# Using open standards for the browser-based visualization of geo-spatial data

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During the last decade geographic information technologies evolved from classic stand-alone systems to a distributed model of independent web services. This reflects the overall development of Information Technologies from mainframe systems over desktop computers to distributed, platform and application independent web-based services.

Furthermore, the proliferation of the Web 2.0 has lead the way to highly interactive web applications. The usage of AJAX has resulted in the emergence of the Web browser as an additional form of an application platform.

The importance of adequate visualization of geo-spatial data can not be overemphasized when it comes to exploration of geo-spatial data sets. That's why this research project lies at the crossroads of geo-visualization and browser- based web applications.

A browser-based client application is presented that enables a user to interactively define the portrayal of geo- spatial data sets.

The main objective of the research project is the evaluation of issues which occur with the browser-based visualization of geo-spatial data and to provide sufficient workarounds.

The client is based on currently available open standards, such as OGC's Web Map

Service Specification (WMS) and Web Feature Service Specification (WFS). The visualization rules that are defined by the user are encoded using Styled Layer Descriptor (SLD), an XML-based map styling language which can be used to define styling instructions for the portrayal of topological objects (feature data sets) and numerical ranges (coverage data sets). The use of standards ensures that the client can be used in conjunction with a wide range of OGC compliant map server applications such as GeoServer or MapServer.

The application is completely based on JavaScript and is therefore not dependent on additional add-ons and plug-ins for web browsers. It uses AJAX technologies to provide a user interface that circumvents the click-and-reload nature of classic web applications. Furthermore, the client is built on top of OpenLayers, a freely available open source web map client software.