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in cooperation with
University of Aveiro
Faculty of Management University of Warsaw
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Polytechnic of Medimurje in Cakovec

Economic and Social Development

56th International Scientific Conference on Economic and Social Development Development

Book of Proceedings

Editors:
Humberto Nuno Rito Ribeiro, Marco Andre da Silva Costa, Ivan Cehok

ISSN 1849-7535

Aveiro, 02-03 July 2020

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Title ■ Economic and Social Development (Book of Proceedings), 56th International Scientific Conference on Economic and Social Development Development

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Publishing Editor ■ Spomenko Kesina, Mario Vrazic, Domagoj Cingula

Publisher ■ **Design** ■ **Print** ■ Varazdin Development and Entrepreneurship Agency, Varazdin, Croatia / University North, Koprivnica, Croatia / University of Aveiro, Aveiro, Portugal / Faculty of Management University of Warsaw, Warsaw, Poland / Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat, Morocco / Polytechnic of Medimurje in Cakovec, Cakovec, Croatia

Printing ■ Online Edition

ISSN 1849-7535
The Book is open access and double-blind peer reviewed.
Our past Books are indexed and abstracted by ProQuest, EconBIZ, CPCI (Web of Science) and EconLit databases and available for download in a PDF format from the Economic and Social Development Conference website: http://www.esd-conference.com

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TO IT-PROVIDER BUSINESS PROCESSES NETWORK MODEL

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ABSTRACT

The ideas of the project-process approach are widely reflected in information technologies and methods of business management in recent years. At the same time, the work of companies and enterprises is necessarily associated with the continuous optimization of business processes, with pressing issues of increasing the efficiency of enterprises and organizations. A numerical assessment of the effectiveness of business processes can be obtained on the basis of control metrics. The model considered by the authors cannot completely eliminate all the risks, however, it can significantly reduce them due to an improved mechanism for controlling situations at each stage of the process. The proposed normative model of IT-service, which describes the order of work and the necessary resources, can be used to build complex planning systems for the provision of services and synthesis of schedules in various fields of activity. Its main difference from those considered earlier is the inclusion of polymorphism elements through inheritance, which are associated with network components. The proposed technical solutions are suitable for implementation in terms of any modern high-level programming language.

Keywords: *Business process, network model, MSF, ITIL, MOF, Service Transition, polymorphism, guideline exposure, modeling-algorithmic complex, network schedule*

1. GENERAL BUSINESS PROCESS MODEL

Consider a generalized structural model of a business process using the example of a domain (life cycle stages) of Service Transition infrastructure management library – ITIL-v3 [1, 2]. ITIL-v3 library is a collection of «best practices» for managing information technology services. The choice of a service or project management library (ITIL [1, 2], MSF, MOF, RUP, etc.) does not play a fundamental role here and serves only as a starting point, an illustration of the working environment for a certain class of planning tasks, for example, in focused IT-activities. Domain ST (service transformation) describes the transition of the state of a functioning system from one start point to another - the end. The introduction of fundamentally new projects or services can be represented as changes in the accompanying business processes and elements of the IT- infrastructure relative to some empty (or missing) set of elements.

Such a need can be dictated by various reasons, the most compelling of which is the need for continuous optimization of business processes in a competitive environment and improving the quality of services (products) [3]. There is always a way to improve in a certain way what has been done and worked well before. Replacing software, updating infrastructure, designing and implementing new technologies, developing new software are typical examples of transforming any IT-systems (business processes and services) into a new state. Each transition is accompanied by time costs, input or output of assets, financial costs, the needs of specific performers and other non-trivial tasks. To assess the quality or effectiveness of business processes, appropriate metrics are needed [4]. Thus, there is a final set of works between the two points, activities that need to be completed for a certain period of time, agreed with the project participants. In fact, to describe the list of works and operations needed to transfer the state of the system from the current to the final, one or more network diagrams (directional graph) of any kind can be used. The start and end points of the network diagram can be associated with the states of the system, or with the beginning and end of a specific regulatory process in the ITIL-v3 domain. The Service Transition stage describes seven regulatory processes that must be implemented during a state transition:

1.Change Management (ChM) - change management.
2.Service asset and Configuration management (SAaCM) - asset and configuration management.
3.Knowledge management - knowledge management.
4.Transition Planning and Support - conversion planning and support.
5.Release and Deployment management - release and deployment management.
6.Service validation and Testing - validation and testing.
7.Evaluation - assessment.

Consider the basic model of a business-process in which a procedural or network description of the performed actions, work is allowed. The basic model is used at the initial stage; in practice, it can be decomposed to the required level, which will ultimately provide complete information systems for planning assessment and support of business processes (Figure 1).

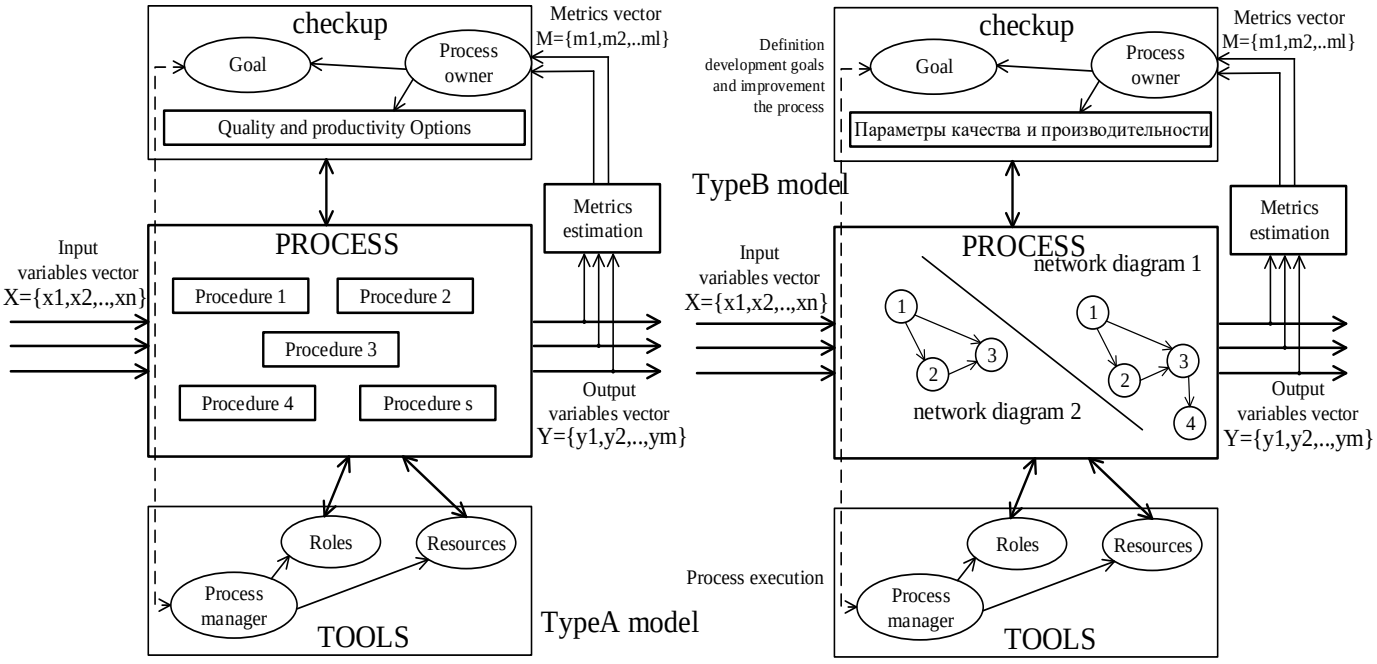

Figure 1: Procedural and (or) network model of a business process

As the main element of the proposed process model (type B) used in this work, we consider a directional graph (network diagram), of an arbitrary form, in which nodes denote certain stages (events) and arcs - operations (actions, works). With nodes and arcs, information of various kinds is identified. This approach, ultimately, allows you to create dynamic models with a constantly changing set, composition of metrics and mechanisms for their evaluation. The process owner provides a business vision of the main goals, objectives and process metrics. The process manager ensures the flow of the process in a form consistent with the business.

2. NETWORK MODEL OF A BUSINESS PROCESS WITH ELEMENTS OF POLYMORPHISM

In fact, any business process can be described periodically by repeating (for operational activities) or a unique set (project activity) of actions, procedures. For such a description, a network structure (directional graph) of an arbitrary kind is well suited, created on the basis of a model of time (duration) of work, resources, and associated data of arbitrary nature. The general idea of the process is supplemented by individual elements, resources and roles that are necessary for its full functioning. A possible special case of the representation of such a model is shown in Figure 2.

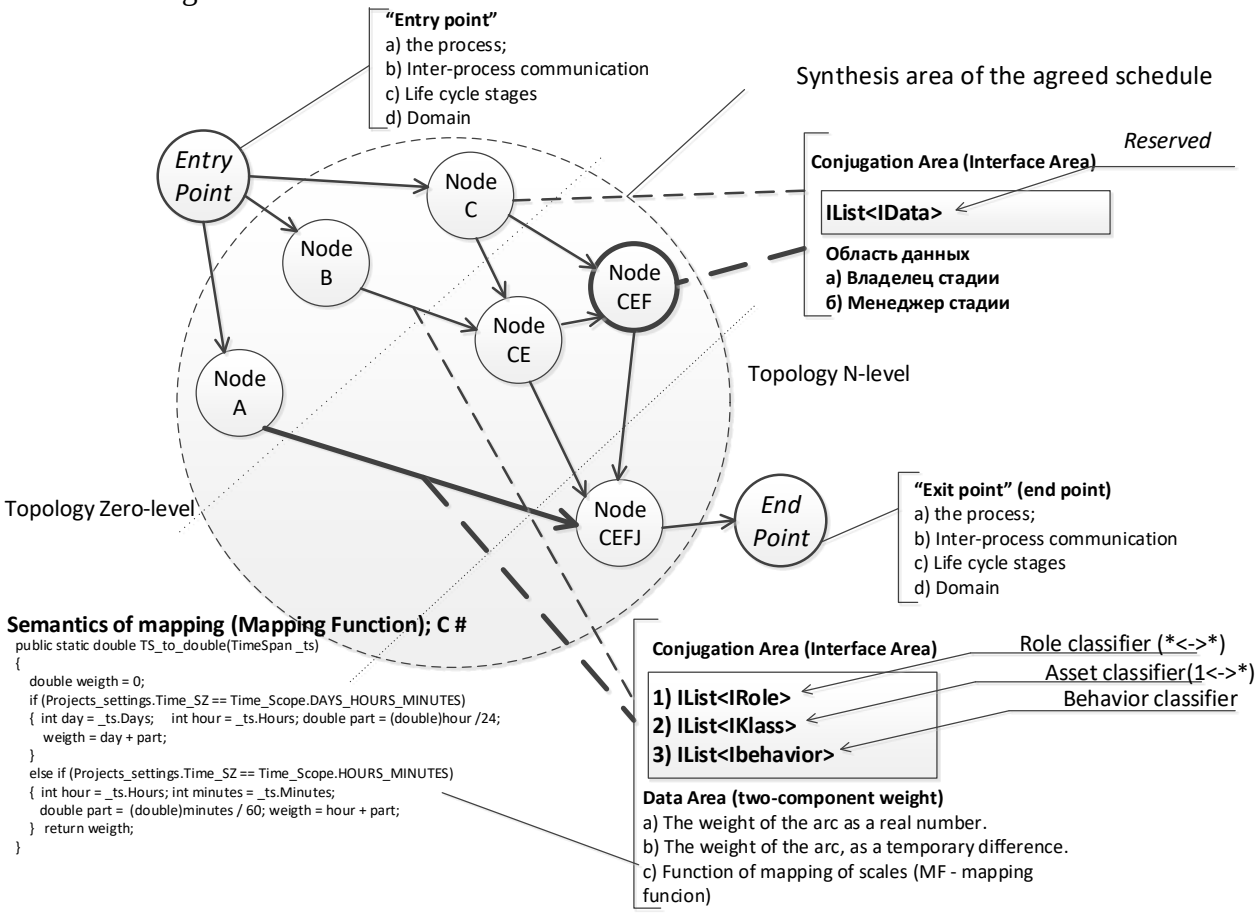

Figure 2: An example of a network model of a business process with elements of polymorphism

In the presented example of the model, a two-component weight is associated with each arc of the graph, which describes the time difference and the corresponding real number, calculated using the function matching the time difference (C # TimeSpan structure), an equivalent real number(1):

$$Number(weight) = F(TimeSpan) = Day + \frac{Hour}{24} + \frac{Minute}{60} \quad (1)$$

The arcs and vertices of the network diagram are associated with specific data of various nature, such as two-component weight, the owner and stage manager, and the corresponding interfaces that allow you to dynamically bind entities that implement them.

The composition, structure and order of actions performed when changing (transforming) a service depends on the subject area in which the business or IT-department operates. Obviously, the course of the main processes will be quite different for companies engaged in the development and sale of software in the market and companies involved in technical support and user support. Do not underestimate the role of owners and managers of business processes at various stages of the life cycle. The process owner is interested in maximizing profits, minimizing all costs and uncompromising, rigorous optimization of any activity. The process owner determines the goals, objectives, as well as metrics by which all processes will be evaluated. The process manager is responsible for achieving the goals set by the owner, provides processes with assets and resources to achieve the specified metrics.

Consider the technological scheme of the elements of the stage of transformation (implementation) of the service life-cycle services for ITIL, MOF (Microsoft Operations Framework)-notations. The proposed scheme reflects the individual stages of the life cycle, which are connected in a single logical sequence. Formally, the implementation is carried out gradually, at the initial stage, the planning and testing of release components with updating of knowledge and configuration database (CMDB) is carried out, at the final stage the same thing happens after the direct implementation (Figure 3).

Figure following on the next page

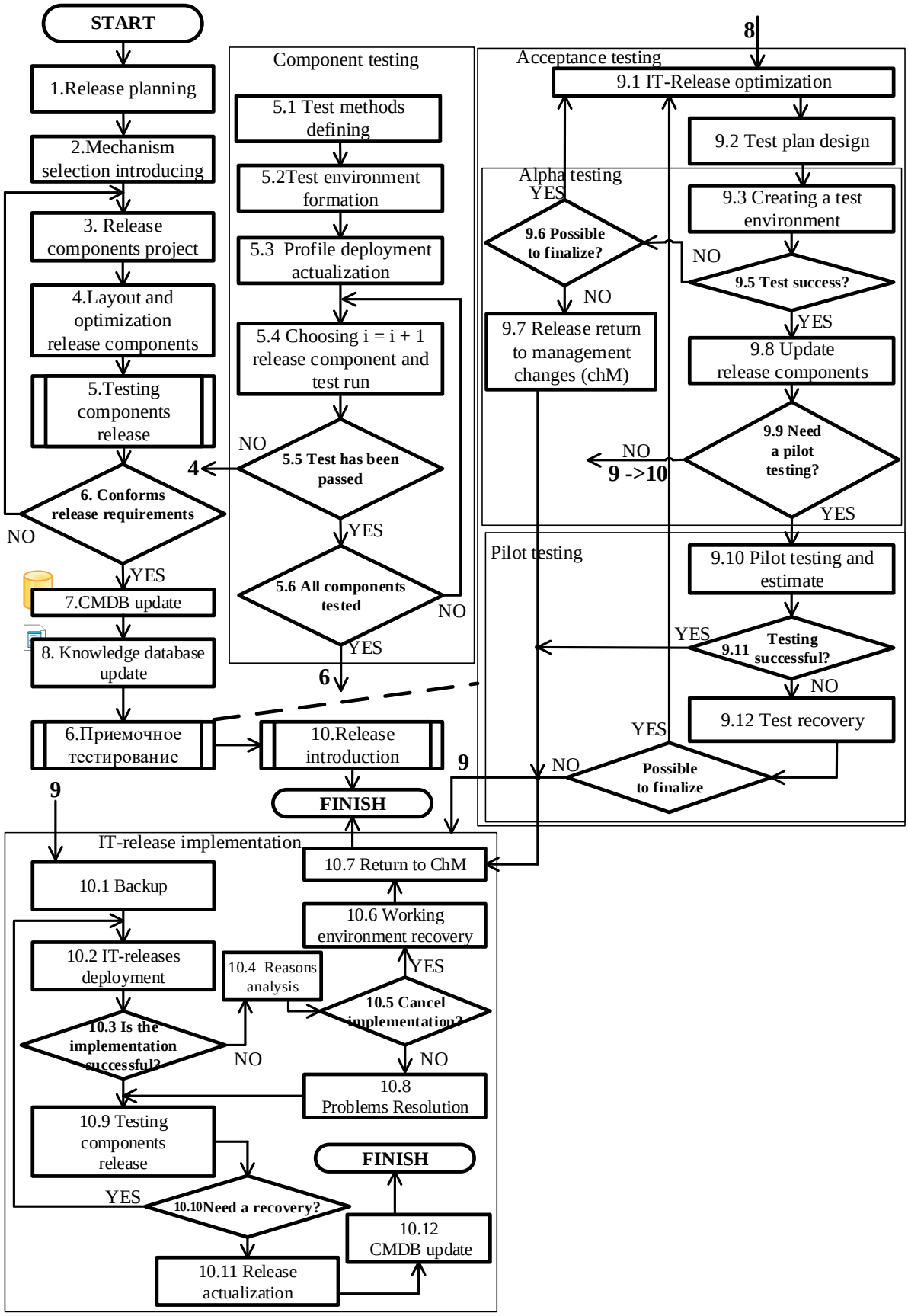

Figure 3: An enlarged view of the stage of transformation of service implementation using the example of ITIL, MOF

The normative representation of the activity shown in Figure 3, suitable for organizations providing consulting services for project management and typical business processes in the field of information technology. The modern approach adopted in business is to use integrated packages [5,6] to improve the efficiency of business processes in general. The construction of large integrated planning systems, support of business processes can be obtained only due to the additional flexibility associated with the ability to bind data of various nature.

3. CONCLUSION

The business process model presented in the article is based on an incomplete model of the software life cycle [7] and is used in the model-algorithmic complex (MAC) of activity planning and construction of schedules on graphs [8]. As practice has shown, the key advantage of the proposed business process model in comparison with rigidly fixed models is the flexibility and wide coverage of a wide range of diverse tasks for planning, creating and further supporting business processes.

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