E-Service Architecture Selection Based on Multi-criteria Optimization

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Abstract. The selection of the most acceptable architecture of e-services system is very important issue. One and the same e-service can be designed using different alternative architectures. Each system has different execution indices that are very important for the e-services clients and providers. This article shows solutions for compromise or the most acceptable selection of the architecture of e-services system using more than one criterion at the same time. The solution is based on the theory of graphs and usage of multi-criteria methods and their basics is following: E-service algorithm is described with an algorithm graph. Using segmentation of algorithm graph web service graphs are obtained that are assessed with characteristic numerical values of system architecture. Several characteristics of system architecture are: Reusability, Costs of Production and Time of Execution. The task of multi-criteria optimization of web service graphs is defined when as result the compromise or the Pareto set of web service graphs is evaluated. The most acceptable solution of system architecture is selected from Pareto set by using additional information. The usage of offered method is demonstrated with help of practical example.

1 Architecture of E-Services System

Currently achievements of information technologies create not only possibilities but also a necessity for simple and efficient means how to ensure information receipt, processing, saving and exchange. Internet has become one of main means for furnishing and receiving information and services.

In such context there occurs necessity to talk about electronic services or e-services, their development, structure and architecture. E-service traditionally is realized as a set of actions of information systems. It contains functional possibilities of several systems as a result giving material and nonmaterial wealth for society (physical and legal persons). Electronic services contain four levels of electronization: 1st – information about the service is available on the internet; 2nd – it is possible to download forms that are necessary for receiving the service; 3rd – it is possible to hand in data electronically for receiving the service; and 4th – complete the electronization of service. Providers of the service and clients must ensure the electronization of service. Further in this article we will understand that e-service is a

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service that is electronizated according to electronization levels for usage on the internet.

For electronic services of levels 3 and 4, it is useful to look at architecture of E-services' systems.

Let's view common architecture of e-services system [1, 2].

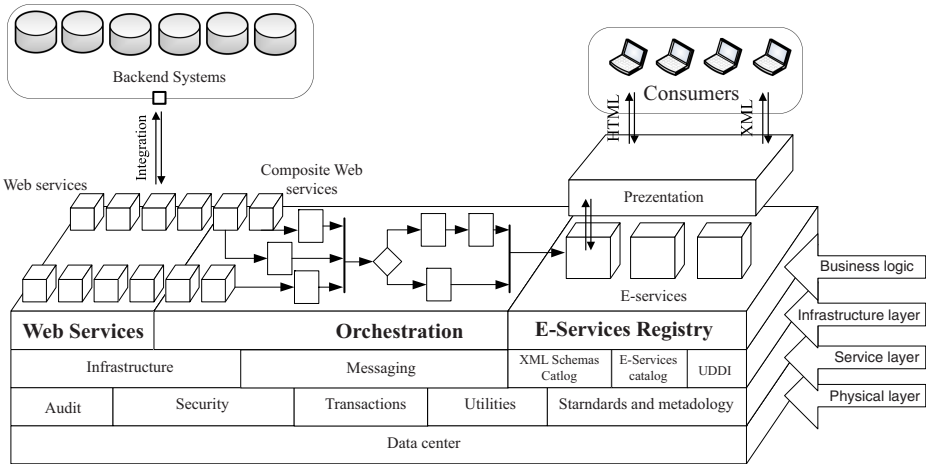

Fig. 1. E-services system architecture

In the logical scheme of architecture (Fig. 1) is shown how the systems that are involved in the service are linked into e-service. There should be elaborated a group of XML schemes for every object of data which should be involved into realization of e-service. Data acquisition from the relevant functional backend system is realized by means of web services. Web service is program component which interfaces can be described with Web Service Description Language (WSDL) and which can be accessed by sending standardized XML messages via standard net protocols. For example SOAP over HTTP. Web services are used to compose e-services. By making calls of web services, also metadata is sent that describes the request. Information that is necessary for filling in auditing registrations is transferred via metadata.

As orchestration (integration) environment of process should be used the BPEL (Business Process Execution Language) processor, as a result of this are e-services that are delivered to applications ensuring e-services for end users, e.g. portals, one-stop agencies, etc. E-services' input forms, milestones, information about payments and results of fulfillment are delivered by HTML or by XML pages which may be used in the portal in order to implement the service by using XSLT transformation.

Holders of web services and e-services, i.e. specialists of institutions and system operators who are responsible for maintenance and development of web services and e-services should have a possibility to communicate mutually on various issues related to execution and development of web services and e-services, as well as execute asynchronous e-services. System of messages is provided for this purpose.