ACTA TECHNICA CORVINIENSIS
– Bulletin of Engineering
Tome IX [2016] , Fascicule 2 [April – June]
ISSN: 2067 – 3809

1. Branka TOMIĆ

GEOPORTALS AND GEOSPATIAL SERVICES – ANALYSIS OF OPEN-SOURCE SOFTWARE SOLUTIONS FOR GEOPORTALS

1. Opština Gradiška, Gradiška, BOSNIA & HERZEGOVINA

Abstract: Portal is a web site that is the starting point or access point for multiple web sites and online services. Portals combine a variety of information from multiple sources, providing consistent data and access to numerous applications that would otherwise pose a separate unit. The personal portal provides opportunities, especially tailored to each user, with the possibility of visiting and moving on to the page with different content. Designed for use with distributed applications, different numbers of software that act between applications and networks to integrate various services from numerous other sources. Portals provide users logging on a variety of activities, a directory service and information pertaining to a certain level of subject or organization. There are three types of portals: vertical portal for special activities, occupations and interests, private intranet portals - for employees, customers, partners, and a manufacturer, extranet portals include public and private information.
Keywords: portals, applications, service, information

INTRODUCTION

Geoportal is a target place for representation of geospatial data, displaying, editing and searching analisys. Geoportal are widely used in geographic information systems (GIS) and Spatial Data Infrastructure (SDI). The users of geographic information use geoportals for searching and retrieval of geographic information that they need. Geoportal play a major role in sharing geographic information and avoiding duplication of work, inconsistencies of data, delays, confusion and waste of resources.

The earliest concept of geoportals was created in 1994 in the United States, in the framework of the NSDI (National Spatial Data Infrastructure). In the European Union first was developed INSPIRE (Infrastructure of Spatial Information) directive, ie geoportal. There are three types of geoportals, which are:

- National and international geoportal (NSDI, INSPIRE)
- State and local Geoportal (GeoStor, CaSIL)
- Theme Geoportal (Conservation, NetCarb);

Geoportals can be marked as:

- Catalogue of Geoportal (organization and management of accessing geographic information)
- Application geoportal (on-line dynamic geographic web services).

Metadata, by definition, are "data about data" in any medium. These are data that describe the characteristics of a source in digital form. They are useful for displaying, transfering and documentation of any content. They can describe one data set of data or only some part of the whole. Metadata are widely used. It is commonly used to accelerate and improve search of large amounts of data, and reveal as much relevant information. A central role in a geoportals have metadata and web map server. It is a server that contains services for metadata management, mapping, geocoding, data downloading, etc.

SOFTWARE SOLUTIONS FOR DISPLAYING, MANAGEMENT & WORK WITH GEOSPATIAL DATA

There are a large number of commercial and free software solution for display, view, manage and work with geospatial data such as:

- OpenGeoportal,
- NJTPA Enterprise GIS
- ESRI ArcGIS Server Geoportal,
- OpenGeoportal,
- INSPIRE,
- GEOSS Portal,
- ERDAS Apollo,
- GeoServer,
- OpenLayers

There is a large number of state and local geoportals. In this paper we will discuss the main caracteristics of mantioned geoportals and possebilities of those aplication in our local

comunity as well as the goverment matter.

Inspire

In Europe a major recent development has been the entering in force of the INSPIRE Directive in May 2007, establishing an infrastructure for spatial information in Europe to support Community environmental policies, and policies or activities which may have an impact on the environment.

INSPIRE is based on the infrastructures for spatial information established and operated by the 28 Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. This makes INSPIRE a unique example of a legislative "regional" approach.

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) was published in the official Journal on the 25th April 2007. The INSPIRE Directive entered into force on the 15th May 2007

To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and transboundary context, the Directive requires that common Implementing Rules (IR) are adopted in a number of specific areas (Metadata, Data Specifications, Network Services, Data and Service Sharing and Monitoring and Reporting). These IRs are adopted as Commission Decisions or Regulations, and are binding in their entirety. The Commission is assisted in the process of adopting such rules by a regulatory committee composed of representatives of the Member States and chaired by a representative of the Commission (this is known as the Comitology procedure).

The INSPIRE directive came into force on 15 May 2007 and will be implemented in various stages, with full implementation required by 2019.

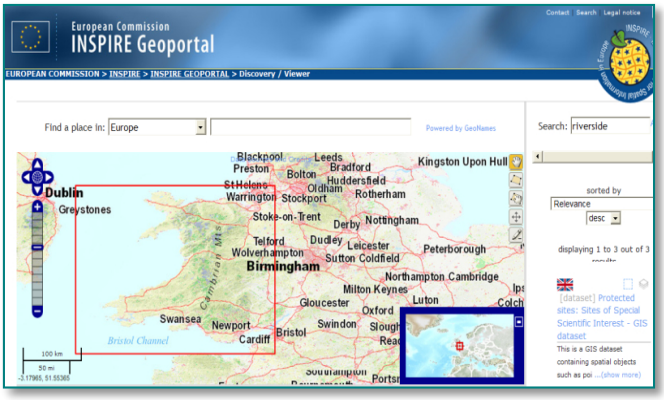

Figure 1. INSPIRE geoportal interface

The INSPIRE directive aims to create a European Union (EU) spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe.

A European Spatial Data Infrastructure will assist in policy-making across boundaries. Therefore the spatial information considered under the directive is extensive and includes a great variety of topical and technical themes.

INSPIRE is based on a number of common principles:

- Data should be collected only once and kept where it can be maintained most effectively.
- It should be possible to combine seamless spatial information from different sources across Europe and share it with many users and applications.
- It should be possible for information collected at one level/scale to be shared with all levels/scales; detailed for thorough investigations, general for strategic purposes.
- Geographic information needed for good governance at all levels should be readily and transparently available.
- Easy to find what geographic information is available, how it can be used to meet a particular need, and under which conditions it can be acquired and used.

Geoportal application of the Republic Administration for Geodetic and Property Affairs of the Republic Srpska was created in a way that allows the presentation, distribution and collection of distributed data from the jurisdiction of the Board through services and applications on one side, and to ensure interoperability with data from other institutions of the Republic Srpska on the other side, which in accordance with the INSPIRE Directive and other international standards in this area.

Esri Geoportal Server Geoportal

Esri Geoportal Server is a free, open source product that enables discovery and use of geospatial resources including datasets, rasters, and Web services. It helps organizations manage and publish metadata for their geospatial resources to let users discover and connect to those resources. The Geoportal Server supports standards-based clearinghouse and metadata discovery applications.

With Esri Geoportal Server, user can:

- Reduce time and redundancy of data production by connecting geospatial data and service producers with consumers.
- Maintain data integrity by allowing organizations to easily share the authoritative version of data among its users.
- Enable easy search and discovery of existing geospatial data and services by allowing users to create and manage descriptions of their geospatial resources and supporting easy-to-use,

sophisticated, data discovery technologies.

Esri Geoportal Server was released under the Apache 2.0 license, which allows developers to freely customize and redistribute the software.

GEO Portal

GEO Portal is a central Portal and Clearinghouse providing access to Geospatial and Earth Observation (EO) data in support of GEOSS. GEO Portal allows you to discover, browse, edit, create and save geospatial information from GEO members around the globe.

GEO Portal has been implemented using Compusult's Web Enterprise Suite (www.compusult.net), a suite of applications, based on open standards, that work together to provide a comprehensive, data discovery, access, retrieval and delivery system. The GEO Portal facilitates the discovery of Earth Observation data from thousands of services, instruments, collections, libraries and catalogues worldwide, transforming the data collected into vital information for society.

The Global Earth Observation System of Systems (GEOSS) is simultaneously addressing nine areas of critical importance to people and society. It aims to empower the international community to: promote sustainable agriculture, conserve biodiversity, respond to climate change and its impacts, protect itself against natural and human-induced disasters, manage ecosystems and energy resources, understand the environmental sources of health hazards, safeguard water resources and improve weather forecasts. GEOSS coordinates a multitude of complex and interrelated issues simultaneously. This cross-cutting approach avoids unnecessary duplication, encourages synergies among systems and ensures substantial economic, societal and environmental benefits.

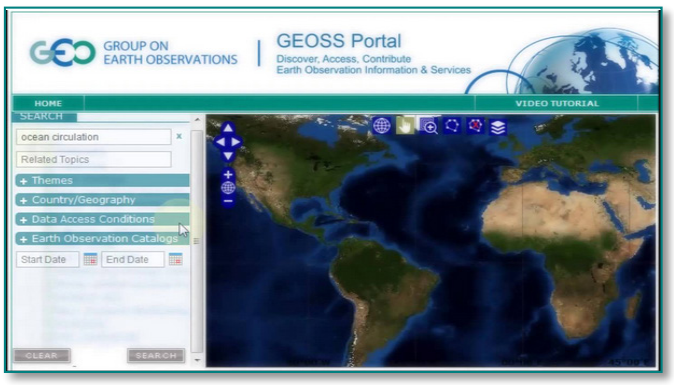

Figure 2. GEOSS Portal

GEOSS is providing solutions for:

» Forecasting meningitis outbreaks
» Protecting biodiversity
» Improving climate observations in Africa
» Supporting disaster management in Central and South America
» Managing water resources in Asia
» Promoting solar energy
» Improving agriculture and fisheries management.
» Mapping and classifying ecosystems
» Forecasting weather for the 2008 Beijing Olympics.

North Jersey Transportation Planning Authority (NJTPA)

The NJTPA has recently completed a project that centrally locates numerous geographic and related non-geographic data collected by, and stored at the NJTPA. These data sources are used by the NJTPA to inform sound decision-making. Some of the data items originate at the NJTPA but many are generated by other agencies ranging from national to local. The main product of this project is a new enterprise-class geospatial database that regularizes how data items are stored, updated, and exchanged. This product is an example of interagency coordination in action - as mentioned above numerous local, regional, and state partner agencies were and are integral contributors.

The database helps to ensure that data is current, accurate and suitable for particular uses - by NJTPA staff, NJTPA subregions, partner agencies and the general public. The Enterprise GIS (EGIS) database allows staff to respond to data requests more efficiently. As appropriate, EGIS information is available for download online at the NJTPA Geoportal, the public-facing website containing the NJTPA's data catalog. Authorized users are be able to draw directly from the EGIS database to produce tables, maps, and conduct their own analyses. During the formal Fall 2010 rollout of the EGIS, authorized users will be provided user identifications and passwords as well as training.

This effort is meant to markedly strengthen the information foundation for the NJTPA and its partners, ultimately supporting wise planning decisions for northern New Jersey. Stay tuned for updates, contributor maintenance schedules, training, information sessions and improvements.

OpenGeoportal

OpenGeoportal.org is a new site that brings together geospatial professionals, developers, metadata specialists, and librarians to coordinate the Open Geoportal (OGP) project. The Open Geoportal is a collaboratively developed, open source, federated web application to rapidly discover, preview, and retrieve geospatial data from multiple repositories. OpenGeoportal.org is also a collaborative effort to share resources and best practices in the areas of application development, metadata, data sharing, data licensing, and data sources in support of geospatial data repositories.

OpenLayers

OpenLayers is an open source JavaScript library for displaying map data in web browsers. It provides an

API for building rich web-based geographic applications similar to Google Maps and Bing Maps. The library was originally based on the Prototype JavaScript Framework.
OpenLayers supports GeoRSS, KML (Keyhole Markup Language), Geography Markup Language (GML), GeoJSON and map data from any source using OGC-standards as Web Map Service (WMS) or Web Feature Service (WFS).

Geoserver

GeoServer – an open-source server written in Java - allows users to share, process and edit geospatial data. Designed for interoperability, it publishes data from any major spatial data source using open standards. GeoServer has evolved to become an easy method of connecting existing information to Virtual Globes such as Google Earth and NASA World Wind as well as to web-based maps such as OpenLayers, Google Maps and Bing Maps. GeoServer functions as the reference implementation of the Open Geospatial Consortium Web Feature Service standard, and also implements the Web Map Service, Web Coverage Service and Web Processing Service specifications.

Figure 3. Geoserver portal

GeoServer aims to operate as a node within a free and open Spatial Data Infrastructure. Just as the Apache HTTP Server has offered a free and open web server to publish HTML, GeoServer aims to do the same for geospatial data.
GeoServer reads a variety of data formats, including:

- PostGIS
- Oracle Spatial
- ArcSDE
- DB2
- MySQL
- Shapefiles
- GeoTIFF
- GTOPO30
- ECW, MrSID
- JPEG2000

CONCLUSIONS

The focus of this paper is based on the identification of available free software solutions for geoportals. Taking in consider the characteristics of these solutions, as well as a comparison with commercial software applications, each of them gives a good representation, management and operation of the geodata. The main disadvantages of this kind is the speed and often breaking a connection with server.
Working with the free geoportal definitely reduces costs of downloading various geospatial data and work with them. They have absolutely the ability to read all types of data formats, as well as commercial applications.
Access with the open source code makes easier integration with other systems, such as content management systems, various virtual folders, desktop applications and the like. One of the most important things of open source solutions for geoportal is improved cooperation ie. It is easier to connect and share data with other geoportal, as the geoportal beyond political boundaries.
There is a strong and growing trend that aims to develop and use open source technology. Some government institutions and organizations have adopted regulations where it is desirable or compulsory use of open source geoportals. By placing the server geo come for the Apache license, which makes it easier to meet these demands. In the near future it is expected that everyone will be free geoportal type.

Note: This paper is based on the paper presented at The 12th International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology – DEMI 2015, organized by the University of Banja Luka, Faculty of Mechanical Engineering and Faculty of Electrical Engineering, in Banja Luka, BOSNIA & HERZEGOVINA (29th – 30th of May, 2015), referred here as [9].

REFERENCES

[1.] Govedarica, M. (2014), Geoportali i geoprostorni servisi, lectures, Faculty od Technical Science, University Novi Sad, Serbia.
[2.] http://www.esri.com/, accessed on 2015-04-30.
[3.] http://geoserver.org/, accessed on 2015-04-29.
[4.] http://www.geoportal.rgurs.org/inspire.html, accessed on 2015-04-20.
[5.] http://geospatial.intergraph.com, accessed on 2015-04-26.
[6.] http://geoportal.njtpa.org:8080/geoportal/catalog/main/home.page, accessed on 2015-05-01.
[7.] http://www.njtpa.org/getattachment/b3a23d66-18a0-4d65-8304c8cb4ca8f44/egis-user-manual.aspx, accessed on 2015-04-30.
[8.] http://opengeoportal.org/, accessed on 2015-04-10.
[9.] Tomić, B. Geoportals and geospatial services – analysis of open-source software solutions for geoportals, 12th International Conference on Accomplishments in Electrical & Mechanical Engineering & Information Technology – DEMI 2015