

Abstract for the dissertation:

Security mechanisms for integration platforms supporting public tasks execution

Digital platforms are more and more often an environment for the production, interaction and sharing of digital services. One of the main areas of application of this type of platform is the implementation of processes for handling public tasks provided by public administration by electronic means. The dissertation presents mathematical and architectural models to support handling of these tasks, with particular emphasis on their security. The advantages and disadvantages of the bilateral and multilateral interoperability frameworks were analysed, especially in terms of their suitability for automating the handling of public tasks. The conclusions resulting from the above-mentioned analysis were presented together with the review and evaluation of a significant number of the most recognized security models. The paper indicates the lack of adequate security mechanisms for the handling of public tasks by electronic means with formally proven principles of operation. In further considerations, author presented the mathematical model for handling public tasks and the security model for execution of electronic public services implemented in the domain and trans-domain platforms environment. The conditions were given, under which it is justified to use the lattice theory to process security rules for the execution of public tasks in the environment of electronic platforms, with the special role of the above-mentioned trans-domain platforms. It has been shown that the use of mathematical modelling (including lattice modelling) is justified not only due to the possibility of creating unambiguous, formal foundations for the functioning of security mechanisms, but also due to the effectiveness of their functioning. The dissertation describes the architectural framework for the development of security mechanisms for public tasks executed with use of electronic services using the effects of mathematical modelling. The architectural framework has been developed in accordance with the principles of corporate architecture and presented using object-oriented modelling tools, in this case UML diagrams. Thanks to the use of package and component diagrams, a generalized component architecture of the trans-domain integration platform was presented, with the components of the lattice security mechanism highlighted. At the end of the dissertation, the results were summarized and potential directions for further research were signalled.

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