Application solution for preparing business processes information for the 1C: Enterprise platform using ERwin process modeller

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Application solution for preparing business processes information for the 1C: Enterprise platform using ERwin process modeller

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Abstract. At present, it is obvious that an increase of the enterprise efficiency indicators is achievable in providing a process approach to manufacturing management. The process approach allows eliminating fragmentation in flow of works, organizational and informational gaps, duplication of functions, inefficient use of material and human resources, as well as significantly reducing transaction costs. However, it should be noted that its successful implementation is a multi-step problem, which takes significant time, labor and material costs. It is important to use CASE-tools for analysis of business processes in integration with corporate management systems (ERP-system) implementing these business processes. One of the well-known CASE-tools in structural analysis and design methodology is the ERwin Process Modeler. The article proposes a universal solution for transforming the process models of ERwin Process Modeler business into business process models in the ERP system environment «1C: Enterprise». The developed software-tool allows supporting and updating business processes without changing the configuration of the ERP system, and it is important for manufacturing enterprises with a complex technological process.

1. Introduction
Timely processing of information helps to improve the organization of production, operational and long-term planning, forecasting and analysis of economic activity. Each organization works to minimize the time, material and labor resources and simplify the process of information processing. These tasks can be solved using automated information systems [1].

Integrated information systems of the ERP class (Enterprise Resource Planning System – enterprise resource management system) are widely used in production management [1,2]. The basis of the ERP system is the principle of creating a single data storage containing all the business information accumulated by the organization in the business process. In particular, it contains financial information, data related to production, personnel management. The ERP methodology allows you to combine all the resources of the enterprise and improve their management.

The use of corporate information systems becomes an integral part of the functioning of organizations. In this regard, the development of the principles of construction and effective application of relevant technologies and software products such as database management systems, CASE-design tools, etc. are relevant [3].
2. Formulation of the problem

Nowadays, most Russian enterprises use ERP-systems and continues to work on the principles of the structural approach [4]. In this case, the organization and management of activities are carried out by structural elements and the interaction of structural elements is carried out through officials and structural units of a higher level. The use of a structural approach to the management of the enterprise over the years has revealed a number of significant shortcomings that significantly affect the growth of its economic performance. At present, it has become obvious that the use of the structural-functional approach is not a sufficient condition for optimizing the operation of the enterprise in modern conditions. Improving business efficiency requires "intelligent" management, which can be achieved using a process approach [5, 6].

A process is a set of interrelated or interacting activities that transform inputs into outputs [5]. In [5], an explanation is also given that any activity or set of activities that uses resources to transform inputs into outputs can be considered as a process. The process approach makes it possible to seriously improve the competitiveness of the enterprise, make it more adequate to market changes and fundamentally improve the quality of products and services. It eliminates fragmentation, organizational and informational gaps, duplication of functions, waste of material and human resources, and significantly reduces transaction costs.

Successful implementation of the process approach is a multi-step task that takes a sufficient amount of time, labor and material costs. It is crucial to use professional tools to describe and analyze business processes, make them more transparent and manageable. One of such products that implement the methodology of structural analysis and design is ERwin Process Modeler [6] – a tool for modeling, analyzing, documenting and optimizing business processes.

As a representative of ERP-systems, software products developed on the 1C: Enterprise platform are widely implemented. This platform is a universal automation system of enterprise economic and organizational activities. The presence of such important property as configurability (the possibility of flexible configuration and modification of application solutions for specific features of the enterprise and the class of tasks) makes the platform 1C: Enterprise highly efficient, expandable and competitive [7].

The 1C: Enterprise platform has its basic set of tools for working with process management, but does not have sufficient capacity to describe the structure of all the processes and subprocesses of the enterprise and the functionality that is incorporated in the ERwin Process Modeler [8, 9]. In addition, work with business processes in 1C: Enterprise is based only on the level of the program code, it is possible to program the existing processes in the enterprise. At the same time, there is no possibility to modify and edit the schemes of their functioning in the user mode. Any tools that allow organizing the preparation of information about business processes in the ERwin Process Modeler and its further use in 1C: Enterprise are also not widely known.

Creating a universal solution that allows importing business process models from ERwin Process Modeler into 1C: Enterprise environment when designing information systems is an important task. The implementation of this solution will allow reducing the time and other costs of the definition, implementation, start-up, monitoring and optimization of business processes of the enterprise. This also allows one to provide change management for existing business process models; to unify the processes in accordance with the standards of the enterprise and reduce the response time to changes in the processes in managing them.

3. Methods of solution and analysis results

A comprehensive description of an organization consists of many interrelated models of different types. It is necessary to create a business process scenario model (IDEF3-model) to describe the business process execution algorithm, a separate scenario in the form of a sequence of procedures, their initial and final events, as well as links to related processes [10, 11]. This model focuses on the logical sequence of procedures that make up this scenario.

An example of a model scenario of a typical business process, presented using the ERwin Process
Modeler, is shown in Figure 1. The scenario model of the business process reflects the sequence of actions in the enterprise within the framework of this process. This model allows you to assign a process owner, distribute all operations by executors, and define key performance indicators that affect the achievement of the company's goals.

Work with processes in 1C: 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 the 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 different types of business processes.

A business process has a route map property, which is a key feature of the business process, clearly describes the life cycle from start to finish. It allows you to implement visual design in terms of the subject area, and is a notation that is understandable not only for professionals but also for owners of business processes. The correspondences of the ERwin Process Modeler scenario model objects and the 1C: Enterprise business process route maps were determined to implement the model conversion mechanism which are presented in Table 1.

The XML language is used as a means of data exchange between ERwin Process Modeler and 1C: Enterprise. An XML file that contains a complete description of the business process is exported to transfer the model to the ERP system from the ERwin Process Modeler. The choice of file format is due to its openness, ease of reading and understanding, the ability to view in any text editor without the use of specialized software, as well as the presence in programming languages, prepares classes and libraries for easy and quick work with files of this format. Saving to XML is performed by standard ERwin Process.
Table 1. Correspondence of the main objects of scenario models ERwin Process Modeler to objects of business process route maps in 1C: Enterprise

| Name                | Description of ERwin – 1C conversion                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------|
| Activity            | The object corresponds to the procedure. Converted to 1C in the point "Activity".                    |
| Junction AND, XOR, OR | The rules of the junction: "AND", "XOR", "OR". In the 1C program, "AND" is converted into points "Merge" and "Separation", "XOR" to the point "Choice of option", "OR" – to the set of specified points |
| Nested business process | The object indicates the presence of a nested subprocess. In 1C it is converted to the point "nested process" |

4. Modeller tools
The Converter has been developed that allows you to download the resulting XML file and convert information about the ERwin Process Modeler model objects into 1C: Enterprise graphical schema objects to convert an XML file to a 1C: Enterprise file. In Figure 2, an example of reading information about the business process shown in Figure 1 is given, and it is developed by the Converter. After opening the XML file in the Converter window, the table containing the full list of business process objects is automatically populated.

Figure 2. Interface of the Converter is loaded from an XML file

You can get a list of all business process objects by reading the XML file exported from ERwin Process Modeler. Each element can have an attribute (or several attributes), content or a nested element. The required data are stored in the following items:

- PMArrow_Groups;
- PMArrow_Groups;
- PMJunction_Groups;
- PMDiagram_Groups.

Data objects include nested elements containing the following information: the name of the line, the object identification number ID, author, note, description, etc. Each point of the route map in 1C: Enterprise can be represented as a certain sequence of characters. The converter from the input parameters read from the XML file generates the text of the description of the route map in 1C: Enterprise format. The result of the work is a file with the *.GRS extension, which includes all the
generated text. The resulting file can be opened in 1C: Enterprise for further customization and creation of a business process. An example of exporting the results of the converter operation (Figure 2) to 1C: Enterprise 8.1 is shown in Figure 3. It is possible to integrate the CASE-design tools of ERwin Process Modeler and the 1C: Enterprise platform using the developed software solution. The design of the enterprise information system takes the character of a sequential transition from one model to another: from a business process execution scenario model (IDEF3-model) to a process model in 1C: Enterprise format, i.e. a file in *.GRS format and 1C: Enterprise route map.

![Diagram](image.png)

**Figure 3.** The result of the Converter in the form of the business process route map for ice cream production

5. **Conclusion**

The paper proposes a universal application solution for the conversion of business process models ERwin Process Modeler in 1C: Enterprise. Using this solution allows exporting models created in the ERwin Process Modeler in the existing or designed ERP-systems. The developed solution is universal: it does not depend on the configuration into which the convertible business process will be embedded – it remains typical and the possibility of its support and updating in a standardized form remains.
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