# REVIEW

### Assoc. Prof. Nora Angelova Angelova, PhD

### of the dissertation of Kristina Lyudmilova Ignatova

### on the topic "MODELS OF CLOUD ARCHITECTURES FOR BUILDING A COMMUNICATION AND INFORMATION ENVIRONMENT FOR JOINT ACTIVITY AND MANAGEMENT "

### for acquiring the educational and scientific degree 'Doctor'

### in the field of higher education "5. Technical Sciences"

### in the professional field "5.2. Electrical Engineering, Electronics and Automation"

## 1. Biographical data

From the presented autobiography it can be seen that Kristina Ignatova was born on June 1, 1991, in the town of Sofia. In 2014 she acquired a bachelor degree in Engineering Ecology and Environmental Protection. In 2017 she acquired a master degree in Information Technology. The doctoral student has participated in 4 conferences - 3 international conferences and 1 organized by the Defense Institute "Professor Tsvetan Lazarov". Kristina Ignatova stated that she speaks English, but no specific level is indicated.

Kristina Ignatova is enrolled as a doctoral student at the Defense Institute "Professor Tsvetan Lazarov" by Order of the Minister of Defense №OX969/25.10.2019 in the doctoral program: Automated systems for information processing and management and the topic of the dissertation Models of cloud architectures for building a communication and information environment for joint activities and management.

## 2. General characteristics and structure of the dissertation

The dissertation has a volume of 160 pages and consists of a text in Bulgarian, 35 figures and 5 tables, presented in:
- Introduction (pp. 6-8);
- Analysis of cloud technologies, architectures, groupware and collaborative systems (Chapter One, pp. 9-54);
- Models for building communication and information system for collaborative actions (Chapter Two, pp. 55-99);
- Simulation of GN models and proposal for building a cloud communication and information system for collaborative actions (Chapter Three, pp. 100-136);

- Conclusion and guidelines for future work (p. 137);
- Results achieved (p. 138);
- Declaration of originality of the results (p. 139);
- List of dissertation-related publications (p. 140);
- References (pp. 141-153);
- List of figures (pp. 154-155);
- List of tables (p. 156);
- List of accepted abbreviations (pp. 157-158);
- Glossary of terms used in the dissertation (pp. 159-160).

The bibliography contains 131 titles of books and online resources in Bulgarian and English. The bibliography includes some new titles and some major publications in the field, which shows that the doctoral student is familiar with the topics discussed. There are also some sites in the references that are mostly used for definitions. My opinion is that Kristina can use more legitimate resources for these deifnitions.

The topic of the dissertation is interesting, relevant and can be a prerequisite for optimizing the work of various institutions dealing with defense.

The topic of the dissertation corresponds to the analysis, proposals, models and simulations. The dissertation discusses various possibilities for building a "private cloud" - cloud types, *different* technologies, architectures, mathematical tools for describing models, development environments, the relationship between cloud technology and defense and more.

Three original generalized network models have been developed in the dissertation, which are related to the specifics of the topic. For each of the developed generalized network models a block diagram has been developed, which takes into account each of the stages in the model. Most of the comments and remarks I gave about the created models were addressed

before this review. The simulations show the real efficiency of the development. I make the following recommendations for future developments:

- Some of the positions in the indicated transitions which simulate certain calculations may be omitted. The same can be done by the simulator when estimating predicates and the tokens can go directly to the correct output places. Specialized input/output places with additional tokens can be created. They could analyze all new tokens that enter the network and accumulate data on all their parameters. In this way it will be possible to make even better visualizations of the change of the individual values.

- The simulations require real data or a well-selected set of random simulation data to indicate different scenarios in each of the models.

- Some of the names can be changed to make it clearer what is being done by the given transition or predicate.

- Introduce clearer and more detailed criteria and a numerical scale for each of the parameters.

## 3. Scientific results

Kristina Ignatova's contributions can be defined mainly as scientific-applied and applied and can be presented as follows:

- A generalized network model of building a communication and information system for collaborative actions has been created (pp. 62 - 72). An example simulation for the model is presented in Chapter 3.

- A generalized network model of video communication in a collaborative environment has been created (pp. 75 - 85). An example simulation for the model is presented in Chapter 3.

- A generalized network model of cloud infrastructure for building an environment for collaboration has been created (pp. 87 - 93). An example simulation for the model is presented in Chapter 3.

- New approaches for determining the evaluation parameters of the tokens in the GN models and for building a cloud communication and information system for collaborative actions for the needs of defense are presented.

- A proposal was made to build a prototype of a cloud communication and information system for collaborative actions for the needs of defense.

## 4. Publications of the dissertation

There are **7 publications** in the presented *"List of dissertation-related publications"*. Four of the presented publications are in Bulgarian and the other three are in English. Six of the presented publications are in Bulgarian editions and only one publication, the one with number [4], was published in Springer and has SJR factor. The presented publications are in the topic of the dissertation and with them Kristina Ignatova collects the required number of points on a group of indicators D, thus fulfilling all the requirements of the *"Regulations on the conditions and procedure for obtaining scientific degrees at the Institute of Defense"* and the Development Act of the academic staff in the Republic of Bulgaria.

My remark to Kristina Ignatova is to publish more often in international journals and in English, which will make her work more visible to the scientific community.

The doctoral student's documents are accompanied by a *"List of citations from publications related to the dissertation of assistant Kristina Ignatova"*, which contains two citations of the [5] and [6] publications,

respectively. There are no self-citations in the cited citations. A general list of all citations is not provided.

## 5. Evaluation for the abstract

The abstract is 40 pages in Bulgarian and reflects the more important contributions of the dissertation. It presents parts of all chapters, the conclusion and guidelines for future work, the results achieved, the list of publications related to the dissertation and the references. The abstract complies with the requirements of ZRASRB.

## 6. Critical remarks

I have the following critical remarks on the layout of the dissertation: The bibliography contains books, publications and Internet resources, but the order is by different criteria - in alphabetical order according to the name of the first author, if any, according to the name of the publication on the Internet, if any, the name of the link (https ) and other.

## 7. Personal impressions

I do not know Kristina Ignatova.

## 8. Conclusion

With all that has been said above, I give a positive conclusion of the materials of Kristina Ignatova. This provides me with reason to recommend to the honorary members of the Scientific Jury to appoint Kristina Ignatova to the academic position **"Doctor"** in professional field **"5.2. Electrical Engineering, Electronics and Automation".**

12.05.2022                           REVIEWER

(Assoc. Prof. Dr. Nora Angelova)