Cesium in 2021
- Why?
- Cesium ion capabilities
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Why Cesium?

With the explosion of sensor availability, 3D geospatial data about the operational environment is being gathered and shared faster, cheaper, in greater amounts, and with better resolution than ever before.

And leaders are demanding the ability to make critical decisions with it.

The challenge Cesium overcomes is making that data quickly and easily available in one picture with the precision and global scale needed for analysis and action.

Learn more: Why Cesium?
Cesium is the open platform for 3D geospatial.

3D Data: Formats & Pipelines
Open standards & the best available tiling tools to optimize a variety of data for streaming

Visualization
Open source web-based runtime engine

Modeling & Simulation
Streaming global scale & WGS-84 precision for game engines

Curated 3D content
Ready-to-stream 3D assets

Analysis
GPU-accelerated 3D geospatial analysis

More on the platform: Cesium ion
Developers across industries, from aerospace to smart cities to drones, use CesiumJS to create interactive applications for viewing, analyzing, and sharing dynamic geospatial data.

Visualization:

CesiumJS

Open source JavaScript library for creating world-class 3D globes and maps with the best possible performance, precision, visual quality, and ease of use.

- Built on open formats, CesiumJS is designed for robust interoperability and scaling for massive datasets.
- Stream in 3D Tiles and other standard formats from Cesium ion or another source
- Visualize and analyze on a high-precision WGS84 globe
- Share with users on desktop or mobile

Learn more and try it out: CesiumJS
3D Tiling Pipeline

Tile your 3D data and fuse it with other data types

- Optimize massive 3D data with tools built to scale for lightning fast processing
- Integrate into on-premises workflows to reliably tile large datasets without losing fidelity
- Measure, analyze, and make decisions with confidence based on visualizations as precise as your source data

More detail on the 3D Tiling Pipeline:

- Point Cloud Tiler
- Photogrammetry Tiler
- 3D Model Tiler
- 3D Buildings Tiler
- Imagery Tiler
- Terrain Tiler
Cesium ion SDK for Analytics

Data fusion: Analyze within a dataset or across disparate datasets—from point clouds to BIM models to terrain to stationary or dynamic objects.

Precision: Draw confident conclusions using a level of precision originally developed for aerospace.

GPU acceleration: Get optimal performance for client-side analysis using the parallelism and computational power of the GPU.

Developer friendly: Build apps using a fully documented API, code examples, and customizable components with the same quality as CesiumJS.

More on Cesium SDK for Analytics

JavaScript library with features including ready-to-use distance, area, and volume measurement tools, and 3D visibility analytics
Cesium ion SDK for Analytics

Analysis:

Transform editor

Sensor geometries & visibility analysis tools

Clipping planes editor

Measurement tools
Curated 3D content:

Cesium World Terrain

Global coverage in **quantized-mesh-1.0**
- Get accurate elevation data for planning & analysis
- Create more realistic visualizations by adding your architecture and building models, or drone imagery, on top of 3D terrain
- Combine your own terrain DEMs with this global layer by uploading them to Cesium ion

Fuses several data sources into a single quantized-mesh terrain tileset optimized for 3D map visualization and efficient streaming into CesiumJS and other 3D engines.

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Approx. resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>1 m to 2 m</td>
</tr>
<tr>
<td>Australia populated areas and coasts</td>
<td>5 m</td>
</tr>
<tr>
<td>New Zealand</td>
<td>8 m</td>
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<tr>
<td>United States West Coast</td>
<td>50 cm</td>
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<tr>
<td>United States</td>
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<td>Canada</td>
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<tr>
<td>Europe</td>
<td>30 m</td>
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<tr>
<td>Mexico</td>
<td>30 m</td>
</tr>
<tr>
<td>Approximately -60 to 60 degrees latitude</td>
<td>30 m to 90 m</td>
</tr>
<tr>
<td>Entire Earth</td>
<td>1,000 m</td>
</tr>
</tbody>
</table>

More on **Cesium World Terrain**

Source
- NZ 8m Digital Elevation Model (2012)
- Digital Elevation Model (DEM) of Australia derived from LiDAR 5 Metre Grid
- LIDAR Composite DTM - 1m & 2m
- Digital Elevation Model over Europe (EU-DEM)
- CGIAR SRTM
- GTOPO30, SRTM, and National Elevation Dataset (NED)
Cesium OSM Buildings

Global Coverage in **3D Tiles**, updated monthly

3D buildings layer covering the entire world. Ready for use in custom applications with CesiumJS or any client that supports 3D Tiles.

Derived from OpenStreetMap and contains over 350 million buildings with per-building metadata.

Metadata includes basic information like building name and height, to address, opening hours, and even type of material for individual parts of buildings.

Try it in the **Cesium OSM Buildings Sandcastle**
Streamable Formats:

- **Efficient**, streamable massive heterogeneous 3D geospatial datasets: terrain, imagery, 3D buildings, photogrammetry, point clouds, BIM/CAD, interiors, etc.
- Designed for visualization & analysis
- Combines:
  - Flexible spatial data structure in JSON
  - “Runtime ready” binary tile formats
  - Khronos glTF open standard for 3D models
  - Vertex/polygon-level metadata
  - Declarative styling
- Open Geospatial Consortium (OGC) Community Standard

Learn more about **3D Tiles**
Cesium ion: On-premises and as-a-Service

How it all works together:

The platform: Cesium ion

Cesium 3D Tiling Pipeline
Cesium 3D Content
Global Terrain, Imagery & Buildings

Tiling & Interoperability

Cesium for Unreal
Visualization for the Web
Cesium ion SDK
Advanced Analytics

Other 3D Engines & Custom Apps

Modeling & Simulation

3D Tiles

Your 3D Data
The global scale and accuracy of the WGS84 standard with the performance and visual realism of game engines

See more: Project Anywhere with Epic Games, Microsoft & NVIDIA
Cesium’s value for game engines

Scale and precision
- Individual Game Levels
- Global WGS84 Accuracy

Data Available
- Load Custom Formats
- Stream Standard Formats & Access Optimized Content

Simulation Environments
- Geotypical
- Geospecific

Source:
- Artist created
- Remote sensing

Image source: https://www.cityillustration.com/panoramic-cityscape-of-paris/
Try it out now. For free.

Cesium ion Community Account

- **Vricon Surface Mesh** of 30 global locations for .mil or .gov users
- **Cesium Stories:** Dynamic Briefing
- **Cesium World Terrain:** Elevation & Imagery
- **Cesium OSM Buildings**
- **Cesium Analytics:** Measurement, Location

[cesium.com/cesium-ion]
Additional Links

Hands-on Demos: Cesium Sandcastles

Vricon satellite photogrammetry of 30 global locations for .mil or .gov users: Cesium/Vricon Work-From-Home

Dynamic Briefing: Cesium Stories

Cesium ion On Premises

Cesium ion SaaS Pricing

Cesium ion Integrations

Use Case: Visualize Underground Layers with Cesium

Use Case: Analyze Detailed Point Clouds with Cesium

Use Case: Explore 3D Models with Cesium

AI/ML Integration: Intel Geospatial

AI/ML Integration: Komatsu SmartConstruction
If this deck leaves you with any questions or you’d like to work together, please feel free to contact me at brady@cesium.com or 910-964-0962 anytime.