

# OPINION

from Prof. Dr. Eng. Angel Sotirov Smrikarov  
of a dissertation  
for the acquisition of the educational and scientific degree "PhD"  
in the field of higher education: 5. "Technical Sciences",  
Professional field: 5.3. "Communication and Computer Engineering",  
PhD program: "Automated Information Processing and Control Systems"

**Author of the dissertation:**

**mag. eng. Velin Sabinov Hadzhiev**

**Dissertation topic:**

**"Modelling of Data Structuring, Storage, and Processing Operations  
on the Internet"**

## **1. Topic and Relevance of the Dissertation**

The dissertation topic is extremely topical as it covers key aspects of data modelling in the context of modern Internet-based systems. Data structuring, storage and processing are fundamental to the development of modern information systems, which is important for scientific, business and societal processes. With the development of Internet technologies and the increasing volume of data generated from various sources, the need for effective data management solutions that provide reliable storage, easy access and fast processing arises.

This dissertation addresses and solves problems related to enabling any user on the Internet to define and manage the structure of their data. This is of utmost importance in the context of modern applications requiring high flexibility and personalization of processes. The approaches proposed in this dissertation aim to overcome the limitations of traditional data storage and processing models by creating novel hybrid methods that combine the advantages of different architectures.

In addition, the relevance of the research is determined by the need to develop models that are suitable for applications in different industrial and scientific fields. Therefore, this dissertation makes a significant contribution not only in theoretical but also in practical aspects by providing solutions for effective data management in a real Internet environment.

## **2. Research methodology**

The research methodology used in this dissertation is based on an integrated approach that combines theoretical analysis, computer modelling and simulations. The main focus is on the development of new hybrid models that combine the advantages of multidimensional architectures and those in third normal form. This approach enables efficient data management while providing high scalability and flexibility of the systems.

The research process includes the following stages:

- Analysis of existing methods and models: a thorough study of known data structuring architectures and methodologies, and identification of their advantages and disadvantages.
- Development of algorithms and models: creation of new algorithms for data structuring and storage.

- Verification of results: simulation studies and comparative analysis of the developed models to assess their effectiveness and applicability in real conditions.
- Practical application: testing of the developed models in a real web-based environment, focusing on system robustness and performance.

Special attention is paid to the modelling process, which includes both classical approaches and innovative solutions proposed by the PhD student. Appropriate, widely available and time-proven simulation and analysis technologies and tools are also used, contributing to the high reliability of the results obtained. This integrated approach provides a comprehensive and thorough solution to the set tasks, and the research results demonstrate potential for broad application in the field of information technology.

### **3. Contributions of the dissertation**

I accept the contributions declared and formulated by the PhD student, which can be classified as scientific and applied. They are significant for the considered scientific field and are limited to the following:

Scientific and applied contributions:

- An in-depth review and analysis of the current literature, and more specifically, architectures for structuring, storing, and processing data in cloud environments, has been conducted, which serves as a foundation for the development of sustainable and scalable systems.
- A methodology for selecting and evaluating models for structuring, storing and processing data has been developed that provides a systematic approach for adapting to specific requirements.
- A hybrid model combining the functionalities of the selected models has been created and demonstrated to be effective and scalable in different practical scenarios. The data flow diagram highlights key aspects of the model.
- Critical aspects of the proposed models are analyzed using software tools that allow objective assessment of their effectiveness, sustainability and scalability.

Applied contributions:

- A data operations optimization method is developed and tested through simulations and tests, demonstrating high performance and robustness.
- A web-based data structuring, storage and processing system has been developed that provides access for a wide range of users and has proven its practical effectiveness in real-world settings.
- The effectiveness of the proposed hybrid model is demonstrated through empirical tests, evaluating its performance and integration capabilities in real systems.

### **4. Publications and citations of the dissertation publications**

The main results of the PhD student are the subject of 9 publications, which fully meets the minimum requirements for the respective criterion. Four of the publications are in Bulgarian and have been published in the country, while the remaining five are in English and have been presented at prestigious international scientific conferences abroad.

The PhD student has participated in IEEE scientific forums, such as the International Conference on Electrical and Electronics Engineering (ELECO) and the International Conference on Computing Communication and Networking Technologies (ICCCNT). One of the publications is an independent paper presented

at an international scientific conference abroad. In addition, the PhD student has declared three citations of his work in refereed journals, indicating knowledge and recognition of his results by the scientific community.

### **5. Authorship of the results obtained**

In the dissertation, a considerable amount of research and experimental work has been carried out by the PhD student under the supervision of his supervisor. I believe that the majority of the research and analyses carried out are the result of the PhD student's personal work. The developed models, methodologies and obtained results demonstrate a high degree of originality and thoroughness in the field of data structuring, storage and processing.

I found no plagiarism in the submitted materials, including the abstract and publications. The research presented in this dissertation builds on existing knowledge and contributes to the development of the field. I consider that the content and layout of the dissertation and the abstract comply with the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria and the Regulations for the Acquisition of Scientific Degrees and Academic Positions of the Technical University of Gabrovo.

### **6. Opinions, recommendations and comments on the dissertation**

The dissertation is presented in a clear and logical manner, covering all necessary aspects of the issues under study. The following recommendations can be made:

- In some places in the text, repetitions are noticeable, which can be removed to reduce the volume of the content.
- It would be helpful if a list of abbreviations used could be added at the beginning of the dissertation.
- Stylistic inaccuracies are noted in places in the dissertation, but they do not detract from the PhD student's work.

I recommend the PhD student to continue the cooperation in the research work with the colleagues from the Technical University - Gabrovo and to participate together with them in national and international projects.

### **7. Conclusion**

I believe that the submitted dissertation meets the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria. The achieved results give me reason to propose to the esteemed jury to award the educational and scientific degree "Doctor" to Mag. Eng. Velin Sabinov Hadzhiev in the field of higher education - 5. "Technical Sciences", Professional field: 5.3. "Communication and Computer Engineering", PhD program: "Automated Information Processing and Control Systems".

**Member of the Scientific Jury:**                      **/signature/**  
(Prof. Angel Smrikarov)

03.02.2025