

Integration capabilities of business process models and ERP-systems

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Abstract. Design and development of modern information systems, such as Enterprise Resource Planning (ERP) systems, requires using the principles of the process approach to analysis of business processes and various tools for automating business-process modeling. The "End-To-End" design of business processes, consisting in the continuous or discrete interaction between business process models and elaborated ERP-system, is particularly relevant. Such integration of business process models and ERP-system becomes important during the design process of the information system for high-tech industries characterized by high dynamics of internal logistics processes. The paper discusses business process modeling using the methodology and software tools ARIS by IDS Scheer Company. Based on the analysis and research results of integrating business process models, performed by ARIS Value Engineering methodology, and the well-known Russian ERP system 1C: Enterprise 8.1, an approach and software tool were proposed to enable the ARIS model for importing into the specified ERP system. The proposed method allows maintaining and updating business processes without changing the configuration of the ERP system. The developed software tool is universal for integration purposes with typical software products of 1C. ERP-system settings with embedded software tool remaining typical without reference to the configuration and it is still possible to maintain and update the ERP system in a standardized operation mode.

1. Introduction

The most promising corporate information systems today are ERP systems that allow achieving consistency in the work of various departments of the company [1]. Their use significantly reduces administrative costs and eliminates the problem of data integration for different applications, since the entire enterprise operates in Integrated Information Environment. On the other hand, the use of new approaches to managing an organization, such as the process approach, also gives ERP systems a number of competitive advantages, such as: optimization possibilities for the control system capable of flexible response to the transformation of the external environment, the implementation of indicators and the criteria system for evaluating management performance at each stage of the management chain, and so on [2, 3].

With the appearance of the process approach there is a single language describing the activities, accessible and understandable to all participants in the process, as well as the possibility of a simple and visual graphical interpretation of the activities [4]. The process management approach is a simple and



reliable definition of control process points that can be achieved by dividing the main business process into sub-processes. [5]. The process approach provides a unified view of enterprise management, which leads to the simplification of multi-level hierarchical organizational structures inherent in the functional approach. This provides a greater organization orientation to the customer. By reducing the levels of the organizational structure, the exchange of information between units is simplified and the separation of units and officials is eliminated [6].

The process approach is an effective and reasonable way to solve the problems associated with the development and implementation of corporate information systems. But effective application of such approach is impossible without integration of business process modelling results and ERP systems. This kind of integration is a multi-step task that takes a significant amount of time, labour and material costs. For its implementation, it is crucial to choose and use tools that allow you to describe and analyze business processes, make them transparent and manageable.

2. Problem statement

For the implementation of the process approach in the management of the organization we widely used development company IDS Scheer, which is a methodology and software ARIS. For redesigning or reorganizing of the company or some of its units, one must apply this solution as ARIS Value Engineering (AVE) to reduce costs or quickly perform post-merger integration [7]. The AVE design methodology is used at all stages of the business creation and development cycle from development of the enterprise strategy aimed at reorganization of the basic business processes from process cost management to introduction of information systems and subsequent optimization of the enterprise [8].

In order to be able to modify and configure the model of the described business processes of the enterprise directly with the participation of the corporate information system, it is necessary that the model be in a certain way connected with it. This task is solved by the unification of these two environments by "bridge", which will transfer new ways of doing business from the process models in the space of information systems.

In Russia the platform 1C: Enterprise 8.1 for design and development corporate information systems is widely used. It has its own basic set of tools for working with process management (configuration object "Business processes"), but it does not have sufficient capabilities to describe the structure of all processes and sub-processes of the enterprise. Also, it does not have the functionality that is incorporated in ARIS software products specifically designed for this purpose [9, 10]. Working with business processes in 1C: Enterprise is based only on the program code level. It is possible to program the existing processes in the enterprise, but there is no possibility to modify and edit the schemes of their functioning in user mode. The flexibility of the platform, the possibilities of joint operation with different software, allow solving the actual problem of integration ARIS tools and ERP system for the development of a universal application solution [11].

This software tool will allow importing business process models from ARIS into the ERP system (based on 1C: Enterprise), which will serve as the basis for the formation of a tool for modifying the business processes of the enterprise directly in the working environment. The development of a universal application solution that will allow importing business process models from ARIS into an ERP system, which will serve as the basis for building a tool for modifying business processes of an enterprise directly in a working environment, is relevant.

3. Methods of solution and analysis results

The specified purpose can be achieved by describing a specific instance of the enterprise business process using ARIS Value Engineering methodology, developing the algorithms for uploading business process models presented in ARIS software products and for loading and converting uploaded models into business process models 1C: Enterprise. As an example, let us consider a typical wholesale process with postpaid, which can be used for manufacturing enterprises of different directions (Business process diagram steps sequence is shared by the economics department of radio electronic enterprise JSC

"Radiosvyaz".). Let us consider the business process scenario model presented using the ARIS Value Engineering methodology (Figure 1).

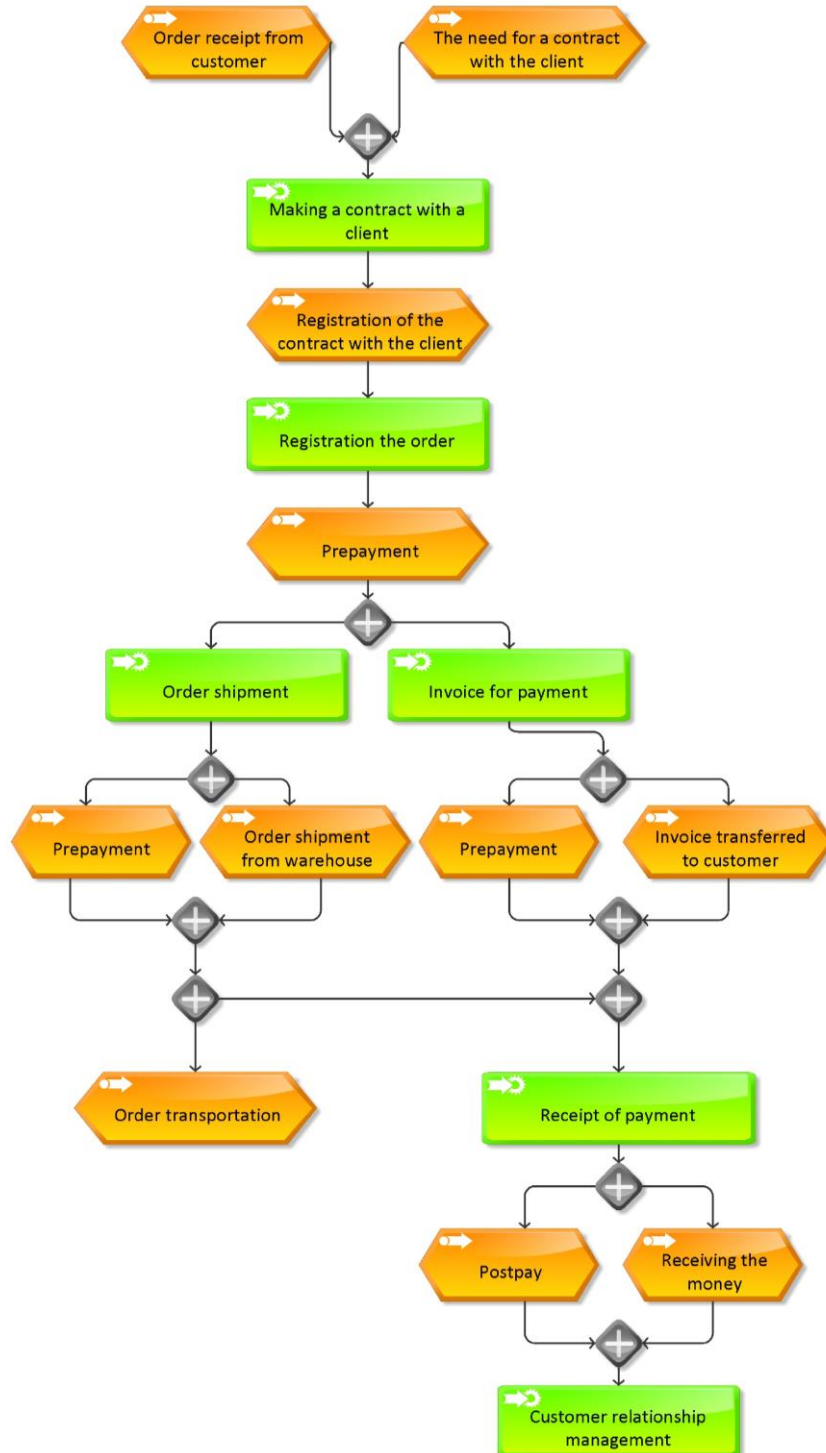


Figure 1. The scenario model of the process wholesale

Work with processes in IC: Enterprise is implemented in the form of configuration objects "Business Processes" and "Tasks". Business processes are designed to manage a sequence of actions aimed at achieving a goal in the context of the automated subject area. Business process tasks are designed to

reflect the issuance and execution of tasks by business process participants or ordinary users of the system. Tasks can be used independently or used to ensure the functioning of business processes of various types. Figure 2 shows the configuration tree and highlights the described objects.

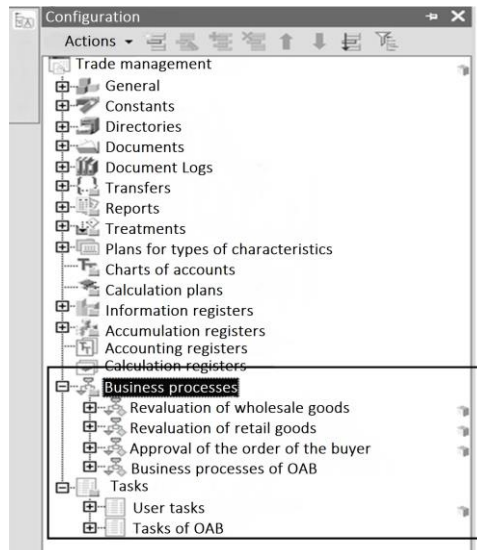


Figure 2. Objects of configuration "Business processes" and "Tasks"

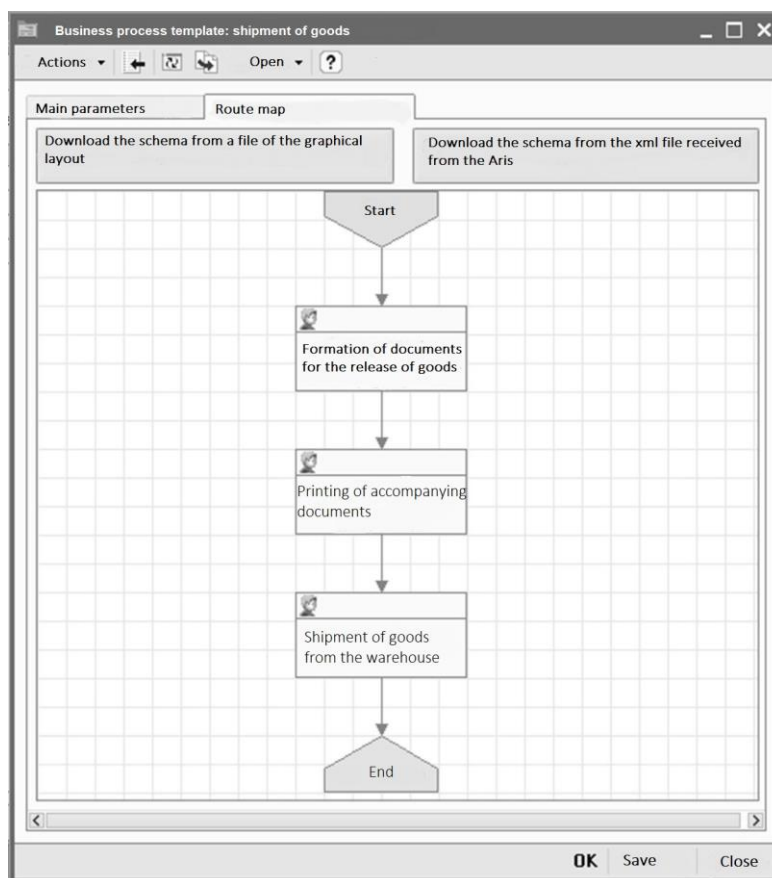


Figure 3. Example of business process route map in 1C: Enterprise

A business process has a route map property, which is a key property of a business process. It clearly describes the life cycle from start to finish, allows you to implement visual design in terms of the subject area, and is a notation that is understandable not only to professionals but also to business process owners. An example of a route map is shown in Figure 3.

Implemented functionality for business process management, incorporated in 1C: Enterprise for configuration and modification of the schemes of processes functioning, cannot be used because of the currently existing configurations; work with processes is incorporated in the configuration itself. It is possible to program the business process, but there is no possibility to modify and customize it in user mode. The implementation of the conversion mechanism of the models was determined by matching objects scenario models ARIS and route maps of business processes in 1C: Enterprise (Table 1).

Table 1. Compliance with the main objects of the scenario models in ARIS with the objects of route maps of business processes in 1C: Enterprise

Object name ARIS	Description of the ARIS – 1C conversion
Function	The object corresponds to the procedure. In 1C converted to a point "Action"
Process Interface	The object is used to reference an external business process function that is not described in this model. In 1C it is not displayed
Event	The object describes the initial and final event of each procedure. In 1C it is used as a "choice option" point or is not displayed.
"AND" rule, "XOR" rule, "OR" rule	The rules of the junction: "AND", "XOR", "OR". In the 1C, "AND" is converted into points "Merge" and "Separation", "XOR" to the point "Choice of option", "OR" – to the set of specified points
Organization unit	Element of organizational structure, structural unit. In 1C it is used to address the action ("Sales Department")
Nested business process	The object indicates the presence of a nested subprocess. In 1C it is converted to the point "Nested process"

The Program in ARIS Sax Basic language has been developed to transfer the model to the ERP system, based on 1C: Enterprise platform. It allows transferring information from graphic models to document files in accordance with certain rules. The result of the program is an .xml file that can be loaded into 1C: Enterprise. In addition, the program has been created for converting the received .xml file into the 1C: Enterprise format of the program. Its objective is to convert information about the objects in ARIS models into the objects of the route map of the business process.

A business process route map is a collection of points of various types and connecting lines (links). Each point of the route map in 1C: Enterprise can be represented as a certain sequence of characters. For each point of the route map of the business process, a template is written. When writing the business process model, the corresponding values from the load .xml file are passed as parameters. In this way an element by the element scheme is created in 1C: Enterprise.

4. Conclusion

The paper presents a universal integrated solution based on the 1C: Enterprise 8.1 platform, which allows you to import models created using the ARIS Value Engineering methodology. The developed program allows implanting models into an ERP system for setting up a model for the functioning of business processes in the user mode of an ERP system. The developed solution is universal in terms of

integration with typical solutions of 1C. The configuration remains typical and can be maintained and updated in a standardized way.

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