The summary of the master's dissertation

Title: "**Development of Single Sign-On component in a complex landscape**"

Reasons for the choice of the subject

During the building of complex information systems there are many such problems as interoperability, scalability, extensibility. From the economic point of view companies prefer rather to create a new system from scratch than to extend the existing infrastructure. Another critical problem for the modern systems is its security. On the intersection of these problems it appears new interdisciplinary tasks. One of them is an authentication in a heterogeneous landscape.

One of the reasons for choosing this subject was the concrete problem which was observed during implementation of SAP Enterprise Search (SAP NetWeaver). On the one hand this search engine works in a very heterogeneous environment because it uses different sources (connectors) to perform searching; on the other hand this system closely depends on external search providers which have their own authentication mechanisms. The problem of finding monolithic, scalable and extensible approach becomes very important.

The existing solutions were not suitable because of their limitations. For example using of passwords mapping is quite difficult to maintain and support changes for administrators. Another approach – one master password is very vulnerable in a security sense.

The goal of this work is to perform the theoretical analysis of mention problems and implement SSO software component for SAP NetWeaver (Enterprise Search Engine) platform.

The research methodology

I used the following techniques in the research for my master's dissertation:

Analysis: during my research I studied and analyzed a large amount of books, articles and specification documents on various topics including internet protocols, authentication concepts, service-oriented computing, software engineering, SAP architectures documents.

Generalization: based on the problem domain research, SSO technology was accepted as a solution for authentication in heterogeneous landscape.

Deduction: after analyzing different theoretical approaches of authentication, making experiments with authentication techniques, investigating the structure of generic web services, experimenting with authentication there was found that the most suitable solution is Single Sign-On.

Implementation: as a case study was chosen the implementation of SSO software component which should be integrated into SAP Enterprise Search and supports two scenarios: authentication between two J2EE engines and authentication between J2EE and ABAP.

The dissertation structure

The master thesis is composed of three chapters.

In the *first chapter* the problem statement is formulated as a theoretical one. It has the theoretical basis of authentication, authorization, security protocols, existing implementations and etc. Also it pays a lot of attention on SSO as an innovative approach for authentication in a heterogeneous landscape. There is an overview of advantages and disadvantages of SSO technology.

The *second chapter* goes to the concept of service oriented architecture. It introduces web services, layers of web services interconnection, existing implementations of the specification (XML, UDDI, WSDL, and SOAP) and security issues. The key point of this chapter is introducing of generic web service concept. The main idea of this type of service is that it can build destination proxy classes dynamically using only run-time data. Generic web service is the base type of service which is used during the implementation of the use case for the practical part of this work. The mechanisms of stub generation, dynamic

configuration and run-time deployment are considered with the idea of ability to extend this functionality in order to integrate SSO component.

The *third chapter* is a description of practical use case which was implemented during this work. First of all it considers the architecture of information landscape: SAP Java Application Server and ABAP Application Server. Another step is defining the possible scenarios which should be supported by the SSO component. There are two main scenarios: interaction between J2EE servers where generic services are deployed and interaction between ABAP and J2EE servers. The second scenario requires configuration and implementation of SSO component and it represents a classical example of heterogeneity (ABAP is not compatible with Java). This chapter describes the architecture of SSO module and its implementation details.

The obtained results

The work presented in the dissertation has several parts. The first is investigation of authentication, authorization, security protocols in respect to SAP NetWeaver landscape. The result is the choice of SSO technology as the most suitable for the current problem. The second part is presentation of possible authentication scenario uses which can be executed with the help of SSO. The next part is implementation of SSO component using Java and SAP frameworks for web services.

The master thesis has practical appliance. The developed SSO component was successfully integrated into SAP Enterprise Search and supports all process related to authentication.