WebWorldWind, achievements and future of the ESA-NASA partnership

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European Space Agency Frame Contract for Social Media and Mobile Applications Development for EO Ground Segment and Mission Operations
  • Mobile Applications
  • Prototypes

International Consortium: 5 companies from 4 countries (Germany, Italy, Romania, Czech Republic)

“Informal” collaboration with NASA to develop WebWorldWind

Using WebWorldWind as 3D virtual globe technology also for mobile Apps
  • 6 persons involved
  • 3.5 FTE/year
General Process

Collect
Ideas, needs, etc.

Develop
New features for the framework

Demo
Community and Stakeholders

Promote
In Europe
Introduction

- The paper:
  - presents results of first year of on-going ESA-NASA collaboration on WebWorldWind development;
  - highlights concrete examples built with the newly introduced features and puts them in relation to possible research and education use cases;
  - Briefly introduces next steps and roadmap.

- WebWorldWind is free and open-source 3D virtual globe API for HTML5 and JavaScript developed by NASA with support of the European Space Agency (ESA) and other partners (earlier today: 1 presentation about it and special event to announce NASA WorldWind Europa Challenge winning projects):
  - Based on WebGL, available stably as part of HTML5 since 2011 (also on mobile)
  - Web technology great for distribution, portability, data access, ease of use -> and thus for research and education
  - WWW is the web version of WorldWind, started in 2014
  - ESA joined the effort in 2015, bringing development capabilities and requirements
Comparison between WebWorldWind and other 3D virtual globes

- Primary mission of WebWorldWind is to support the operational needs of the geospatial community:
  - Different from other 3D virtual globe platforms such as Google Earth, ESRI and Cesium, which implement business models
- An API rather than an application (such as Google Earth) -> N applications vs. 1
- WWW now implements KML, so it offers similar visualization capabilities w.r.t. GE
- ESRI is commercial, relatively expensive, proprietary and not as full-featured as WWW and GE -> Also an application, not an API
- Cesium is similar to WWW but harder to use and to extend (WWW strong point). Aims at computer graphics needs, rather than geospatial community needs. PRO version costs several thousands of EURO (commercialized by AGI)
- Key technical differences highlighted in the paper
What about the mobile arena?

- All the discussed 3D virtual globe technologies, including WebWorldWind, target the Web, not mobile platforms
- Glob3Mobile is out of the paper’s scope
- However, Consortium has demonstrated that WWW (web tech. in general) is perfectly suitable for use on mobile applications and devices (using WebViews):
  - ESA Sentinel App, for Android and iOS smartphones and tablets, migrated successfully from Glob3Mobile to WebWorldWind in July/August 2016
    - Freely available on the App Store and on Google Play:
  - Not only suitable, actually advantageous for cross-platform applications
  - Glob3 Mobile development was slow, the community was small and code poorly documented
General Objectives

**Standard Formats**
JPEG, PNG, GeoTIFF, Shapefile, GeoJSON, KML, Collada...

**OGC Standards**
WMS, WCS, WMTS, WPS, WFS...

**Aesthetic**
Atmosphere, Day/Night, Skybox, Retina, Antialiasing...

**Utilities**
Layer Management, Controllers, Recognizers...
Results of the first year: framework

- In complement to Shapefiles, JPEG and PNG:
  - GeoJSON for shapes
  - GeoTIFF for both strip- and tile-based imagery
  - Collada for 3D models
  - KML (geometries, placemark, styling, overlays, time primitives, network link,...)

- Visual effects:
  - Atmosphere
  - Sun illumination
  - Day/night layers
GeoJSON

- Catalogue results, ground station masks, other shape-based information...
GeoTIFF

- Imagery and data, e.g. elevation
Collada

- 3D models, ground stations, satellites...
KML - Keyhole Markup Language

- Acquisition plans, timed information, region...
Results of the first year: reference applications

- Satellite tracker (also in Sentinel App)
- EO product visualization (also in Sentinel App)
- NDVI Viewer (large amount of data, time-series)
Outlook and Conclusion

- 1-year extension, started 01/07/2016:
  - Continue contributing to framework
  - Build rich, interesting and useful applications to promote/help ESA
  - Continue working on objectives set at Quarterly intervals
- WWW has bright future with ESA and NASA backing
- Future ESA use cases?
  - Thematic Exploitation Platforms
  - Next Generation Earth Observation
- Growing online community and user base
- Technical Roadmap:
  - WMTS, WCS
  - WPS, WFS, Measurement, Line of Sight, Analytic Surface, HDF and FBX, among others
  - Inputs welcome
- For Education: WWW + JSBin
WCS – Web Coverage Service

- Layer and elevation model in combination with GeoTIFF
WMTS – Web Map Tile Service

- Optical satellites data (by Thales)
Show me the code!

- https://github.com/NASAWorldWind/WebWorldWind
- https://github.com/ESAFastPrototyping/WebWorldWind/

Examples:

- http://worldwindserver.net/webworldwind/examples/GeoJSON.html
- http://get.solenix.ch/webworldwind/examples/GeoTiffExample.html
- http://get.solenix.ch/webworldwind/examples/Collada.html
- http://get.solenix.ch/webworldwind/examples/KmlExample.html

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Thank You