374 kB	20 ms	
data92.b3dm	200	xhr	Resource:is2256	536 kB	38 ms	
data93.b3dm	200	xhr	Resource:is2256	144 kB	19 ms	
data1153.b3dm	200	xhr	Resource:is2256	347 kB	22 ms	
data111.b3dm	200	xhr	Resource:is2256	214 kB	28 ms	
data113.b3dm	200	xhr	Resource:is2256	285 kB	29 ms	
data97.b3dm	200	xhr	Resource:is2256	132 kB	8 ms	
data98.b3dm	200	xhr	Resource:is2256	372 kB	26 ms	
data95.b3dm	200	xhr	Resource:is2256	122 kB	17 ms	
data96.b3dm	200	xhr	Resource:is2256	254 kB	20 ms	
data90.b3dm	200	xhr	Resource:is2256	132 kB	11 ms	
data89.b3dm	200	xhr	Resource:is2256	264 kB	23 ms	
data88.b3dm	200	xhr	Resource:is2256	256 kB	32 ms	

3DTiles by B

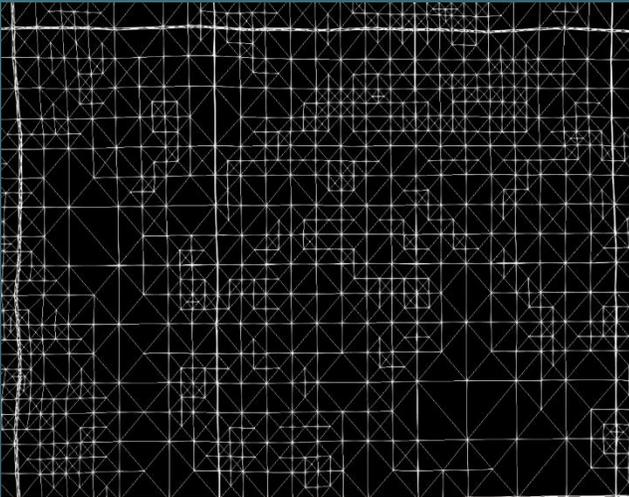
## 2. Originally Supported Features

# mag3DTerrainer

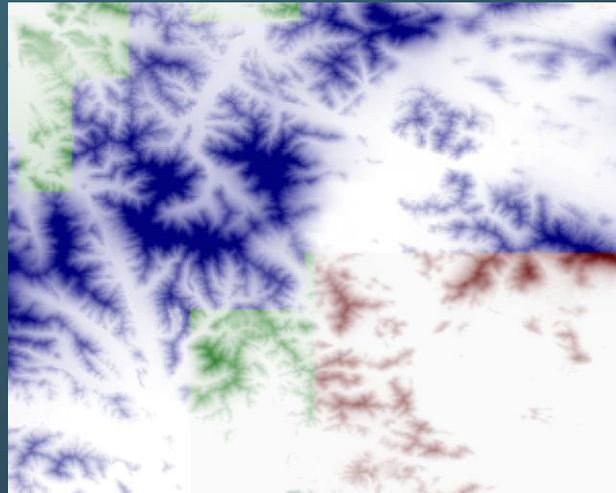
### From Urban to Terrain — mag3DTerrainer

mag3DTiler focuses on urban and object-based 3D data, so **mag3DTerrainer** complements it for terrain data processing

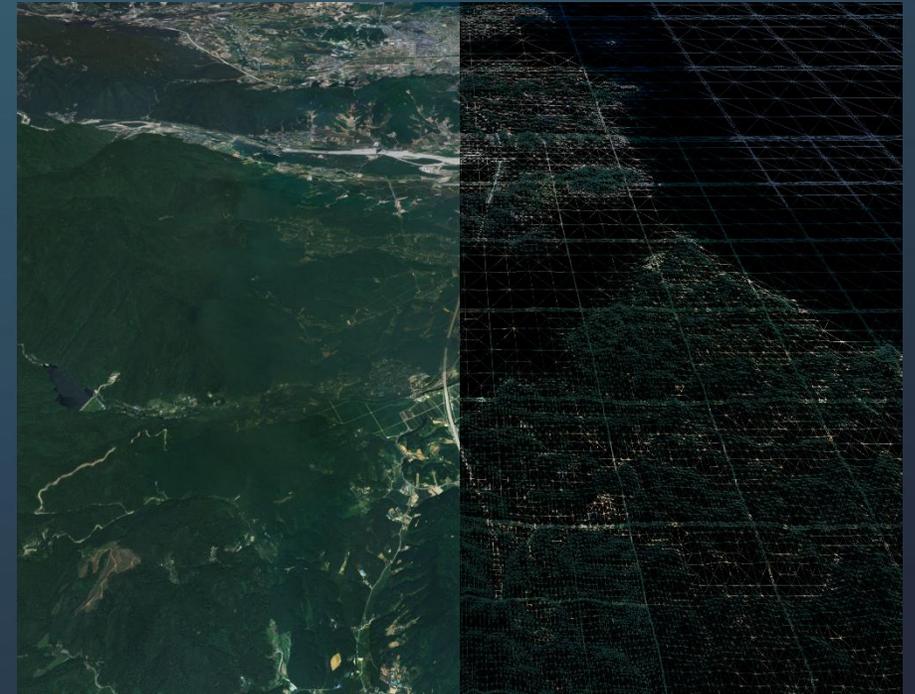
- Simple to use, fast DEM-to-Terrain conversion
- Supports multiple GeoTIFF inputs and multi-CRS handling via Proj
- **Prioritizes high-resolution data when mixing multiple datasets**
- RTIN-based terrain generation



<Wireframe Terrain>



<Multiple Resolution GeoTIFFs>



<Terrain Wireframe Comparing Screenshot>

## 2. Originally Supported Features

# mag03DTerrainer

# mag0 3DTerrainer

<https://github.com/Gaia3D/mago-3d-terrainer>

: Java based open source quantized-mesh terrain generator

# <https://github.com/Gaia3D/mago-3d-terrainer>

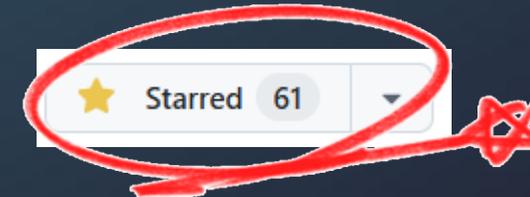


Commit	Message	Time
znkim	test: add test codes ✓	d16a6d6 · last month 1,378 Commits
	build : fix word	6 months ago
	refactor : improve build scripts	6 months ago
	refactor : refactoring project	last year
	Merge commit '0847a664b2b562bd86ed2f183c393a715469...	5 months ago
	test: add test codes	last month
	Merge remote-tracking branch 'common/main' into develop	6 months ago
	build : change docker(jib) Authentication method	6 months ago
	doc : fixed korean manual, readme	11 months ago
	refactor : improve build scripts	6 months ago
	refactor : improve build scripts	6 months ago
	refactor : improve build scripts	6 months ago
	build : fix test, update readme	6 months ago

<May 2025>



<December 2025>



Latest Version: 1.10



## 2. Originally Supported Features

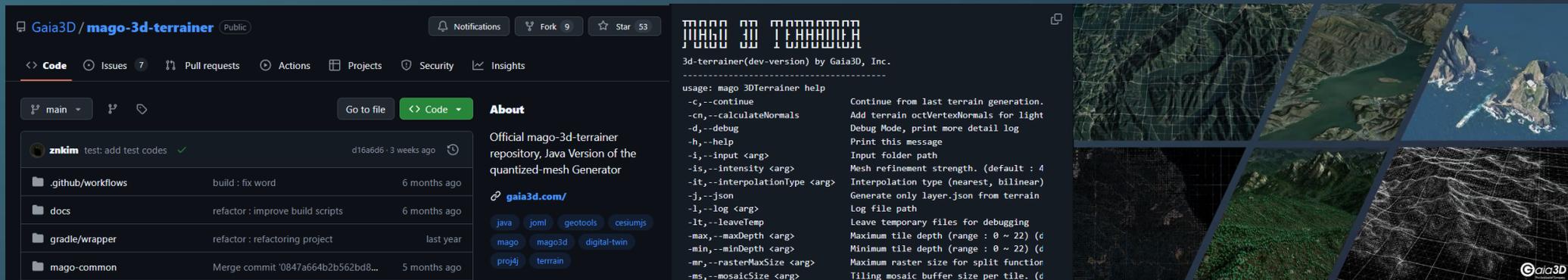
# mago3DTerrainer

## mago 3DTerrainer

<https://github.com/Gaia3D/mago-3d-terrainer>  
<https://github.com/CesiumGS/quantized-mesh>

: Java based open source quantized-mesh terrain generator

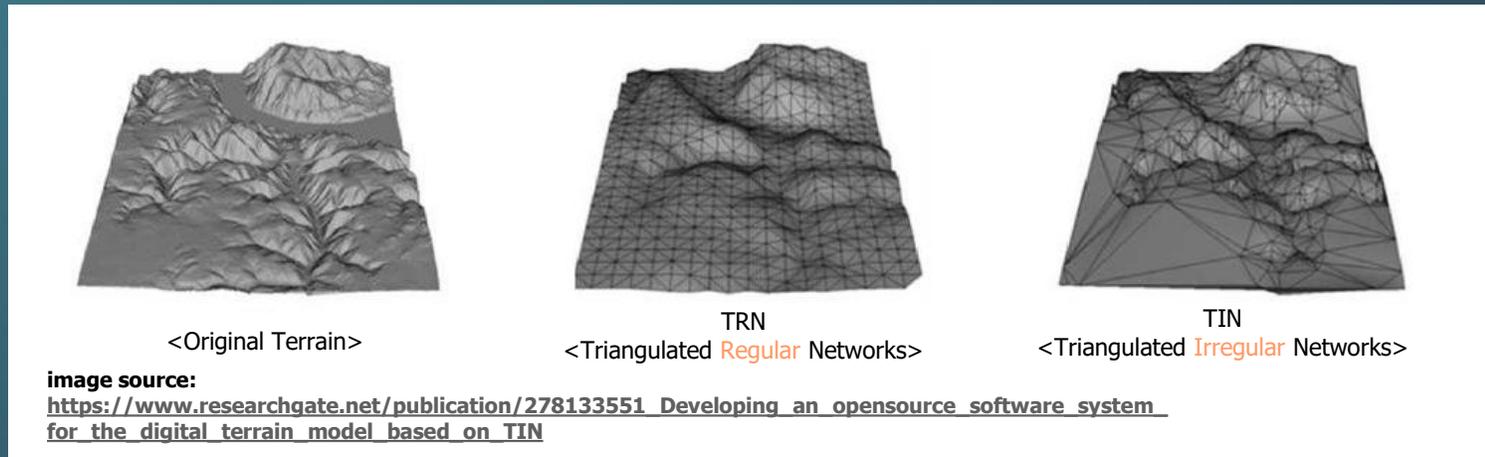
Open Source	<b>No dependencies</b> on any specific company or technology
Portable & Scalable	Offering excellent <b>interoperability, portability, and scalability</b> with other systems
SRS Conversion	<b>Real-time SRS transformation</b> during 3D Tiles making
High accuracy	Generate quantized-mesh data with high accuracy.
Multiple data conversion	Convert <b>multiple GeoTIFF</b> data at once.
Customizable options	<b>Provides various customization options</b> such as min/max tile depth, tile raster max size, tile mosaic size, tile generation strength, interpolation method, etc.



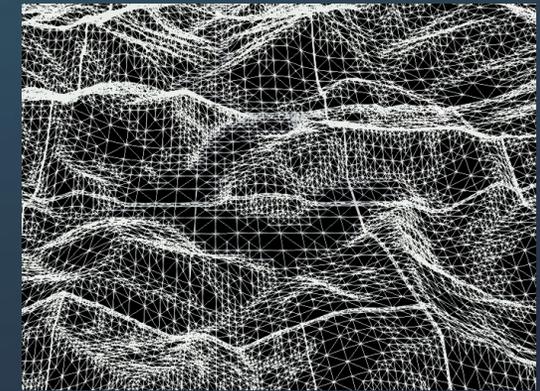
## Why we use RTIN(Right-Triangulated Irregular Network Type)?

We adopted the **RTIN-based method** as our primary terrain generation approach.

- RTIN provides an efficient **balance** between TIN and traditional terrain grids
- It captures terrain features accurately while keeping the mesh lightweight
- The refinement process allows flexible control over detail levels
- Because refinement can be adjusted, LOD generation becomes much easier and more efficient



<Terrain Mesh Types>



RTIN  
<Right-Triangulated Irregular Network Type>

## 2. Originally Supported Features

### License

- mago3DTiler, mago3DTerrainr are released under the [MPL 2.0 license](https://www.mozilla.org/en-US/MPL/2.0/) (https://www.mozilla.org/en-US/MPL/2.0/)
- If you do not wish to disclose the modified code under the [MPL 2.0 license](https://www.mozilla.org/en-US/MPL/2.0/), you may opt for a commercial license. In this case, please contact us at [sales@gaia3d.com](mailto:sales@gaia3d.com)

*"It's a work  
in progress"*



*"Good things  
take time!"*

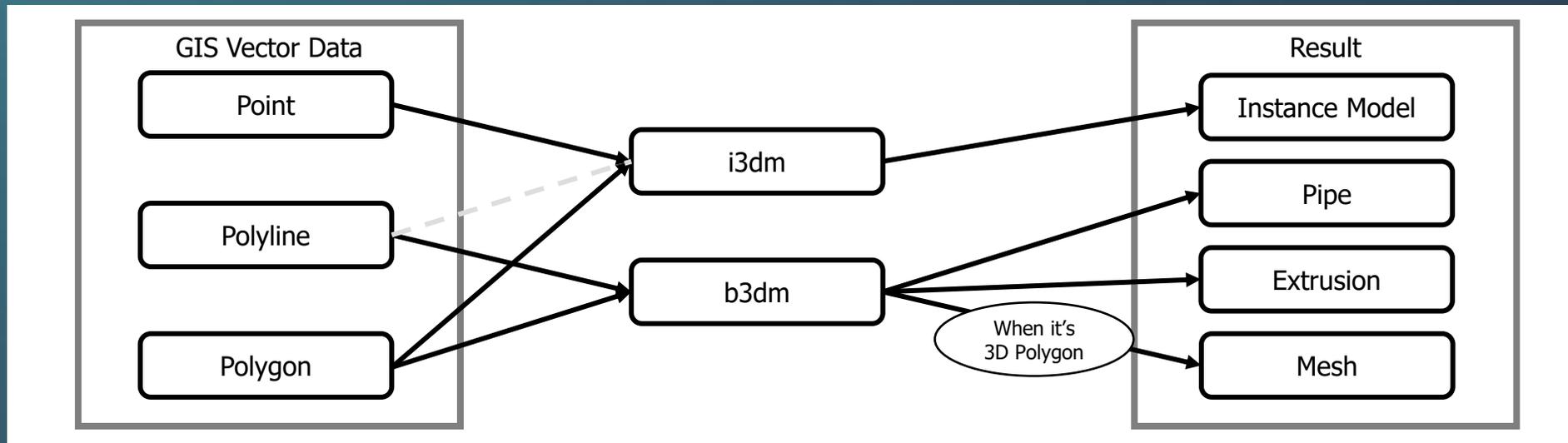
# Newly Supported Features

(mago3DTiler)

# 3D Tiles Making from 2D Map

## More flexible 2D map conversion features

- Enhanced 2D map data conversion for more flexible use, including extrusion and underground pipe generation features.
- It's not just about converting point-type data to i3dm—it also enables generating random instances within polygons.

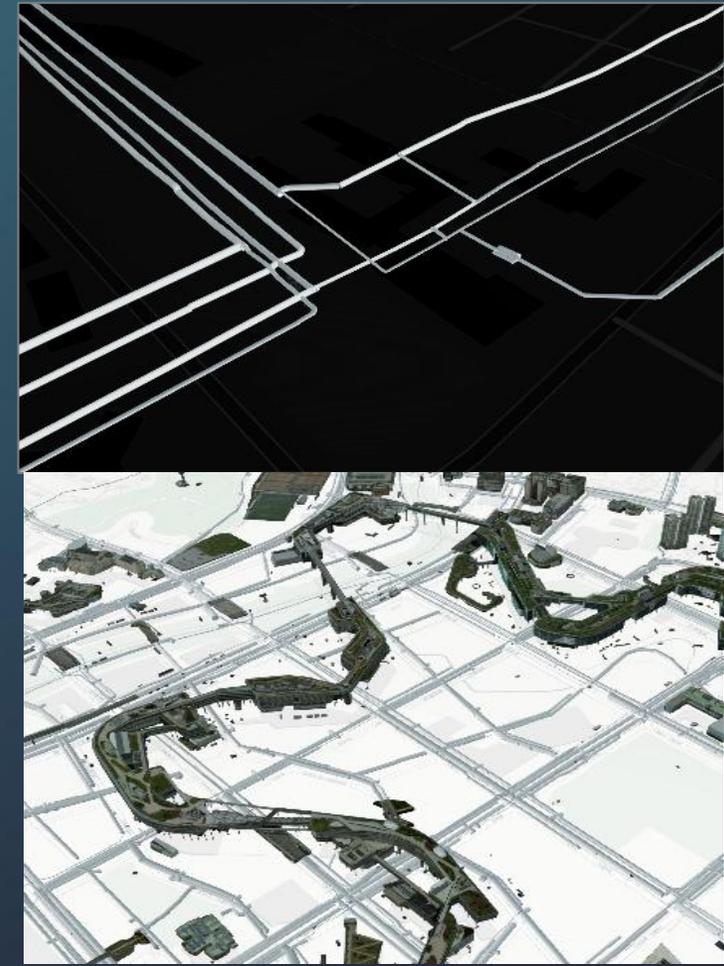


<3D Tiles Conversion Flow from 2D Map>

# 3D Tiles Making from 2D Map

## Underground Facility Support

- Use underground drawings or maps in SHP format (linestring)
- Use specific attributes as diameter and node depth

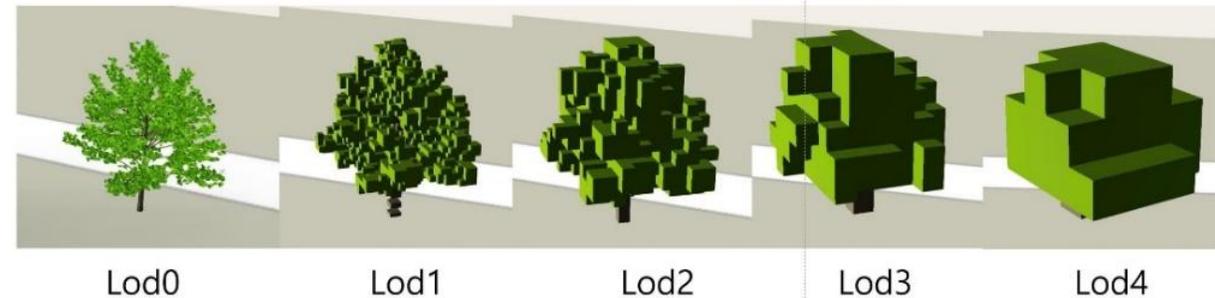
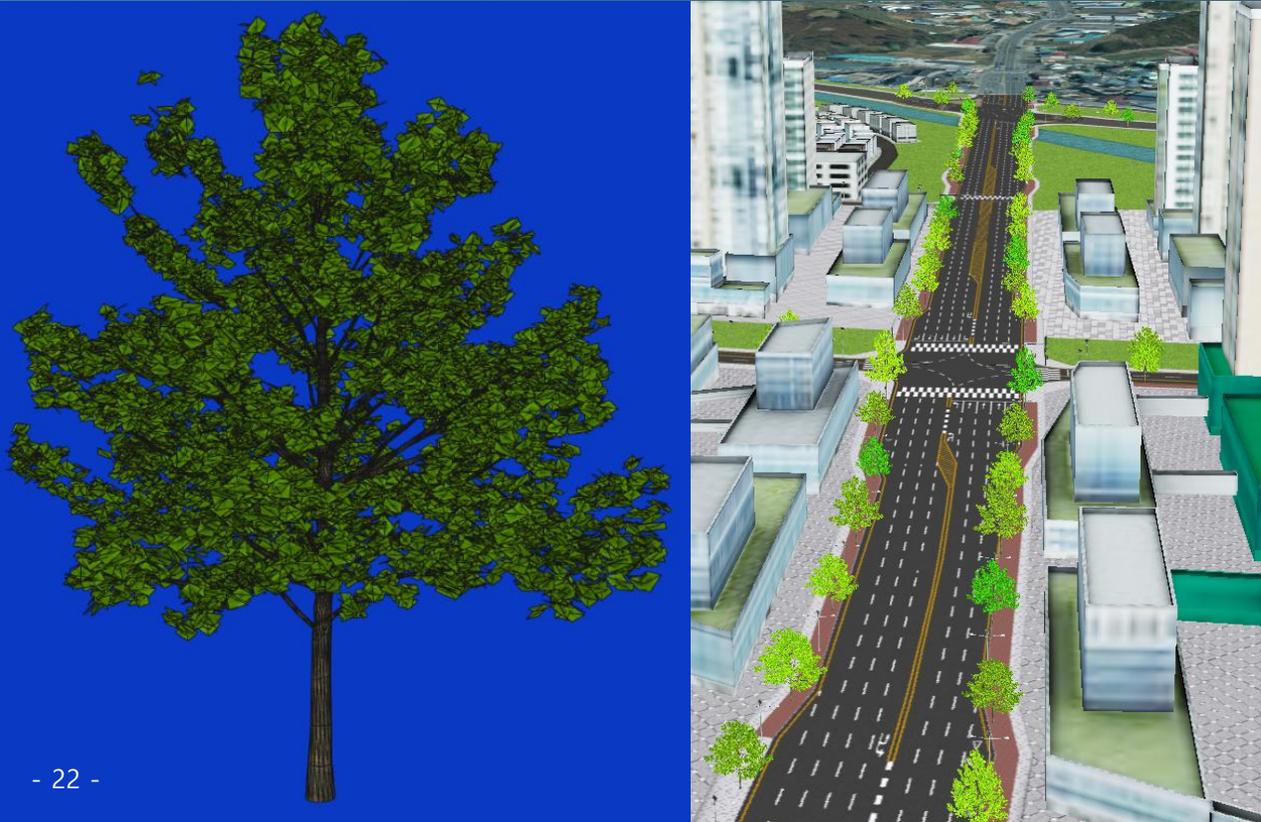


# 3D Tiles Making from 2D Map

## Multi-LOD I3DM Support

- I3DM that allows for easy reuse of the same model, like a cookie-cutter molds
- If the model has a large file size, create LOD-specific cookie-cutter molds from the original model

Street tree I3DM using large-scale tree models



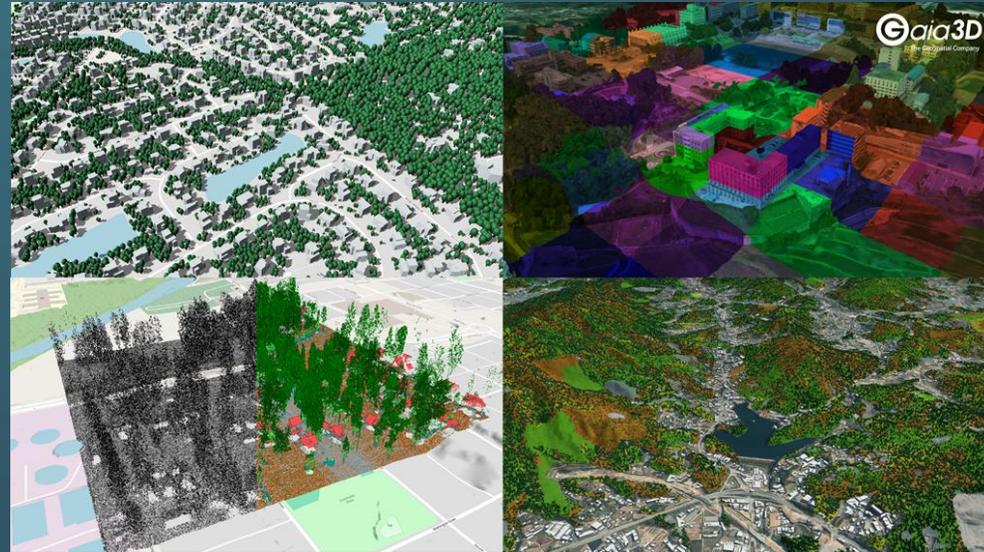
LOD processing of the original instance

# 3DTiles 1.1

## Supporting OGC 3DTiles Version 1.1

<https://docs.ogc.org/cs/22-025r4/22-025r4.html>

The image shows the cover page of the OGC 3D Tiles Specification document. On the left, there is a vertical sidebar with the text 'OGC COMMUNITY STANDARD' and 'APPROVED'. The main content area features the title '3D Tiles Specification' and the Open Geospatial Consortium logo. Below the logo, the authors 'Patrick Cozzi' and 'Sean Lilley' are listed with 'Edit' buttons. The document's submission, approval, and publication dates are provided. A table of contents is visible on the left side of the page, listing sections from I. ABSTRACT to 7.6. INSTANCED 3D MODEL. At the bottom, the text 'OGC COMMUNITY STANDARD' is displayed.



### Support for 3D Tiles 1.1 Specification

- The default tileset version is now **1.1**.
- You can still generate tiles in the **1.0** format by using the option:

```
--tilesVersion 1.0
```

- Legacy tile formats ( **b3dm** , **i3dm** , **pnts** ) have been replaced with glTF ( **.glb** ) based structures.
- Extension handling has been updated to use both Tileset and glTF extensions as specified in the 1.1 standard.

# 3D Tiles Making from 2D Map

## Applying Remeshing Techniques to LOD

- ✓ We generated South Korea's forest i3dm data using a Forest-Type based on polygons.
- ✓ We created realistic forest data by using forest **density**, **tree species**, **tree height**, and random heading.

You can now create i3dm using Polygon.

--densityColumn <arg> : Polygon instance generation density relative to area

--scaleColumn <arg> : Instance size

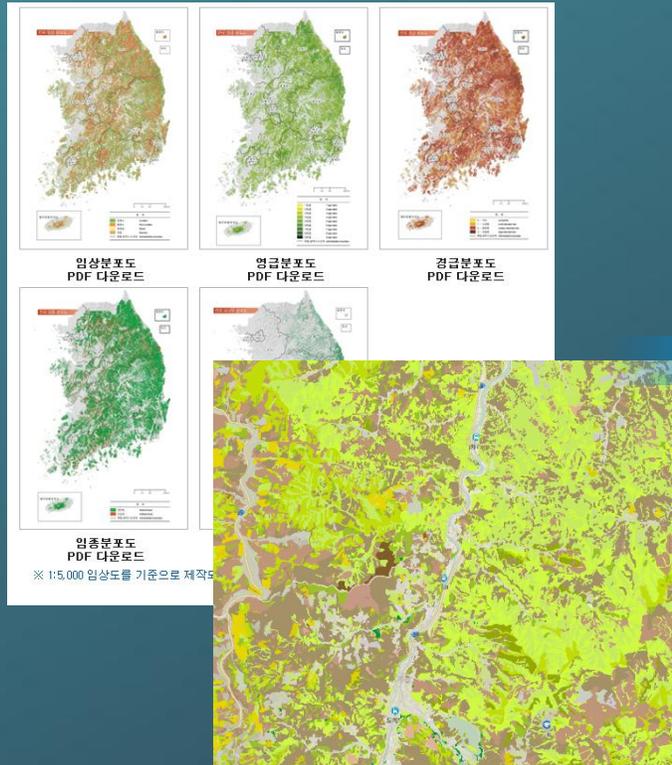
--AttributeFilter <arg> : Feature attribute filter

--headingColumn <arg> : Instance heading



# 3D Tiles Making from 2D Map

## Building a Forest with the i3dm Format



<Forest Maps from the Korea Forest Service>  
2D Vector Polygon

<Generated Forest 3DTiles(i3dm)>

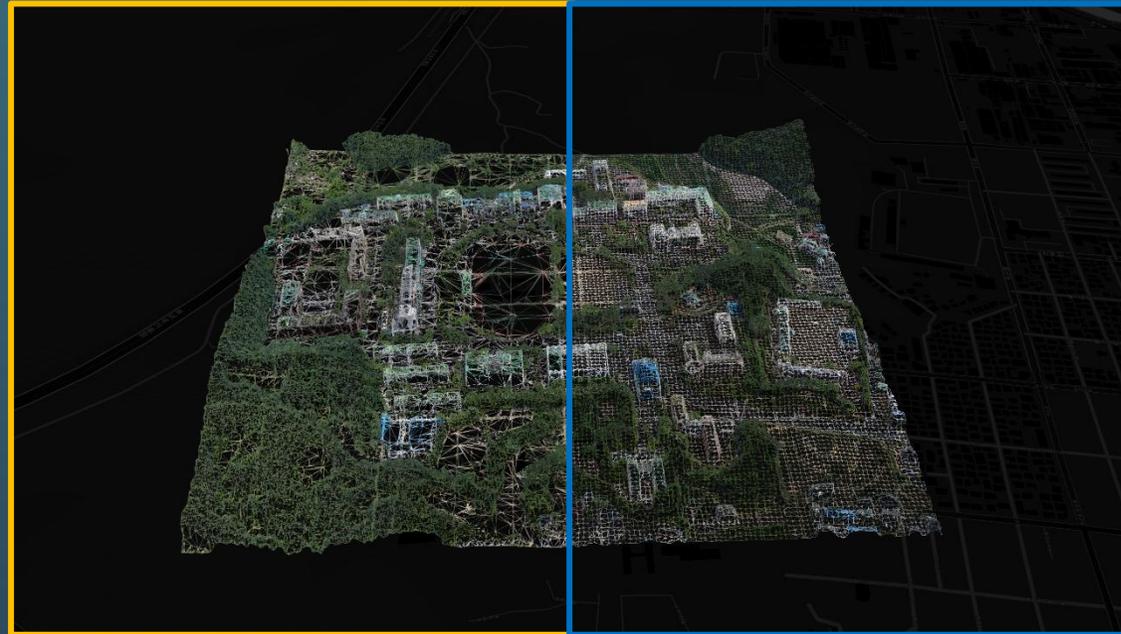
# 3D Tiles Making from 2D Map



# Improvement of Reality Mesh Conversion

## Visual Improvement and Size Optimization

- By applying mesh optimization techniques such as **remesh** and **decimate**, along with enhanced retexturing capabilities, we **minimized the visual gap between high LOD and low LOD** while reducing file size.
- applying glTF mesh quantization.



<L : Decimate, R : Remesh>

# Improvement of Reality Mesh Conversion

## Visual Improvement and Size Optimization



<Old Version>



<New Version>

### 3. Newly Supported Features (mago3DTiler)

# Improvement of Reality Mesh Conversion

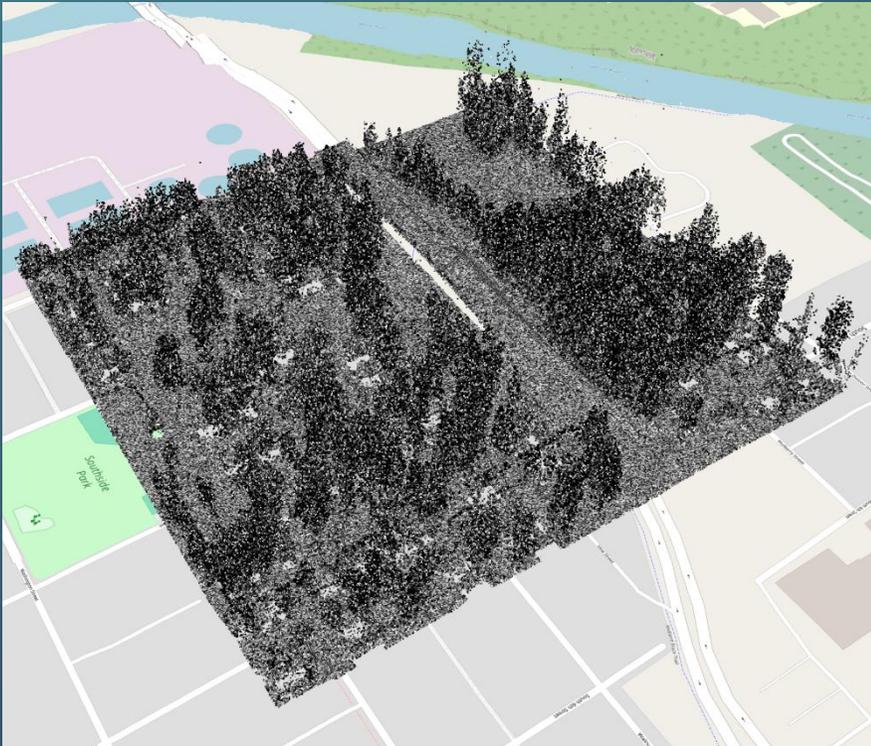


# Improvement of Point Cloud Conversion

## Support for **Intensity**, **Classification** in point clouds

Now, not only the **RGB** data from LAS files but also attribute information such as **Intensity** and **Classification** is included in 3DTiles.

They are included in the glTF's attributes, so they can be used through a custom shader.



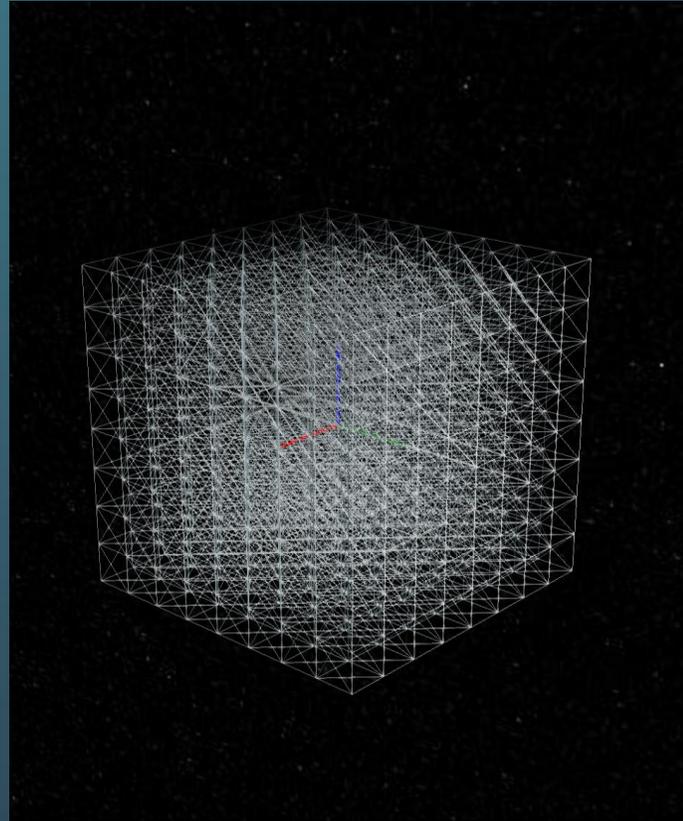
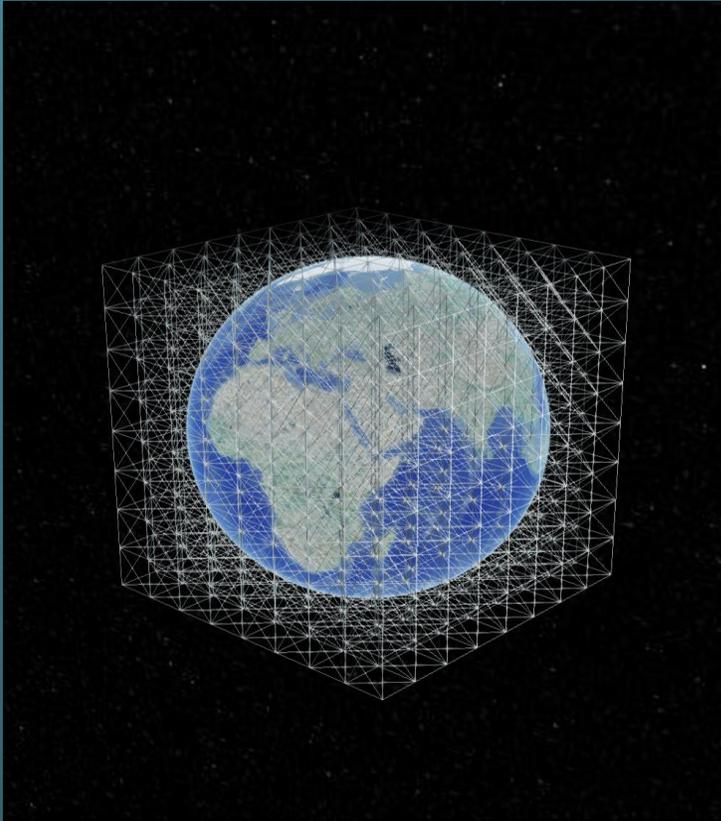
<Intensity>



<Classification>

# ECEF coordinate system support

## Support ECEF Coordinate System



# 4. Things to Do Moving Forward

There is still a long way to go

## mago3DTiler

- Improve stability and performance of photogrammetry conversion
- Add automatic billboard LOD generation for i3dm outputs

## mago3DTerrainer

- Expand input data types: TIN, irregular point sets, contour lines, etc.
- Support TIN-based terrain generation
- Enable generating terrain data directly as OGC 3D Tiles
- Add geoid correction
- Support additional tiling schemes: WebMercator (in addition to Geographic)

We have priorities, but your money can change the priority!

Show me the money, we'll show the code!!

# Q & A

# Thank you!

<https://github.com/Gaia3D/mago-3d-tiler>

<https://github.com/Gaia3D/mago-3d-terrainer>

Web: [www.gaia3d.com](http://www.gaia3d.com)

YouTube: <https://www.youtube.com/@mago3d890>

Facebook: <https://www.facebook.com/Gaia3d>

X(Twitter): <https://twitter.com/Gaia3D>

