



Concept Note on "BPM Comparison analysis"

Component 2: Development of a comprehensive information and analytical system for planning and implementation of local budgets

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CONTENTS

1. COMPARISON OF BUSINESS PROCESS MANAGEMENT APPROACHES	2
2. COMPARISON OF AVAILABLE BPM SOLUTIONS	4
2.1. ANALYSIS OF PROCESS MODELING CAPABILITIES	4
2.2. ANALYSIS OF INTEGRATION POSSIBILITIES.....	5
3. CONCLUSIONS	7
4. REFERENCES	9

1. COMPARISON OF BUSINESS PROCESS MANAGEMENT APPROACHES

Businesses are increasingly empowered to increase employee productivity and improve information management to increase competitiveness, reduce costs and adapt to dynamic market and legal situations.

There are several approaches to handle and manage business process automation.

Ministry of Finance Ukraine (i.e. Beneficiary) of has embarked on development of a budget management software for local governments with support from EUD through LOGICA project.

Below we consider the two approaches discussed with the Beneficiary in order to point to advantages of one over the other, suggest the most fit-to-purpose solution and communicate the justified standpoint of the Beneficiary with this regard.

Option 1: Rule Engine. This option was originally pre-approved and suggested by the Scope of Work formulated by the Project and submitted as part of the 2nd Progress Report.

In brief, this approach allows implementation of business rules and its artefacts with the feature to bind them in certain behavioral patterns. Specifically, business rule engine may, for instance, perform recognition of a pattern in a business process and formulate a business event (typically carried via a messaging infrastructure) or create higher level business knowledge (e.g., evaluating the series of organizational, product, and regulatory-based rules concerning whether or not a loan meets underwriting criteria). On the other hand, a workflow would respond to an event that indicated something such as the overloading of a routing point by initiating a series of activities.

Pros of Rule Engine. Fast and easy to implement once all business rules are defined. Also, this option carries considerably lower implementation costs.

Cons of Rule Engine. Most rule engines that are present on the market are the black boxes in terms of system code. From the customer perspective, when build a domain model, it is obviously desired to have certain business rules to be intrinsic to it. For example, business rules indicating that an object has invalid values. This feature allows multiple systems to share the domain model without duplicating business logic. This approach is not feasible to implement by design of rule engine and it is matter to implementation with the BPM approach.

Option 2: Business Process Management (BPM) engine. This option is finally requested by the MinFin and is in accordance with their non-functional specifications which were formulated only recently.

This approach allows mapping of business processes as workflow diagrams, task automation and improvement of their execution parameters. The widespread development of IT industry is contributing to the increasing availability of process management tools. The business software market is filled with modern and sophisticated solutions, so the choice of the right tool is becoming more and more difficult and raises a lot of questions and doubts among potential customers.

Pros of BPM.

Agility: The ability to respond to opportunities or threats in real-time. Agility also enables users to adopt quickly to changing business (i.e. legal) environment.

Transparency: BPM provides for thorough comprehension of business process, including each necessary step in various stages of business process implementation. BPM encourages participation of all stakeholders, while it also improves communication, productivity, and efficiency among workers.

Efficiency: BPM enables better use of resources by identifying the best methods to utilize funding for service delivery, performance review and development.

Cons of BPM. Sophisticate but robust solution that imposes a number of challenges in implementation phase, including (relative to Rule Based option): high-level expertise for implementation, goal oriented team, increased level of Customer participation and involvement and proven success of the delivery from the vendor. This solution imposes higher implementation costs.

Summary Assessment:

BPM provides a standardized way of formulating various business processes' related tasks within software operation and enables compatibility with other software within Ministry of Finance (Beneficiary). This feature allows functionalities of the software to be combined and supplemented with functionalities of other software for different purposes in a consistent way. One obvious advantage here is the increased potential for analytical efforts of the user. On the other hand, "Rule engine" provides a stand-alone solution to the issue which does not spread across other running software and prevents immediate compatibility for analytical, or any other purpose.

After thorough consideration of these two approaches and a series of consultations, Beneficiary has released non-functional requirements for the potential solution that includes the requirement to implement BPM approach as a component and as a part of project delivery. Beneficiary representatives have participated in the meeting with the potential vendor and considered presented solution as a solution that meet Ministry of Finance requirements. This solution is included to comparison analysis below.

2. COMPARISON OF AVAILABLE BPM SOLUTIONS

The aim of this comparison analysis is to give the brief overview of the existing solutions and to present pros and cons of different Business Process Management systems implementation available on the market. Tools are compared according to criteria that normally apply to BPM-driven systems.

2.1. ANALYSIS OF PROCESS MODELING CAPABILITIES

In order to compare their process modeling capabilities, each of the analyzed tools had been investigated to find a set of potential functional features that BPM tools can offer.

The first analyzed feature is the ability to graphically model processes. The graphical environment in each tool can vary a lot from very modest to very sophisticated and eye-catching graphics.

The next feature to check will be the presence of a process engine responsible for implementing and running the modeled processes. Some of the applications described offer not only the BPMN notation, which is currently standard in business process modeling, but also allow modeling using other notations like, for example, Unified Modeling Language (UML). If a framework offers its own notation, then this fact will also be noticed.

In addition, model validation capability criteria was considered. Flexible tools should offer the ability to export and import models created with other tools using MS Visio or XPD. The data modeling context, which includes all the data required for a process, will also be analyzed. Process data like on-screen forms, documents, attachments, document repositories, or any external sources of information that may be required for execute the process at every possible stage will be considered.

Another assessment criteria concerns the business rules, both defining and enforcing. A business rule is a rule that defines or constrains some aspect of business and always resolves to either true or false. Business rules are intended to assert business structure or to control or influence the behavior of the business. A useful option or extension of the BPMN diagram is the ability to simulate the process.

Simulation is used to trace the process flow, find bottlenecks, and test the continuity of the process. More advanced tools also allow you to estimate the time and costs of processes, which may help you in forecasting your budget, but will not replace Business Intelligence. The last element analyzed is whether the framework is provided with ready-to-modify template processes.

All of the open source tools analyzed have a graphical interface that enables modeling using the BPMN notation, validation of modeled processes, as well as options for importing and exporting process models (**see Table below**). The process engine that enables them to be implemented in enterprises is available in almost every application except the Yaoqiang BPMN Editor, which is used exclusively for modeling. Only Orchestra allows you to map the BPMN process to BPEL, while the rest of the analyzed applications only support BPMN. Based on the below results, Bonita BPM not only provides an easy-to-read graphical and user-friendly interface, but it is also a fully-featured solution for complex process modeling.

However, the open source tools have a significant disadvantage in terms of delivery. Each of this tool requires strong and mature team of the developers with the proven experience both in implementation of current tool as well as in the Customer-specific business area.

By analyzing the below table, it can be seen how small differences in their capabilities appear among commercial tools. All analyzed tools have a graphical environment for process modeling in BPMN notation, and also allow you to import and export modeled processes. Except for iGrafx FlowCharter, all standard tools

are equipped with a model validator that can capture potential errors in the process. Similarly, screen forms support, the ability to model data and bind them to process elements, and the ability to model and execute business rules are present in all evaluated tools. The only tool out there that is suitable only for modeling is the iGrafx FlowCharter. It does not have a process engine, but includes the UML modeling feature and converts modeled processes into BPEL.

The differences in modeling capabilities between the analyzed commercial solutions are negligible. The tool with the best process modeling capabilities seems to be the Oracle BPM Suite, but the Aurea BPM competes with all the features but the ready-made diagram templates.

However, the commercial tools have a significant disadvantage in terms of cost. Most of the world class tools vendors have a local partners with the strong teams aimed to implement all business processes on demand. Average cost for the licenses is about 350-800k EUR with the 75-150 EUR hour rate for the experts on the project. Please find the cost comparison in Chapter 2.2.1

2.2. ANALYSIS OF INTEGRATION POSSIBILITIES

The integration is one of the critical process of the system delivery. The use of various approaches for the integration is a great benefit for the system provider.

The tools that are used to implement the process management system should allow integration with existing infrastructure in the enterprise. Such integration enables full automation of business processes. In the first place, you will be able to integrate with the two popular tools: Sharepoint and Outlook and their ability to be used as client applications. Next, the capabilities of external access to process engines will be examined, as well as the capability of API or Web Service integration. Finally, you will be able to see which applications allow you to integrate processes with database objects.

By analyzing the results of comparison analysis (**see Table below**) both commercial and opensource tools have APIs or Web Services to communicate with other software. This allows, for example, to run specific processes or remodel them using external software. The exception is, of course, Yaoqiang BPMN Editor which does not have its own engine nor external database access.

Bizagi BPM Suite, iGrafx Flowcharter, K2 Blackpearl, Oracle BPM Suite and IT enterprise support integration with Sharepoint platform, three of which integrate with MS Outlook.

Availability of local staff with support of Ukrainian language-based documentation is a significant advantage of the IT enterprise software in terms of integration steps that play a vital role for the project schedule and a time of delivery.

	Commercial World-class software						Open-source software						Ukrainian
	Aurea	Bizagi	IBM	iGrafx	K2	Oracle	Activity	Bonita	jBPM	Camunda	Orchestra	Yaoqiang	IT.ua
Graphical modeling	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Built-in process engine	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	NO	YES
Supported notations													
BPMN	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES
BPEL	NO	NO	NO	YES	NO	YES	NO	YES	NO	NO	YES	NO	YES
UML	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
Own	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Model validation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Model import	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Model export	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Data modeling	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	NO	YES
Forms	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	NO	YES
Document repository	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	YES
Business rules	YES	YES	YES	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES
Process flow animation	YES	YES	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO
Process templates	NO	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES

2.2.1 ECONOMICAL ANALYSIS

The intergration of open source solution requires deep competence and proven experience of solution delivery with Minfin non-functional requirements taken to the account. It is not trivial task to find the team with appropriate experience in such a field with the solution being developed and deployed on the same enterprise level as Ministry of Finance requires.

The use of commercial solutions which is consider in the table above as a platform that matches all requirements require the appropriate license and professional services to design, develop and integrate the solution based on such a platform. Usually, it requires to buy the license for the platfrom usage that can be recognized as an incidental expenditure (7.5 g).

Please see the Table below for the information on approximate cost of the license and professional services for the various of commercial software that can be used as a basis for the BPM-based solution implementation.

	Aurea	Bizagi	IBM	iGrafx	K2	Oracle	IT.ua
License cost, EUR	35-80 per user /monthly	Min 75 for user/monthly	400 per author/90 per user/ monthly	60-150 per user/monthly	By quote	By quote	40 000EUR one time fee
Professional services cost, EUR	75-150 per hour	66-150 per hour	75-190 per hour	75-150 per hour	75-150 per hour	75-150 per hour	25-35 per hour

The use of brand named BPM platforms require the budget which is not allocated for the Component 2 form the beginning. However, Ukrainian IT Enterprise company is well-recognized software vendor with the domestic BPM platform and proven integration experience in TOP 50 Ukranian companies can be used as a solution for the Local Budget Management system design and development.

3. CONCLUSIONS

1. Ministry of Finance has chosen BPM as an approach for the Local Budget Management System implementation. Originally, Rule Based approach was suggested by the Scope of Work document that was discussed at the Steering Committee Meeting.
2. The objective of this Concept Note was to: i) compare the different approaches to business process management within the future budget software of Beneficiary, and ii) analysis of available BPM solutions through application of performance criteria that relate to process modelling capabilities and integration possibilities.
3. On the basis of above assessments and conclusions made regarding both aspects considered hereby, LOGICA recognizes that the most efficient way forward in implementation of activities that will lead to successful development of budget software, is to build on the requests imposed by the non-functional requirements of the Beneficiary in terms of selection of approach to business process management, on one hand. And on the other, to build on the advantages of functionalities and local perspective brought by the IT.UA in line with strategic orientation of the Beneficiary.
4. IT Enterprise is recognized as a Ukrainian company with BPM platform that match all conditions of functional and non-functional requirements of the project. The cost of the licenses can be covered by Chapter 7.5 (g). and the license can be treated as "software excluding standard office software that should be covered by the fees to support the experts in performing their tasks"

4. REFERENCES

1. Activiti User Guide, <http://activiti.org/userguide/index.html>, retrieved 21 May 2017,
2. Aurea BPM, <http://www.aurea-bpm.com/>, retrieved 07 June 2017,
3. Bizagi, <http://www.bizagi.com/>, retrieved 07 June 2017,
4. Bonita BPM Documentation, <http://documentation.bonitasoft.com>, retrieved 22 May 2017,
5. Camunda User Guide, <https://docs.camunda.org/manual/7.3/guides/user-guide>, retrieved 30 May 2017,
6. Code Yaoqiang BPMN Editor, <https://sourceforge.net/projects/bpmn/>, retrieved 31 May 2017,
7. Documentation jBPM, <http://www.jbpm.org/learn/documentation.html>, retrieved 25 May 2017,
8. Github: Activiti, <https://github.com/Activiti/Activiti>, retrieved 21 May 2017,
9. Github: Bonitasoft, <https://github.com/bonitasoft>, retrieved 22 May 2017,
10. Github: Camunda BPM, <https://github.com/camunda/>, retrieved 30 May 2017,
11. Github: jBPM, <https://github.com/droolsjbpm/jbpm>, retrieved 30 May 2017,
12. Horus Workflow, <http://horus.pl/produkty/workflow>, retrieved 24 May 2017,
13. IBM Blueworks Live Admin User Manual, [https://www.blueworkslive.com/download/ IBM Blueworks Live Admin User Manual.docx?postId=10000ae3e95c27e&fileItemId=10000ae3e95bb5 2](https://www.blueworkslive.com/download/IBM%20Blueworks%20Live%20Admin%20User%20Manual.docx?postId=10000ae3e95c27e&fileItemId=10000ae3e95bb52), retrieved 07 June 2017,
14. IBM Blueworks Live, <https://www.blueworkslive.com>, retrieved 01 June 2017,
15. iGrafx FlowCharter, [http://www.igrafx.com/products/process-modeling-analysis/ flowcharter](http://www.igrafx.com/products/process-modeling-analysis/flowcharter), retrieved 15 July 2017,
16. It.ua – Solution Design and Architecture documents
17. K2 blackpearl User Guide, <http://help.k2.com/onlinehelp/k2blackpearl/UserGuide/4.6.11/webframe.html>, retrieved 25 September 2017,
18. K2 blackpearl, <http://www.k2.com/bpm-software>, retrieved 25 September 2017,
19. MGX partner iGrafx FlowCharter, <http://www.mgx.com.pl/node/135>, retrieved 16 July 2017,
20. OASIS, Web Services Business Process Execution Language Version 2.0. OASIS Standard (11 April 2007), <http://docs.oasis-open.org/wsbpel/2.0/OS/wsbpel-v2.0-OS.html>, retrieved 20 March 2017,
21. Object Management Group, Business Process Model and Notation (BPMN) version 2.0, <http://www.omg.org/spec/BPMN/2.0/PDF/>, retrieved 20 March 2017,
22. Oracle BPM - Business Process Management, [http://www.oracle.com/us/technologies/bpm/overview/ index.html](http://www.oracle.com/us/technologies/bpm/overview/index.html), retrieved 11 August 2017.
23. Orchestra code, <http://orchestra.ow2.org>, retrieved 06 June 2017,
24. Orchestra User Guide, <http://download.forge.ow2.org/orchestra/Orchestra-4.9.0-UserGuide.pdf>, retrieved 06 June 2017,
25. OW2 Orchestra, http://forge.ow2.org/project/showfiles.php?group_id=266, retrieved 06 June 2017,
26. Tom Baeyens, Joram Barrez, Introduction to Activiti BPM, <http://www.slideshare.net/alfresco/introduction-to-activiti-bpm>, retrieved 21 May 2017,
27. What's New Oracle BPM Suite 12c, Oracle white paper, <http://www.oracle.com/technetwork/middleware/bpm/overview/bpm-12c-new-features-wp-2235510.pdf>, retrieved 10 August 2017,
28. Yaoqiang BPMN Editor, <http://www.yaoqiang.org/>, retrieved 30 May 2017.