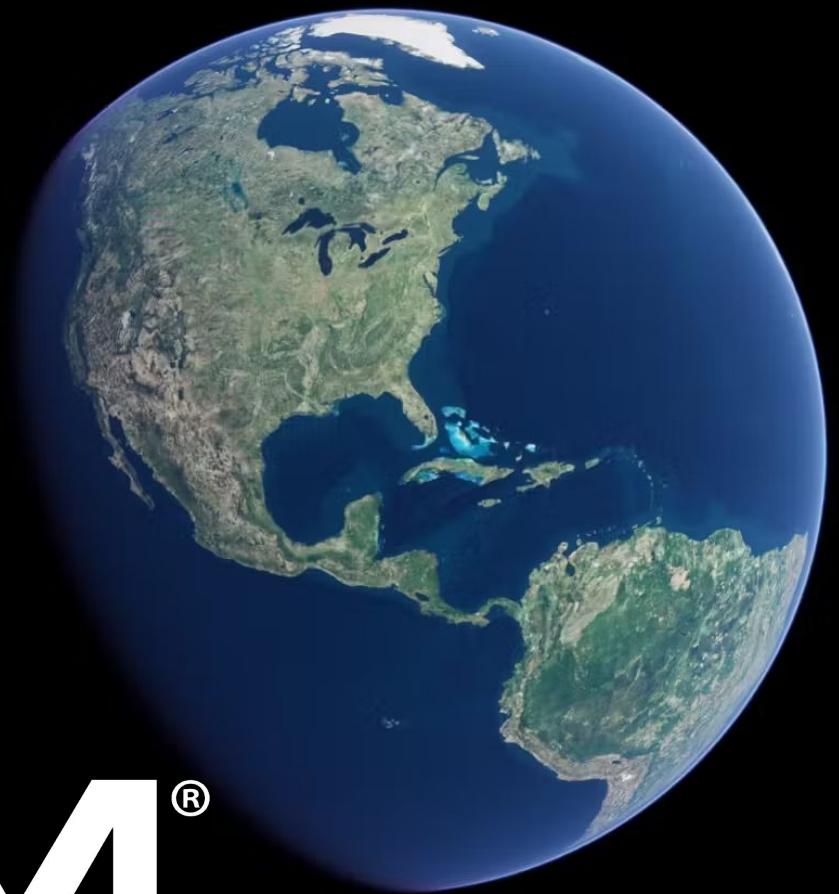




CESIUM[®]

Introduction





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Market Development @Bentley Systems

Dipl.-Ing. Bauingenieurwesen (TUM)

SOFiTStIK|Nemetschek|PTC|ANSYS|Thinkproject

Agenda

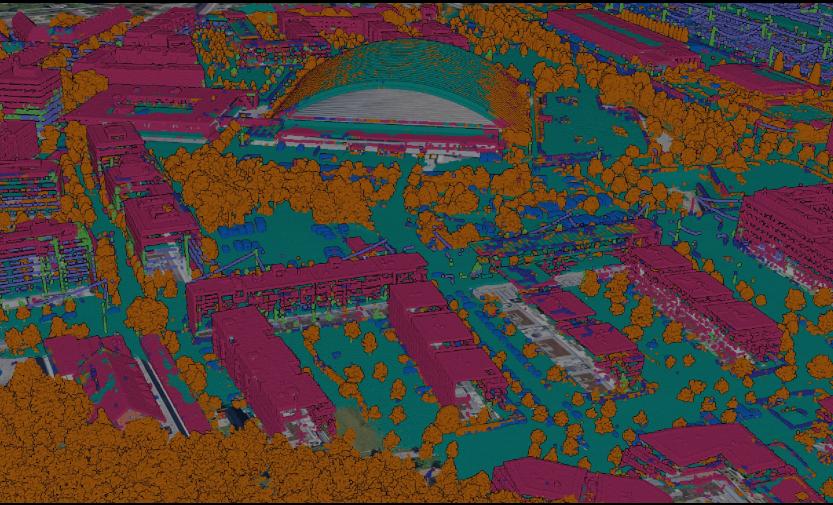
What | How
Hands-On Exercise



Civil x Arch x GIS

Typical Challenges

- Lack of context
- Isolated Models
- No geo-reference
- Multiple data-sources
- Multiple data-formats
- Performance
- Accessibility
- Model-specific functionality



What is CESIUM?



“Think of it as “Google Earth” on steroids.”

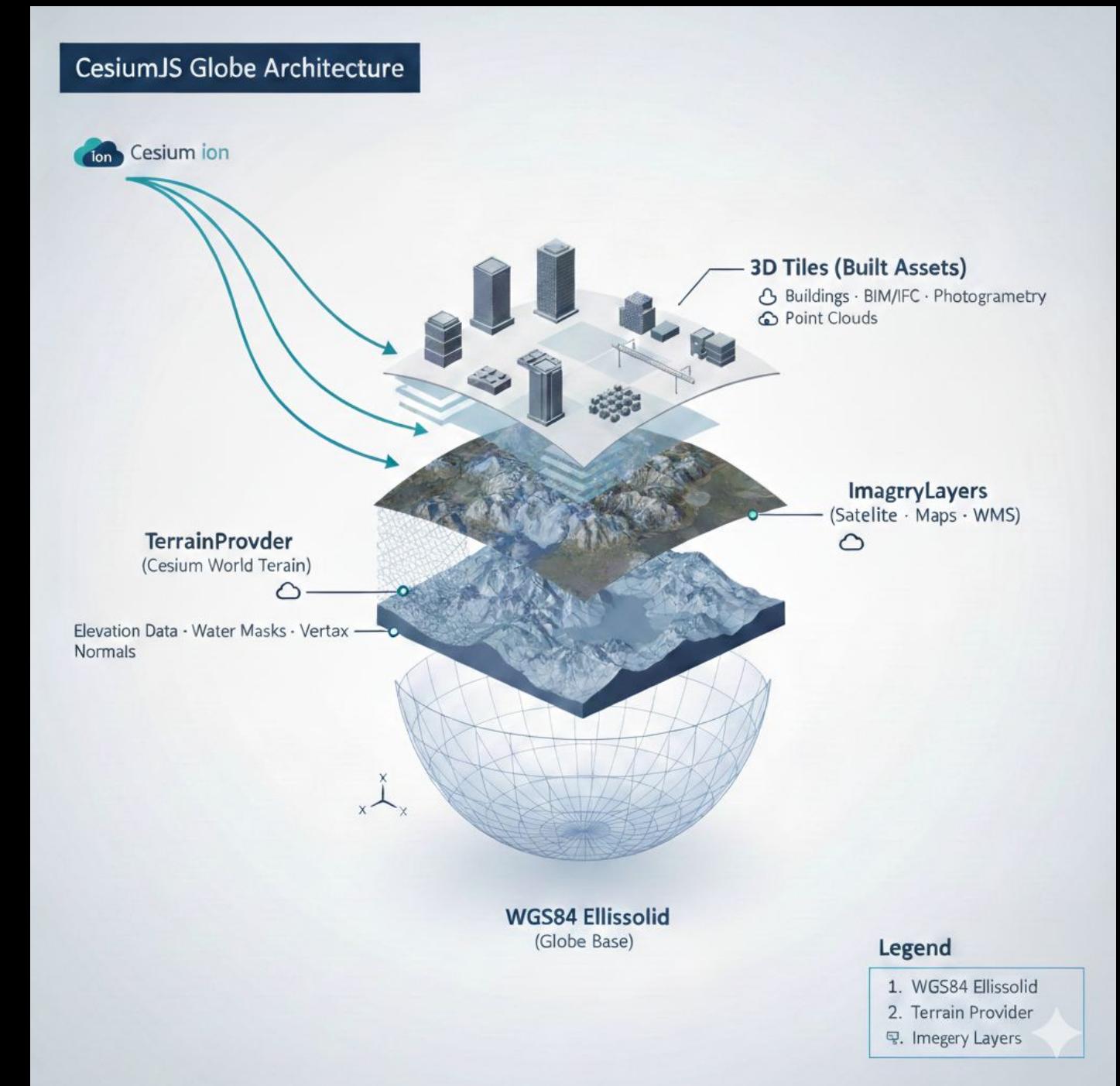
CESIUM for the AEC/O Industry - What?

- BIM goes Geospatial
- Contextualisation & Visualisation
- Holistic & Coherent Information
- Accessibility (Web-Technology)
- Flexibility & Scalability (SDK & Edge Computing)
- Open Technology (Open Source, IFC, glTF, REST...)
- Easy customization & deployment
- Can run on-prem



CESIUM - Globe Architecture

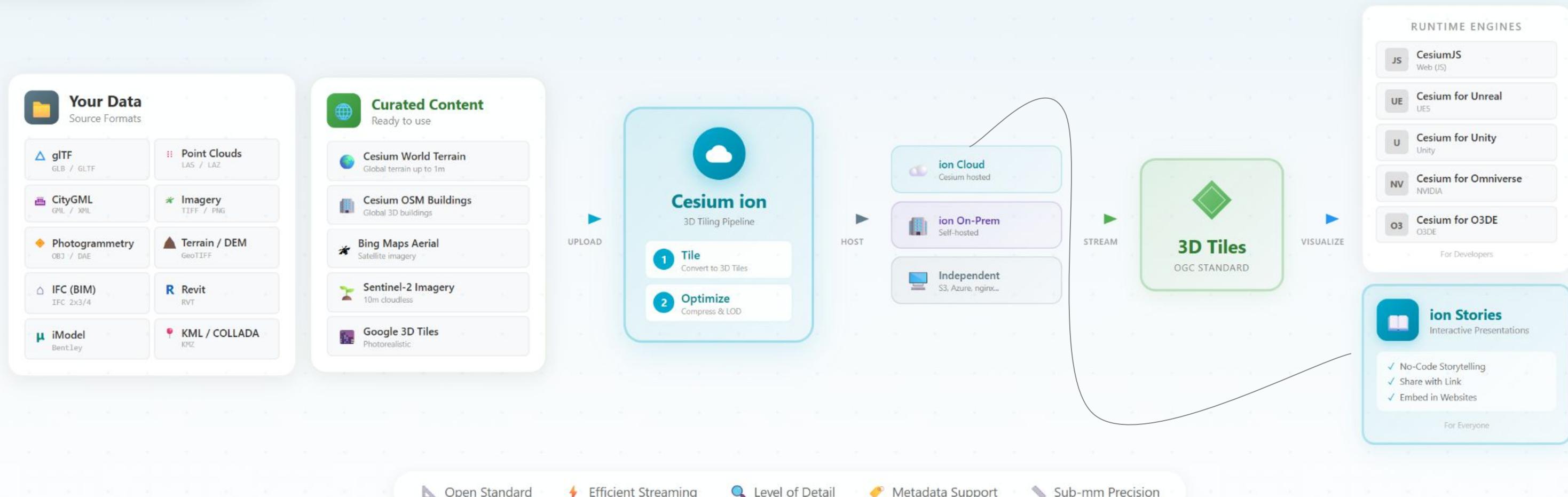
- Terrain Models
- Orthophoto & Image Data
- Map Data
- Built & BIM Assets
- Lighting/Shadows
- Dynamic data
 - weather
 - traffic
 - IOT Sensor Data
 - ...



CESIUM - Pipeline

Cesium Data Pipeline

From Source Data to 3D Visualization



Source: cesium.com/platform/cesium-ion • 3D Tiles is an OGC Community Standard

CESIUM - Data

- Terrain Models
- Orthophoto & Image Data
- Map Data
- Built & BIM Assets
- Lighting/Shadows
- Dynamic data
 - weather
 - traffic
 - IOT Sensor Data
 - ...

Supported data formats

The following table lists accepted data formats and their corresponding asset types:

| Format | 3D Tiles | Terrain | Imagery | glTF | Native |
|---|----------|---------|---------|------|--------|
| Zip Archive (.zip) | ✓ | ✓ | ✓ | ✓ | |
| glTF (.gltf, .glb) | ✓ | | | ✓ | |
| Filmbox (.fbx) | ✓ | | | ✓ | |
| CityGML (.citygml, .xml, .gml) | | ✓ | | | |
| CZML (.czml) | | | | ✓ | |
| GeoJSON (.json, .geojson, .topojson) | | | | ✓ | |
| KML (.kml, .kmz) | ✓ | | | ✓ | |
| LASer (.las, .laz) | ✓ | | | | |
| COLLADA (.dae) | ✓ | | | ✓ | |
| Wavefront OBJ (.obj) | ✓ | | | ✓ | |
| IFC (.ifc) | ✓ | | | | |
| Floating Point Raster (.flt) | | ✓ | ✓ | | |
| Arc/Info ASCII Grid (.asc) | ✓ | ✓ | | | |
| Source Map (.src) | ✓ | ✓ | | | |
| GeoTIFF (.tiff, .tif) | ✓ | ✓ | | | |
| Erdas Imagine (.img) | ✓ | ✓ | | | |
| USGS ASCII DEM and CDED (.dem) | ✓ | ✓ | | | |
| JPEG (.jpg, .jpeg) | | | ✓ | | |
| PNG (.png) | | | ✓ | | |
| Cesium Terrain Database (.terraindb) | | ✓ | | | |
| Digital Terrain Elevation Data (.dt0, .dt1, .dt2) | | ✓ | | | |

CESIUM - Open Source vs. \$\$

- "Google Earth"-like visualization engine for BIM, Infrastructure and Digital Twins
- CESIUM JS: Java Script Library (Free & Open Source)
- CESIUM ION – Commercial Offering (\$)
- No code: "CESIUM ION Stories" (\$)
- Design Tiler for BIM Models (\$)
- Photogrammetric Reconstruction (\$)
- AI Point Cloud Categorization (\$)
- Global & Local Terrain Models (\$)
- Map & Sat Data (Sentinel, Google, Azure..) (\$)
- 3D Tiles Location Editor (\$)

\$ = Free of charge for educational purposes and small businesses

| Quotas | Community |
|---|--------------------------|
| Storage | 5 GB |
| Streaming | 15 GB / month |
| Reality Modeling (Technology Preview) | 20 gigapixels / month |
| Reality Analysis | 5 hours / month |
| Global Imagery (Bing Maps, Google Maps; Azure Maps as Technology Preview) | 1,000 sessions / month |
| Google Photorealistic 3D Tiles | 1,000 root tiles / month |
| Geocodes | 50,000 / month |
| Clips of Asset Depot Data | 10 clips / month |
| Teams Members (Teams accounts only) | Individual account only |

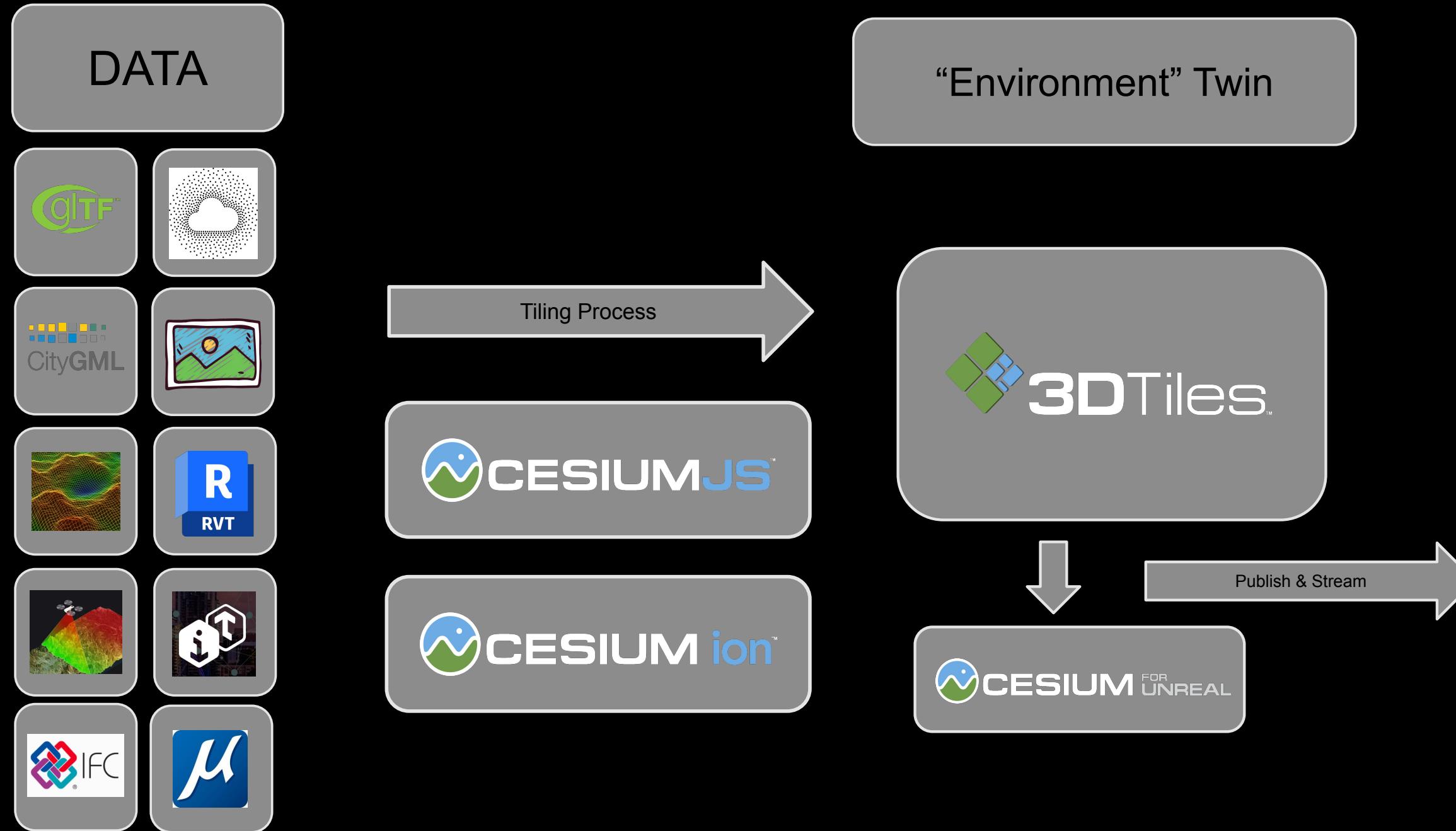
When do I need a paid account with a commercial license?

- If your company currently makes more than \$50K in annual gross revenues or has raised funds in excess of \$50K, or
- If you are working on a government project, or
- If you are working on funded educational research, or
- If you exceed the usage limits of the free community account

The free community account can be used for

- Non-commercial personal projects, or
- Exploratory commercial or government development, e.g., evaluating if Cesium ion will meet your needs, or
- Unfunded educational activities

Process



Integrations



CESIUM - Exercise

- Create your **free account** at ion.cesium.com
- Upload your model & GIS data
- Use data from [OPENDATA](#)
- Use ION content (e.g. Google 3D Tiles)
- Position your asset anywhere
- Create & Publish your CESIUM Story
- Explore sandcastle.cesium.com
- Build a custom JS app using AI/Vibe Coding
- Gamify your assets with Unreal Engine
- [More tutorials >>](#)



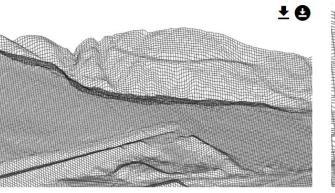
Digitales Orthophoto RGB 20cm
(DOP20 RGB)



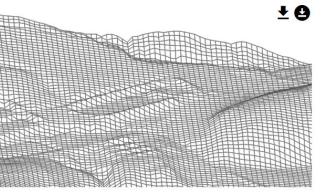
Digitales Orthophoto CIR 20cm (DOP20
CIR)



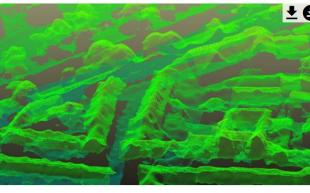
Digitales Orthophoto RGB 40cm
(DOP40 RGB)



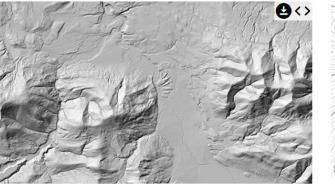
Digitales Geländemodell 1m (DGM1)



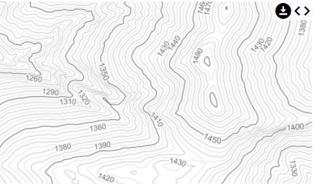
Digitales Geländemodell 5m (DGM5)



Digitales Oberflächenmodell 20cm
(DOM20)



Geländerelief



Höhenlinien



3D-Gebäudemodelle (LoD2)



Exercise-Files

github.com/christof2304/cesium-intro-tum

christof2304 / cesium-intro-tum

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

cesium-intro-tum Public

main 1 Branch 0 Tags Go to file Add file Code

christof2304 Add files via upload 678552c · 1 hour ago 5 Commits

| | | |
|--|----------------------|------------|
| 01_BIMcollab_Example_ARC_optimized.ifc | Add files via upload | 1 hour ago |
| rstadvancedsampleproject.rvt | Add files via upload | 1 hour ago |
| simple_house.ifc | Add files via upload | 1 hour ago |
| tum_introduction_vibde_coding.txt | Add files via upload | 1 hour ago |

README

Add a README

Help people interested in this repository understand your project.

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[Repository>>](#)

Thank You!

