

OPINION



by **Corr. Member Lyubka Doukovska, DSc**
from the Institute of Information and Communication Technologies,
at the Bulgarian Academy of Sciences,
on the Thesis for awarding educational and scientific degree PhD,
under the Scientific Field: **5. Technical Sciences**,
the Professional Area: **5.3. Communication and Computer Techniques**,
the Scientific PhD Specialty: **“Computer Systems, Complexes and Networks”**
Author of the PhD Thesis: **Edita Ananieva Djambazova**

PhD Thesis Title: **Study of the dependability characteristics of a fault-tolerant distributed real-time system with adjustable reliability**

In accordance with Order No. 191 from 20.07.2023 of the Director of the Institute of Information and Communication Technologies, I have been appointed as a member of the Scientific Jury regarding the PhD thesis of **Edita Ananieva Djambazova** for awarding the educational and scientific degree “Doctor of Philosophy” (PhD). The scientific advisor of the PhD thesis is Assoc. Prof. Rumen Andreev, PhD.

As a member of the Scientific Jury I have received:

1. Order No. 191 from 20.07.2023 of the Director of the Institute of Information and Communication Technologies.
2. PhD thesis for the educational and scientific degree PhD.
3. Abstract of the PhD thesis for the educational and scientific degree PhD.
4. Copies of the publications included in the PhD thesis.
5. Accompanying documents according to the procedure for the defense of the PhD thesis.

In order to form the final evaluation of the PhD thesis, the requirements of the *Development of Academic Staff Act in the Republic of Bulgaria* are implemented the specific requirements in the Act’s Institutional Regulation shall be taken into consideration, where the respective norms are:

1. Pursuant to Art. 6 (3) of the *Development of Academic Staff Act in the Republic of Bulgaria*, PhD thesis should contain scientific or scientific-applied results, which represent an original contribution in science. The PhD thesis must indicate that the candidate has in-depth theoretical knowledge of the relevant specialty and ability for independent research.

2. According to Art. 27 (2) of the specific requirements in the Act's Institutional Regulation, PhD thesis should be presented in a form and volume corresponding to the specific requirements of the primary unit. The PhD thesis should contain: a cover page; content; introduction; exhibition; conclusion - a summary of the results obtained with a declaration of originality; bibliography.

The PhD thesis consists of 134 pages. Its structure includes introduction, four chapters, conclusion, request for originality, bibliography and two applications.

The aim of the PhD thesis is to study the dependability characteristics of the proposed fault-tolerant distributed real-time system with adjustable reliability, to compare them to those of the known similar systems, and based on the results to develop an approach (of adjustable reliability) for use in dependable distributed real-time systems.

To accomplish this, the following tasks have been set:

1. To make a study, a survey, and a critical analysis of dependable distributed systems. To synthesize a classification of the existing dependable distributed systems. To outline the research opportunities in structural redundancy distribution.

2. To propose a model and an architecture of a fault-tolerant distributed system with adjustable reliability that gives a solution to the high-reliability requirements of the application.

3. To define a research method for the study of the proposed model. To develop a tool applying the method. To compose a research protocol.

4. To design and conduct experimental research to test and analyze the dependability characteristics of the proposed fault-tolerant system with adjustable reliability using the chosen research approach and developed software product.

I find that the aim and the problems formulated reflect the topicality and significance of the presented PhD thesis, as well as the possibility to apply the results obtained in the engineering practice.

Five publications are included in the presented list of publications on the PhD thesis. One publication is in a journal, listed as accepted for publication in the presented list, but it

should be noted that it has already been published in an open access journal. Four of the publications are in the proceedings of national and international conferences, which are referenced in Scopus. The data thus presented give me reason to conclude that the research has been provided with the necessary publicity.

I accept that the contributions so formulated could be considered to have scientific and common application. This separation would allow detailing the results obtained in accordance with the specificity of their significance. Such defined contributions can be defined as enriching the existing scientific field with new knowledge.

The PhD abstract has a volume of 49 pages. It faithfully reflects the essence and content of the PhD thesis, including the purpose, subject, object and tasks of PhD thesis research and the ways of their realization.

In order to form the final evaluation of the PhD thesis, the requirements of the *Development of Academic Staff Act in the Republic of Bulgaria* and its Implementation Rules are to be taken into account, so I should note that all remarks made by me during the preliminary discussion of the PhD thesis are reflected in its final version.

In conclusion, I accept that the requirements of the Law for the *Development of Academic Staff Act in the Republic of Bulgaria* and the specific requirements in the Act's Institutional Regulations for its implementation, the Rules for the conditions and the order for acquiring academic degrees and for the occupation of academic positions in Bulgarian Academy of Sciences and the Rules for the specific conditions for acquisition of academic degrees and occupation of academic positions at the Institute of Information and Communication Technologies - BAS are fulfilled. After my introduction to the dissertation thesis and its publications, an analysis of their significance and the contributions they make, I give my positive assessment and I recommend to the Honorable Jury to award the educational and scientific degree PhD to **Edita Ananieva Djambazova** in the Scientific Field **5. Technical Sciences**, the Professional Area **5.3. Communication and Computer Techniques**, the Scientific PhD Specialty **“Computer Systems, Complexes and Networks”**.

28.08.2023

Sofia

Signature

/Corr. Me

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