

STATUS OF SPATIAL DATA INFRASTRUCTURE IN MONTENEGRO

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Abstract:

The rapid development of modern society and the use of increasing amounts of spatial data have stimulated the development and construction of spatial data management systems, known as spatial data infrastructures or geo-information infrastructures worldwide. User requirements for Spatial Data Infrastructure (SDI) are no longer just applicable to conventional charts, charts, etc. forms, but to up-to-date, geometrically accurate and easily accessible spatial data in digital format. Information is increasingly being linked to a spatial component, so spatial data and their distribution are gaining general interest. They are based on a large number of different human activities including agriculture, forestry, environmental protection, transport and public infrastructure, telecommunications, the real estate market, etc.

More efficient planning, decision making and general improvement of society in which we live today is being more and more directed to usage, exchange and analysis of information on space. To properly arrange the information on space we create and use, establishing their infrastructure has become necessary.

The need for geospatial data has increased in Montenegro in the last few years. By accepting new trends and technological achievements, requests for data in analogue form are neglectable compared to requests for data in electronic form, which implies the conclusion that there is a need to digitize available data. Spatial information consolidated into common infrastructure prevent duplication and data inconsistency, and provide the possibility of efficient management, faster, easier access and decision making. While intensively work on updating, aligning and standardizing spatial data is in process, still some of the data does not correspond to the criteria required for a quality National Spatial Data Infrastructure (NSDI). Additionally, the associated metadata is missing for part of the data. As spatial data is a fundamental component of NSDI, this is one of the major weaknesses of the Montenegrin NSDI.

Keywords: spatial data, geo-information systems, National Spatial Data Infrastructure, geospatial data, system digitization

SPATIAL DATA INFRASTRUCTURES

Spatial data infrastructures (SDI), as a set of technologies, policies, standards and human resources required for the collection, processing, distribution and improvement of spatial data, have gained great importance in the past ten years. The need to organize spatial records and their distribution has encouraged the development of SDI at all levels from national, through regional to global SDI.

Spatial Data are very important and integral part of our everyday life. Technically speaking, spatial data refer to any kind of data, which have a spatial aspect or a spatial representation. However, spatial data often include not only spatial, but environmental, health or security data at the same time. By accepting new trends and technological achievements, requests for data in analogue form are neglectable compared to requests for data in electronic form, which implies the conclusion that there is a need to digitize available data. Spatial information consolidated into common infrastructure prevent duplication and data inconsistency, and provide the possibility of efficient management, faster, easier access and decision making. Common geospatial data infrastructure should be developed on the basis of available data, but it is necessary to keep the mutual compatibility in mind.

STATUS OF SDI IN MONTENEGRO

More efficient planning, decision making and general improvement of society in which we live today is being more and more directed to usage, exchange and analysis of information on space. To properly arrange the information on space we create and use, establishing their infrastructure has become necessary.

In Montenegro, various institutions which function at local, regional, national and international level produce or use geospatial data, mostly about spatial planning, environment, tourist, agricultural, water management and manufacturing capacities. A high percentage of organizations obtain different kinds of geospatial data needed for their everyday operations from other institutions. All this indicates the importance and complexity of establishment and maintenance of National Spatial Data Infrastructure (NSDI) which ensures the possibility of combining spatial datasets and services interaction.

The fundamental vision of NSDI development in Montenegro is to make existing spatial data available to all stakeholders. This vision is based on the unification of all existing spatial data and their harmonization to facilitate their search and identification. One of the visions is the development of a well-organized geo-information community established on an open public-private-academic partnership. The most important thing to note in this respect is the need to harmonize the policies, technical standards and operational capabilities of the NSDI with European principles.

ROLE OF UNIVERSITIES IN NSDI DEVELOPMENT

Science plays a key role in solving a many developmental problems in Montenegro, primarily facilitating the overcoming of low levels of economic and social development, positively affecting the renewal of economic activity and economic growth and generating preconditions for establishing spatial data.

In the development of SDI in Montenegro, universities must play one of the key roles. In view of the insufficient knowledge and opportunities provided by the SDI concept, it is necessary to promote and educate the academic staff in various ways, which will adequately integrate these concepts into all areas of work and activities of various state-owned institutions as well as private entities through where the data exchange and standardization will be adequate.

Through participation in Erasmus project „Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures“–BESTSDI, University units Biotechnical Faculty and Faculty of Philosophy have contributed to the basis for launching new research projects and intensifying cooperation between universities in the public and private sector in this area. With extending curricula and subjects in this area, the curriculum would be more appropriate and in line with market needs and the educated experts would be more prepared for the challenges of applying new geo information technologies, standardizing the field of work and managing geospatial data, and applying concepts that define the infrastructure of geospatial data.

BESTSDI PROJECT RESULTS

As part of the project activities, systematic was approached to numerous studies in order to provide a comprehensive analysis of the current state of affairs in partner countries, starting from the academic community to business entities that have a strong need for staff with adequate knowledge of SDI.

Within the BESTSDI project, an extensive curriculum structure was developed that addresses the needs of the consortium as a whole and which should cover the needs of education of all participants in the development of SDI. The basis for creating a new curriculum was the previous metadata analysis of existing courses programs, modules and courses on partner institutions, existing learning materials, and the individual requirements of partner institutions.

Based on the preliminary analysis of metadata course related to the SDI and geo-information, some conclusions and recommendations for existing curricula and the development of new special SDI curricula for partner countries can be made:

- Spatial data are represented in subject curricula, but geospatial data infrastructure is often not recognized as a topic in learning materials.
- It is necessary to identify and promote SDI aspects which are more recognizable by the users and communities.
- Master studies should be the main target level for the new BESTSDI curricula.
- At the beginning, SDI courses will be offered as electives, primarily due to administrative procedures related to the updating and accreditation of new study programs and course curricula.
- The curriculum of the subject will be restructured in order to better present what is going on in the courses (summaries and learning outcomes).
- The benefits, use cases and SDI applications missing in geo-disciplines.
- It is necessary to put GIS into a broader context in order to achieve the use of technology in decision-making at all levels.

One of the tasks defined in the framework of the BESTSDI project is the establishment of lifelong learning courses. This concept is insufficiently represented in Montenegro and certainly represents an important part of the education of staff in spatial data infrastructure.

Most stakeholders expressed a great need for continuing education on this issue to train a staff that will be able to adequately implement the decisions of the SDI Development Council. Within the framework of the BESTSDI project two lifelong learning courses proposed - *Basis of SDI for providers* and *Setting OGC Web Services*.

CONCLUSION

User requirements for SDI are no longer just applicable to conventional charts, charts, etc. forms, but to up-to-date, geometrically accurate and easily accessible spatial data in digital format.

The growing demand of users as well as the increasing volume of spatial data with regard to their modern collection technology has stimulated the development and construction of spatial data management systems, known as spatial data infrastructures or geo-information infrastructures worldwide.

The need to establish a spatial data infrastructure is no longer questionable, and when and how it will be built. Only a few thoughts on spatial data infrastructure have just begun in Montenegro and it may be useful to draw on and take the lessons and experiences of other countries. First and foremost, it is necessary to adopt and implement European and international standards relating to geo-information, which is also one of the priority tasks in the forthcoming period.