The Rise of 3D GIS on the Web

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Today, we’re going to talk about 3D on the web in general. That is, what is already being done today and what is currently being worked on.
I’ll draw specifically on examples from Cesium since I work on it everyday. Cesium is an open-source JavaScript library for creating 3D globes and 2D maps in a browser without a plugin. It is used by developers to build applications for end users.

The image here is a screenshot of Cesium showing the sunrise at Crater Lake using Bing imagery and STK World Terrain, which is a terrain dataset we have created from SRTM, NED, and other data sources.
Just four years ago, I would not have believed what we see today on the Web. In fact, I don’t think anyone on the Cesium team would have believed it.

We have backgrounds in desktop application development, mainly C++, C#, and OpenGL. We did not think that JavaScript – of all languages – would power this kind of content.

In the top row here, we see dynamic data visualization, airspace visualization (Argentinian Air Force), GPS track visualization (Doarama), and a real-estate investing app (Create.io).

In the bottom row, we have NORAD Tracks Santa, satellite visualization (SpaceBook), Monster Milktruck demo (port from Google Earth), and a real-estate investing app (Cube Cities).

These are just a few of the many applications built on Cesium.
• Animated Santa model used glTF
• ~20 million unique visitors

AGI: http://www.agi.com/
More details: http://cesiumjs.org/demos/noradtrackssanta.html
http://www.agi.com/solutions/SSA/

Developed by AGI

Server-sent events with CZML.
The National Map is a website for map-based access to Australian spatial data from government agencies.

The National Map is an initiative of the Australian Commonwealth Government's Department of Communications and the software has been developed by NICTA working closely with the Department of Communications, Geoscience Australia and other government agencies.
France: http://cesiumjs.org/demos/ign.html

India: http://bhuvan.nrsc.gov.in/globe/3d.php#

Video: https://www.youtube.com/watch?v=-2f4vTCQEcQ

Demo: http://www.doarama.com/view/2171
Desktop and mobile.
Windows, Linux, and Mac.
Android and iOS.

Technology Stack

Application

CESIUM

WebGL

Video card

The same video card desktop apps use
Demo: http://analyticalgraphicsinc.github.io/cesium-google-earth-examples/demos/milktruck/

Google Earth resources page: http://cesiumjs.org/for-google-earth-developers.html
Cesium Tests

- 89K lines of engine code
- 84K lines of test code
- Tests
  - 6,393 tests
  - 93% code coverage
  - 60 seconds

Stats from the Cesium master branch on 02/26/2015 (before merging KML)
Well over 100% growth in four months (10/2014 to 02/2015, 281 to 609+).

February is a short month, and there is almost three days left. 😊
Formats and Workflows

Getting data to the web…fast

and serving it fast with open formats
### Web-Friendly Formats

<table>
<thead>
<tr>
<th>Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D models</td>
<td>glTF</td>
</tr>
<tr>
<td>Imagery</td>
<td>WMS, WMTS, TMS, ...</td>
</tr>
<tr>
<td>Terrain</td>
<td>quantized-mesh, heightmaps</td>
</tr>
<tr>
<td>Vector</td>
<td>CZML, GeoJSON, KML?</td>
</tr>
<tr>
<td>3D Buildings</td>
<td>TBA</td>
</tr>
<tr>
<td>Point Clouds</td>
<td>TBA</td>
</tr>
</tbody>
</table>
Server-side conversion: http://cesiumjs.org/convertmodel.html
CyberCity3D: http://www.cybercity3d.com/

Work-in-progress
http://fairbanksfodar.com/ - Matt Nolan

Understanding the impacts of climate change on the landscape of Alaska

Photogrammetry: Pictures to imagery, point cloud, and DEM. Cheaper than LiDAR.

Mount Chamberlin, 10cm imagery, 20cm terrain
Unalakleetm - 25cm imagery, 100cm terrain

Work-in-progress
Closing Thoughts

Four years ago, I wouldn’t have believed this:

What will the 3D Web look like four years from now…or even one or two?
Thanks!

cesiumjs.org

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