

## Opinion

By Assoc. Prof. Dr. Vladimir Nikolaev Ivanov

Member of the Scientific Jury, appointed by Order No. 104/17.05.2026 of the Director of IICT-BAS

**Subject:** dissertation work by Iliyan Grozdanov Iliev on the topic "OPTIMIZATION OF THE TRANSITION FROM ASSET MANAGEMENT TO SERVICE MANAGEMENT IN COMPLEX FEDERATED SYSTEMS IN THE PUBLIC SECTOR", submitted for the acquisition of the educational and scientific degree "doctor" in the professional doctoral program "Computer Systems, Complexes and Networks", professional direction 5.3. "Communication and Computer Engineering"

### Information about the procedure

At the first meeting of the scientific jury, I was selected to write an opinion. Under this procedure, I have received all documents in electronic format.

### Relevance and significance of the researched issues

The topic of the dissertation is undoubtedly relevant and of high public and scientific-applied significance. The transition from asset management to service management is one of the main goals of the modern digital transformation of the public sector.

The topic is given particular weight by its connection with real regional deficits (Northeast Bulgaria, the Black Sea and Danube coasts), with maritime security and situational awareness, as well as with current initiatives such as EuRIS and DANRiSS/DANRISS 2. In this way, the work fits into both national priorities (including the National Scientific Program "Security and Defense") and the broader European context of the digitalization of public services.

### General characteristics, structure and volume

The dissertation is 153 pages long and is structured in an introduction, five chapters, conclusion, formulated contributions, directions for future research, list of publications and bibliography. It contains 49 figures, 6 tables and 127 literary sources.

A particularly strong aspect of the layout is section 1.8, which presents the relationship between the goal, tasks, chapters and expected results. Each of the six tasks is related to a specific chapter and a specific result, which makes the work internally coherent and facilitates tracking of what has been achieved.

### Brief overview by chapters:

Chapter 1 traces the historical, technological and organizational prerequisites for digitalization and justifies the need for a transition to service management. Here, the four representative classes of services are defined (adaptive multimedia distribution via HLS, GPU as a service, real-time VoIP and federated AIS cloud) and a comparison table (Table 1.1) with the optimization criteria is derived. The goal, tasks, object, subject and methods are formulated.

Chapter 2 analyzes the reliability and security of communication services, in particular the weaknesses of RSA in the case of insufficient entropy of random number generators, and argues the choice of cryptography on elliptic curves (ECC/ECDSA/ECDH on NIST curves) for distributed and resource-constrained services.

Chapter 3 presents methods for accessing protected content and protecting personal data, guided by the principle of “content is one thing, authentication is another”.

Chapter 4 discusses the provision of administrative and computing services on demand.

Chapter 5 proposes two architectural solutions for optimization: a hybrid VoIP architecture (centralized SIP signaling + direct P2P media transport via ZeroTier) with real-world latency measurements ( $\approx 15$  ms vs.  $\geq 22$ – $25$  ms via the exchange) and traffic analysis with Wireshark, as well as a federated AIS cloud with a conceptual formalization of the resource effect.

## **Knowledge of the problem and research methodology**

The doctoral candidate demonstrates good knowledge of the subject area. The literature review is broad and competently selected - it combines standards and regulatory documents (RFC, ITU-R M.1371, NMEA 0183, FIPS 186-5, NIST SP 800-57/500-332), peer-reviewed scientific publications, as well as primary and regulatory sources.

Scientific and applied scientific contributions

I accept the contributions formulated by the doctoral candidate as correctly reflecting the achievements. By their nature, they are mainly applied scientific, with separate elements of a scientific nature.

## **Assessment of the publications and their impact**

Six scientific publications have been attached to the topic of the dissertation, four of which have the doctoral candidate as the first author (three published and one forthcoming - EEPES 2026), and two - as the third author. The publications are in reputable forums and publications, including international conferences under the auspices of IEEE (CIEES 2023, CIEES 2025) and the indexed journal Information & Security: An International Journal. There are also two noted citations. The volume and quality of the publication activity exceed the minimum national requirements for acquiring the ONS "doctor" in the relevant field.

## **Critical notes and recommendations**

The notes made are of a recommendatory nature and do not belittle the merits of the work:

1. The introduction and the beginning of Chapter 1 are written in a distinctly personal and essayistic style. It is fascinating and creates context, but in places dilutes the strictly scientific presentation.
2. There are minor editorial and technical inconsistencies: two different tables are numbered "Table 5.1" (comparison of VPN technologies and the table with the designations in 5.2.1); there are single inaccuracies in writing formulas. I recommend refinement in the final design.

## Questions for the PhD student

1. In the hybrid VoIP architecture – how are security and trust ensured for direct P2P media streams (e.g. DTLS-SRTP) and how does the solution scale for a significant number of simultaneous calls between many regions?
2. To what extent does the choice of NVIDIA/CUDA/RAPIDS for insightd limit the portability of the solution in real administration and do you foresee provider-independent alternatives?

## Conclusion

The dissertation work of Iliyan Grozdanov Iliev is a completed independent study with a clearly expressed scientific and applied value, which solves a current and socially significant problem. The work contains original results, proven through actually developed and implemented solutions, approved in publications. The set goals and tasks have been achieved, and the formulated contributions are personal, credible and sufficient for acquiring the ONS "doctor". The notes made are of a recommendatory nature.

Based on the above, I give my positive assessment and propose to the esteemed scientific jury to award Iliyan Grozdanov Iliev the educational and scientific degree of "Doctor" in the doctoral program "Computer Systems, Complexes and Networks", professional direction 5.3 "Communication and Computer Engineering".

12.06.2026

