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Service-driven 3D Atlas Cartography

Introduction and Motivation

Atlases are powerful tools to share and explore spatial information. With the emergence of the internet and of 3D technologies, now digital atlases have the opportunity to go fully online and to offer 3D geovisualization.

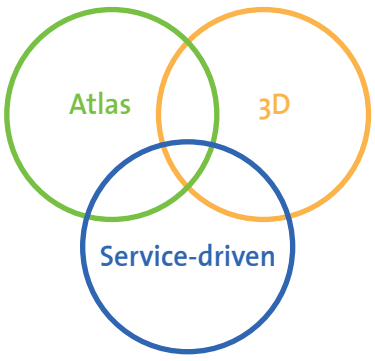

Figure 1: Core concepts

Atlases can benefit from service-oriented architecture (SOA) and 3D geovisualization. SOA enables access to large amount of spatial data, including 3D data, from remote thin clients. 3D geovisualization brings advantages regarding shape and qualitative understanding as well as task orientation in the landscape.

Implementation

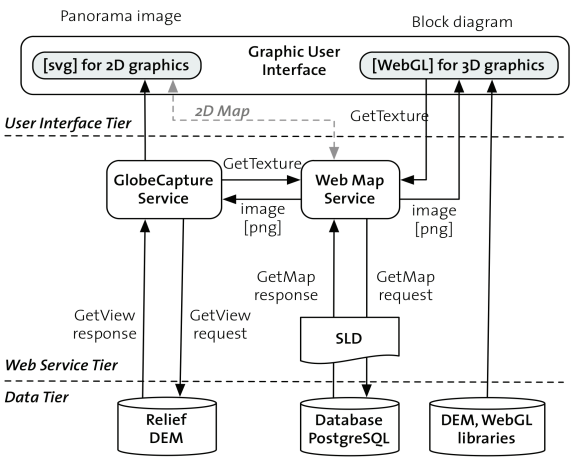

Figure 2: system architecture of the service-driven 3D atlas prototype

The three-tier architecture is visible in figure 2 and is based on a SOA. The Panorama View uses a combination of a web view service, Globe Capture Service, and a Web Map Service (WMS), to deliver a perspective view of the landscape with a texture (figure 3). The Block Diagram displays a block of the landscape using WebGL and a WMS (figure 4). The Graphic User Interface uses Scalabe Vector Graphics and the interactive functionality is realized with JavaScript.

Conclusion

This Master thesis shows that service-driven 3D atlases are feasible, although there is still room for improvement. The use of WMS as texture for surface and line features is especially appropriate for topographic and choropleth maps. However, WMS is not ideal for point and label symbology because they are flatten onto the ladscape and distorted. The lack of standards for 3D web services hinders the full integration and interoperability between the Globe Capture Service and the WMS. Regarding WebGL, the size limitation encountered and the only partial support from the major browser are clear downsides.

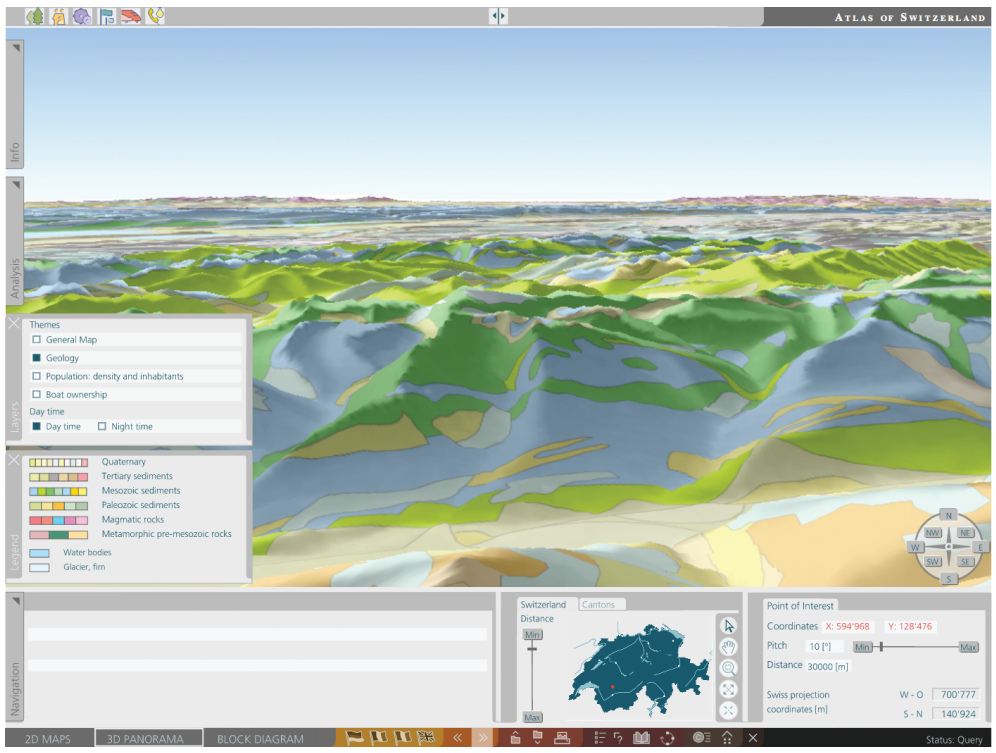

Figure 3: Panorama View mode

Outlook

The use of web services delivering the different parts of the visualization definitely goes in the direction of the actual tendency of devices with little processing capacity combined with streaming or online applications. It is to be expected that more and more atlases go online.

Other web services need to be developed and integrated, such as DEM or 3D symbols web services, to enable full-fledged service-driven 3D atlases.

For world atlases, it can be interesting to look into the different solutions for virtual globes and their integration with WMS, other web services and different 3D graphics formats.

Figure 4: Block Diagram mode

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