

## ABSTRACT

The size of the explanatory note is 135 pages, contains 24 illustrations, 34 tables, 1 appendice, 20 references.

**Relevance of the topic.** The paper considers the problem in the field of geographic information systems (GIS) with the object of study - the architecture of software for spatial data processing. The main features of existing GIS solutions, including their advantages and disadvantages, are shown. The need to develop a specialised architecture that will increase productivity, reliability, and ensure standardisation of data processing is identified.

**The aim of the study.** The main goal is to develop a geographic information system architecture based on a microservice approach with delegation of individual data processing processes to optimize performance and ensure a single standardisation of spatial data processing.

**Object of research:** Architecture of geographic information systems for processing and visualisation of spatial data.

**The subject of the study:** Architectural solutions and software components that optimise the processing and storage of spatial data in geographic information systems.

To achieve this goal, **the following tasks have been formulated:**

- Analyse existing approaches to GIS architecture and identify their shortcomings.
- Develop a microservice architecture for processing and storing spatial data.
- Implement a mechanism for delegating data processing and ensure unified data standardisation to increase productivity and reduce the load on the client side.
- Conduct a marketing analysis to assess the potential market for the proposed system.

**The scientific novelty** of the results of the master's thesis is that an architectural solution for building a geographic information system based on microservices with a data processing delegation to ensure standardisation is proposed. Unlike other solutions, this approach allows for efficient load distribution and increased reliability of spatial data processing.

**The practical significance** of the obtained results is that the developed architectural solutions allow to create a flexible and scalable geographic information system with high performance and standardisation of data processing. This can be useful for various applications in the fields of transport, environmental monitoring, urban planning, etc.

**Linkage with research programmes, plans, and topics.** The work was carried out at the Department of Computer Science and Software Engineering of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute".

**Approbation.** The scientific provisions of the dissertation were tested at the VII All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Information Systems and Management Technologies" (ISTU-2024) - in Kyiv. Kyiv.

**Publications.** The scientific provisions of the dissertation are published in:

1) Mamontov M.V. Architecture of a Geographic Information System for Real-time Spatial Data Processing / M.V. Mamontov, O.P. Stelmakh // Proceedings of the VII International Scientific and Practical Conference of Young Scientists and Students 'Software Engineering and Advanced Information Technologies SoftTech-2024'.

**Keywords:** SOFTWARE ARCHITECTURE, MICROSERVICE ARCHITECTURE, GEOGRAPHIC INFORMATION SYSTEM, SPATIAL DATA, MESSAGE BROKER, CANONICAL DATA MODEL, DATABASE MANAGEMENT SYSTEM, GEOINFORMATICS, INFORMATION SYSTEM.