

INTERNATIONAL SAVA RIVER BASIN COMMISSION



Sava GIS

*Common platform for sharing and disseminating information
and knowledge on protection of the water resources and
water management activities in the Sava River Basin*



www.savagis.org



INTRODUCTION

In 2009, Sava GIS Strategy established vision, principles and objectives for development of Geographical Information System of the Sava River Basin – Sava GIS.

The further conceptualisation and proposal of Sava GIS architecture is done within project “Preparation of the Implementing Documents for Establishment of Sava GIS”, completed in 2010.

Sava GIS empowers national geographic systems of ISRBC member countries

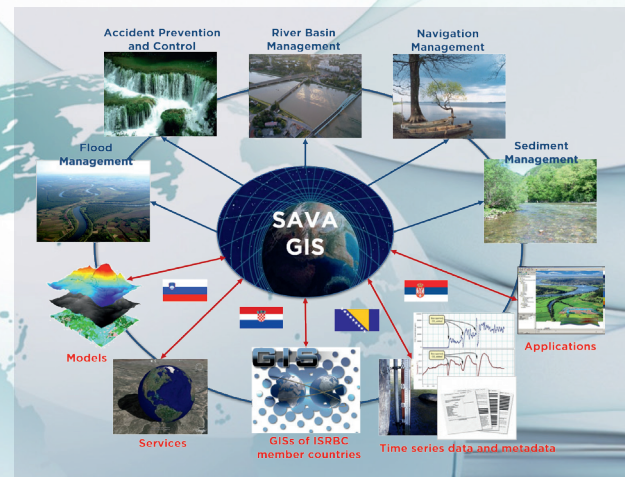
Development of Sava GIS continued throughout the process of preparation of integrated Sava River Basin Management Plan. This process was supported by European Union through a technical assistance project, administered by the EC, and a direct grant aimed to support ISRBC in all activities required for the plan development.

All spatial data contained in 22 maps, which graphically illustrate key information provided in this plan, were consolidated into a common geodatabase. Through this support most of the IT equipment required for Sava GIS was purchased.

Further support to establishment of Sava GIS was provided by another grant of European Commission under the contract with ISRBC for “Establishment of the Sava GIS core functionalities” in 2014, which resulted in the establishment of a functional system.

OBJECTIVES

The overall objectives of Sava GIS establishment are to provide seamless and platform-independent geoinformation system to ensure timely and open access to integrated data, information and services and thus support implementation of FASRB goals and plans.



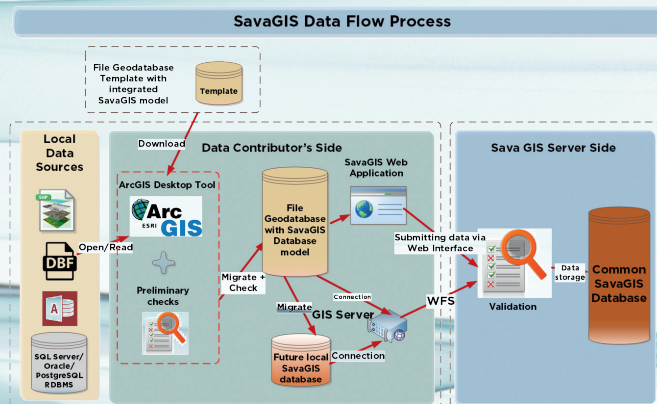
The specific objectives of Sava GIS in this phase were focused on:

- Providing a common spatial data framework for integration of data sets related to River Basin Management and Flood Management from national GIS into unique geodatabase of ISRBC
- Development and implementation of effective and efficient system to support wide range of analytic, planning, management and reporting activities of ISRBC
- Establishment of Sava Geoportal for publication and retrieval of geoinformation of ISRBC
- Development and implementation of web-based applications for data and metadata cataloguing and harvesting

DRIVERS

Sava GIS establishment is driven by:

- Open and service oriented architecture
- Interoperability standards and common data specification that enables sharing of geospatial information between ISRBC member countries and ISRBC Secretariat
- Metadata cataloguing and harvesting
- Server side tool components that enable mapping services, visualisation and reporting tools.



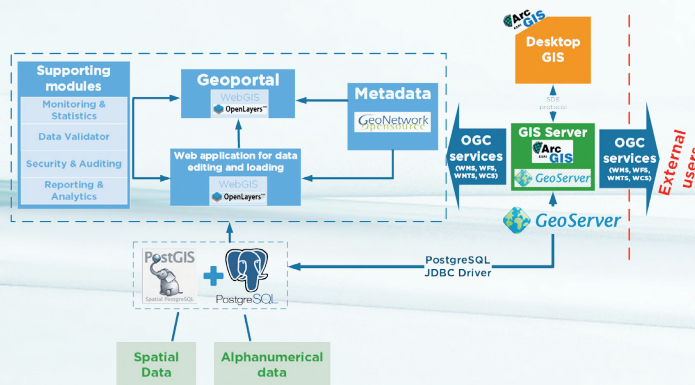
Sava GIS is composed of contributing geographic information systems of ISRBC member countries (Slovenia, Croatia, Bosnia and Herzegovina and Serbia)

The synergy among those systems is established using common data specifications.

TECHNICAL SOLUTION

The foundation concept behind the implemented Sava GIS platform is the use of open industry standards and protocols which allows interoperability between various open source and proprietary software components, such as ESRI and related IT industry standard products.

Sava GIS Geoportal is based on GeoServer and GeoNetwork (open source) technologies for web-based spatial data management. The central geodatabase for storing and managing spatial data of Sava GIS is implemented using PostgreSQL/PostGIS DBMS. Data sharing/reporting is enabled using file geodatabase upload or GML file exchange using Web Feature Service (WFS).



Sava geodatabase models are in a form of ESRI Geodatabase and contain all layers and attributes relevant for implementation of EU Water Framework Directive and Floods Directive, as well as WFD Reporting Guidance 2016 v4.9, FD Reporting Guidance 2013, INSPIRE Directive, Water ML 2.0 part 1: Timeseries model implementation and other professional requirements and IT industry standards.

FUNCTIONALITIES

Sava GIS is composed of contributing geographic information systems of ISRBC member countries. The synergy among those systems is established using common data specifications and procedure for data exchange.

The heart of Sava GIS is Geoportal which enables publishing and discovering geoinformation by ISRBC member countries, stakeholders and general public

Sava GIS enables to its public users:

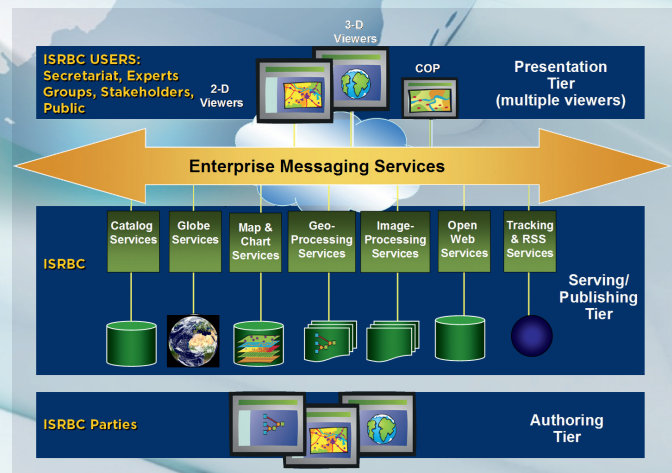
- Overview of the Sava River Basin map with navigation toolbar for positioning, zooming, measuring and identifying data
- Select and display of all available layers or only those of particular interest
- Search and view of layers and its attributes
- Map printout (whole or part of the map; writing texts with arbitrary fonts, angle, size and colours)
- Reporting in the form of maps, tables, graphs and drawings with enabled selection of attributes and report types
- Data processing tool allowing for comparison, selecting, sorting and summarising data according to the predefined criteria
- Advanced data analyses and statistics for unlimited number of attributes with tools for selection by SQL inquiries or spatial features.
- Metadata viewing.

Sava GIS enables to its registered users:

- Editing/Changing/Deleting alphanumeric and spatial data, as well metadata
- Loading (importing) and extracting (exporting) data and metadata
- Viewing and retrieving data
- History tracking of data change
- Validation and geographic transformation of data
- Reporting on centrally stored data
- User and database administration.

USERS

- ISRBC and its expert bodies
- The authorities/bodies/agencies responsible for implementation of FASRB
- Observers to ISRBC
- Institutes, researchers, and other stakeholders
- General public.

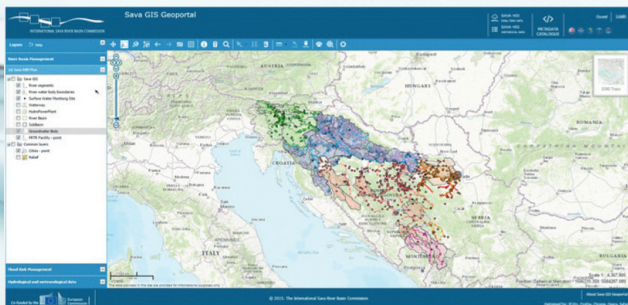


DATA MANAGEMENT

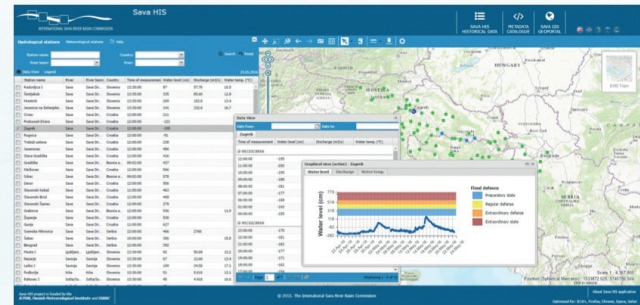
Sava Geoportal enables secure access to geographical information and services of ISRBC.

Users interact with spatial layers stored in geodatabases repository through a web-GIS-based portal that enable searching of the content and discovering spatial information related to integrated water resources management

It facilitates data sharing, integration, and use of geographic information across ISRBC member countries, stakeholders and general public.



Web-application for 'near real-time' hydrological and meteorological data, as a part of Sava GIS Geoportal, has the purpose to enable an effective common channel for exchanging and viewing, filtering and analyzing the hydrological and meteorological data and information in normal and emergency situations, primarily those related to flood events.

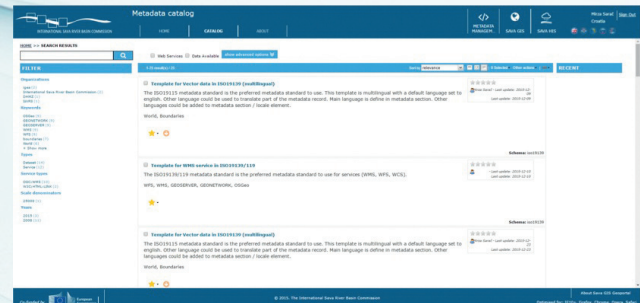


METADATA MANAGEMENT

Metadata management system is based on the GeoNetwork solution. GeoNetwork is an OpenSource catalogue application for management of spatial datasets. GeoNetwork contains fully functional and INSPIRE compatible Discovery Service. Sava Geoportal hosts repository of metadata in order to facilitate:

- Discovering of geospatial information resources
- Viewing details about each discovered resource
- Immediately viewing data and map resources discovered
- Creating, uploading and managing metadata manage and update user account information
- Managing the queries created for use during subsequent sessions.

Discovery Service allows users and computer systems to search for spatial datasets and services based on their metadata records. It provides access to all other services through metadata.

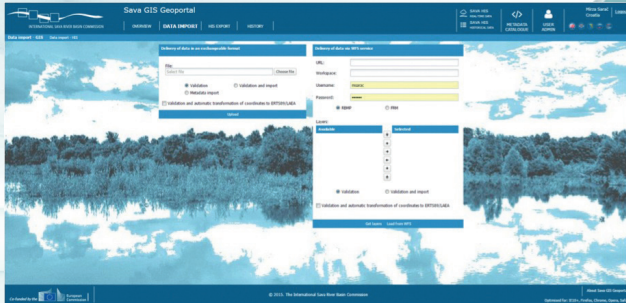


REPORTING

The exchange of spatial data sets and their attributes between national GIS of ISRBC member countries and Sava GIS geodatabase can be done using:

- Upload via web interface (FGDB)
- Transactions via Web Feature Service (WFS).

If the user's data is in some other coordinate reference system than ERTS89/LAEA, validation will detect it and an automatic transformation to ERTS89/LAEA will be done.



OTHER TOOLS

Sava GIS tools include a secure management and administration of all software components including:

- Data auditing - Tracking and storing any access and change of data
- Database auditing - Capture access, use of system privileges and changes of database schemas and structures
- Monitoring of the system's traffic and performance
- Help and messaging systems
- User management
- Security and backup.

BENEFITS

Sava GIS helps in sharing and disseminating information and knowledge enhancement in the Sava River Basin. It reduces duplication of efforts and data redundancy.

Sava GIS leads ISRBC community toward the efficient information management and improvement of data/information quality at the Sava River Basin level

Benefits include:

- A basis and method by which changes and improvements resulting from FASRB can be assessed
- Spreading and reporting the information gathered for the implementation of FASRB goals and enabling it for use throughout Sava Geoportal
- Allowing future assessments to be made as a matter of routine. The availability of transparent information and knowledge on water resources improves decision making processes and builds public trust and confidence in the overall work of ISRBC
- Creation of horizontal and vertical integration opportunities to easier and faster discovery of, access to, share of and use of information on water resources over the time
- Uniform international terminology and common understanding on sustainable water resources management in the Sava River Basin.

- System based on common concept, standards, and network of national geo-information system of ISRBC member countries (contributors' systems)
- Added value to the contributors' systems
- Clarification of a critical geographic and knowledge gaps in the water management domain
- Improved understanding of where further investments, research and joint work of ISRBC member countries is required to deliver FASRB outcomes.

DATA

The reference coordinate system used is ETRS 1989 LAEA, and projection is Lambert Azimuthal Equal Area

- River Basin Management database contains 2 feature datasets and 28 feature classes, 92 tables (object classes), 110 relationship classes and 112 domains.
- Flood Risk Management database contains 1 feature dataset and 17 feature classes, and 26 tables (object classes), 30 relationship classes and 25 domains.
- Hydrological and Meteorological Data Management database contains 2 schemes (hydro&meteo), and 44 tables (object classes), 8 views and 1 role.

FURTHER DEVELOPMENT

Further development of Sava GIS will be oriented to implementation of advanced tools and services for dynamic reporting and mapping. Establishment of various basic and advanced decision support systems is also planned.

For operational use and further development of Sava GIS, continued support of ISRBC member countries is of vital importance

In the near future the focus will be put on establishing modules for navigation, sediment management and accident prevention and control.

ACKNOWLEDGEMENTS

Many institutions and individuals, in different ways, contributed to the establishment of Sava GIS, and therefore Sava GIS represents a true collective effort that reflects cooperation in the Sava River Basin and beyond.

ISRBC is grateful for the support provided by: national institutions of ISRBC member countries, ISRBC experts groups, particularly PEG GIS, Consortium IN2&IGEA which has established the system, ICPDR and Finnish Meteorological Institute for their financial support.

Special thanks go to European Commission for financial and other support in all phases of development of Sava GIS.

ABOUT ISRBC

The four riparian countries of the Sava River Basin, namely, the Republic of Croatia, Bosnia and Herzegovina, the Republic of Slovenia and the Republic of Serbia have been cooperating under the Framework Agreement on the Sava River Basin (FASRB), through the International Sava River Basin Commission (ISRBC). FASRB is aiming at transboundary cooperation of governments, institutions and individuals for establishment of an international regime of navigation on the Sava River and its navigable tributaries; prevention or limiting hazards, such as floods, ice, droughts and accidents involving substances hazardous to water, as well as reduction or elimination of related adverse consequences and safeguarding sustainable development of the Sava River Basin.

To achieve the main goals of FASRB, the following activities are coordinated by ISRBC:

- Creation and realization of joint plans for the Sava River Basin (e.g. river basin management plan, flood risk management plan)
- Preparation of development programs for the Sava River Basin
- Rehabilitation and development of navigation in the basin
- Establishment of integrated systems for the Sava River Basin (GIS, RIS, flood forecasting and warning system, etc.).

In the Strategy on Implementation of FASRB, which ISRBC adopted in 2011, the information management, as a cross cutting issue necessary for efficient implementation of the above actions, has been noted. Accordingly, ISRBC implemented core functionalities of Sava GIS.



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