Methodology of Building ALM Platform for Software Product Organizations

Ivo Pekšēns

AS Itella Information Mūkusalas 41b, Rīga, LV-1004 Latvija
ivo.peksens@itella.com

Abstract. This work investigates Application Lifecycle Management (ALM) and elaborates a methodology for building an ALM platform for organizations dealing with manufacturing of software products. The meaning of platform is defined and available ALM platforms on the market are analyzed as a part of the methodology execution. Emphasis is put on basic principles coming from PLM – Product Lifecycle Management which are about integration of different parts and roles in an organization with the purpose of better information exchange that positively impacts business agility, performance and visibility.

Keywords: Application Lifecycle Management, Software products, Tool integration.

1 Introduction

Application Lifecycle Management (ALM) is a term coined in various sources, (examples [1], [2], [3]) around Information Technology (IT) industry during the last decade, but no two definitions are the same. Often the scope of ALM is narrowed down to software development activities only, including maintenance at best. A more detailed investigation (examples [4], [5], [6]) shows that ALM is very similar to PLM – Product Lifecycle Management which covers much broader scope – from idea till end of life of the product. The question is – if software is a product why cannot ALM cover the same scope as described by PLM, especially taking into account the maturity of the latter? (Term PLM is rooted in manufacturing and has been widely used for years describing the whole lifecycle of the physical/hardware products).

The idea behind PLM is to solve the problem of un-integrated work of different roles and parts of an organization that collaborate on product throughout its lifecycle [7]. The main elements of the solution are product information flow, visibility and availability that make the work integrated and effective which is crucial for product innovation in today's fast pace business world.

The ALM platform in short encompasses all the technical means that enable the above stated qualities of the information throughout the software product lifecycle. While it is possible to build such a platform from existing tools and systems, market offers out-of-box ALM solutions [8], [9], [10], [11] specifically addressing the software product lifecycle management. Vendors like IBM, Microsoft, Hewlett Packard and others are the key players in this market niche.

Organizations participating in software business usually have some set of tools in place therefore obtaining an out-of-box ALM platform is a huge responsibility and requires a thorough fit-gap analysis prior to making the decision.

This article describes the elaborated methodology for building the ALM platform based on current state of an organization producing software products. At the end, execution (partial) of the methodology with fit-gap analysis method to four ALM platforms available on the market is presented.

2 Structure

The elaborated methodology consists of two parts:

- ALM Readiness check – describes/defines target organization's product lifecycle against ALM Reference model;
- ALM Tool investigation – investigates tools that support the described product lifecycle and evaluates them accordingly to ALM Reference Requirements (derived from the ALM Reference model).

Figure 1 illustrates the mapping of the methodology foundation (ALM Reference model and ALM Reference requirements) to the product lifecycle and its tools.

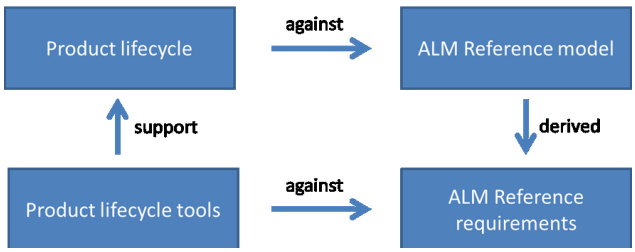

Fig. 1. The mapping of the methodology foundation to the product lifecycle.

2.1 ALM Reference model

In order to build the ALM platform, reference points are needed. Investigation of the information about IT industry shows that there is a lack of independent, objective guides/methods for ALM type of solutions. Variety of sources [12], [13], [14], [15], [16], [17] has been researched and none of it describes the whole lifecycle of the software product in a clear, concise way. For this reason originally constructed ALM Reference model for building ALM platform is presented that defines and integrates ideas from various approaches into one common model that covers the whole lifecycle of a software product very similar to how PLM does [7]. See Figure 2.

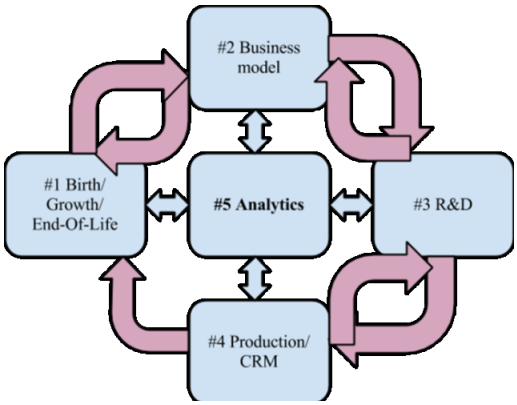

Fig. 2. ALM Reference model.

Birth/Growth/End-Of-Life block is either a starting, improvement or end-of-life point for the product. Depending on organization, this may be a small set of few separate products reaching to huge program and product portfolio management processes that are targeted in this block. This block maintains product's full information that is updated on frequent basis.

Business model block is the place where product's feasibility is validated before the actual product development is started. It is included in the model as extension to classical project management. It is proposed to function according to innovative way of creating business models as proposed by A. Osterwalder [18]. Its main benefit is in being a visual one-pager style look [19] at the project/product/idea from many perspectives which leads to much more precise validation of financial information.

R&D block represents Research & Development phase of the model which includes finding the right technology and running software development according to some of known software development approaches [20].

Production/CRM block is the last phase which mainly includes processes like Release and Customer Relationship Management (CRM). Challenges in here are release strategy choice, actual release management, customer feedback incorporation into development and similar. The key idea of this block's relation with block 1 is getting the real production statistical data and CRM data as input into block 1 for correct and timely decision making about the fate of the existing products (termination, further development, new product).

Analytics is the core of this model as it is meant as continuously analyzing part of processes and information in other blocks. It can be divided into internal and external parts. Internal is any type of analytics solution up until enterprise level business intelligence implementations [21], whereas external is interface to something as Big Data[1].

[1] From http://visual.ly/big-data: "Big Data is data that is too large, complex and dynamic for any conventional data tools to capture, store, manage and analyze. The right use of Big Data allows analysts to spot trends and gives niche insights that help create value and innovation much faster than conventional methods"

Main feature of the model is *Integration* which makes all parts of it work as one system. This way it achieves high agility and visibility of information under processing.

2.2 ALM Reference requirements

In order to execute partially the methodology with fit-gap analysis method, twenty nine ALM Reference requirements are derived from the ALM Reference model that represent the model's blocks in more details. See Appendix: ALM Reference requirements[2].

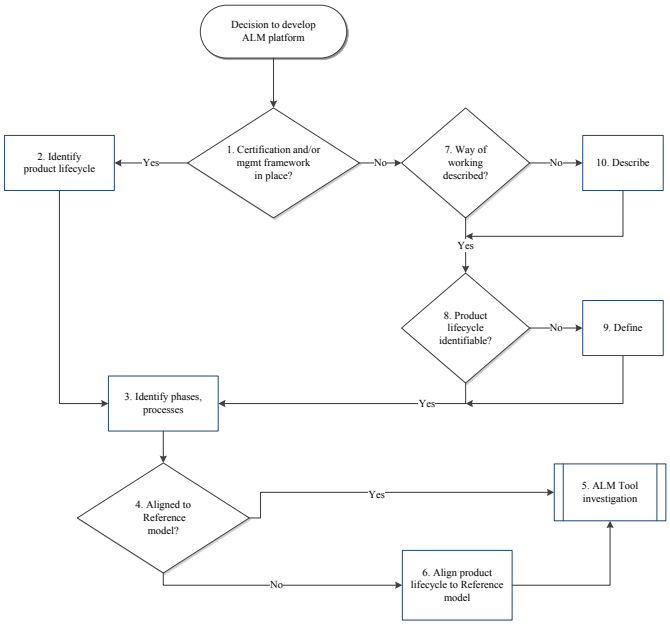

Fig. 3. ALM Readiness check flowchart – first part of the elaborated methodology.

3 ALM Readiness check

Figure 3 shows the first part of the methodology as introduced in Section 2. Its goal is to verify if the target organization that wants to build an ALM platform is ready for this undertaking. The ALM Readiness check identifies and reveals the software product lifecycle inside the organization and if necessary aligns it with the defined ALM Reference model. The result of this check is a clear description of the product lifecycle, for example, in a widely used swim lane format.

[2] Some of requirements are not shown due to space limitations.

4 ALM Tool investigation

The second part of the methodology – ALM Tool investigation is based on the fact that all processes need tools in order to be executed; therefore it deals with the investigation of the technical means, which are mainly software application tools that support the execution of identified software product lifecycle. See Figure 4.

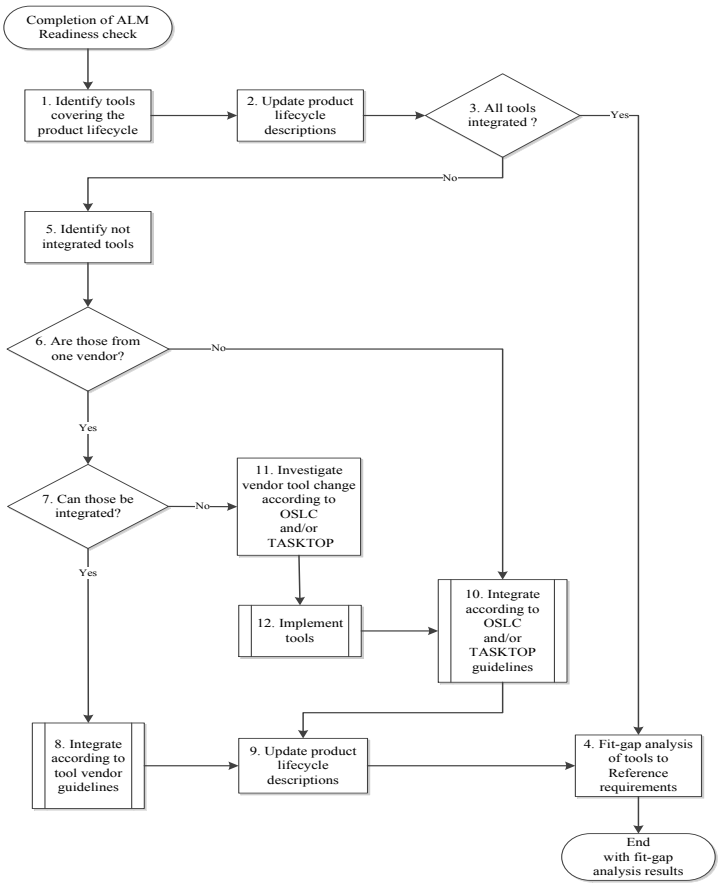

Fig. 4. ALM Tool investigation flowchart – second part of the elaborated methodology.

As it can be seen (Figure 4), Activities 10 and 11 references to OSLC[3] and Tasktop[4]. The reason for that is their knowledge in integration of diverse set of vendors/tools

[3] http://open-services.net/ - Open Services Lifecycle Collaboration - An open community building practical specifications for integrating software.

that produce software product manufacturing tools and applications for use by IT industry players. Emphasis is on the fact that ALM platform might be either one complete solution from one vendor like, for instance, IBM or it can consist of various tools made by various vendors. The key thing is to make them all work integrated, so they can be called the ALM platform. ALM Reference requirements representing the ALM Reference model can be considered as an instrument to verify the conformity of the tools that form the ALM platform to the proposed ALM Reference model.

5 ALM platform analysis

For execution (partial) of the elaborated methodology, test organization is introduced that has passed the first part of the methodology and has one vendor ALM platform in-house. This way the second part of the methodology gets executed that deals with the tools. Four participants were chosen according to Gartner [12] and Forrester [13] recommendations and those are IBM Rational, Microsoft Visual Studio ALM, Rally Software ALM and Atlassian based ALM ([8], [9], [10], [11]). Analysis approach is based on information investigation which is available mainly on the vendor websites. Neither real world testing, nor customer feedback survey was used. Fit-gap analysis method was used with the twenty nine requirements as described in section 2.2. Tables 1 – 7 show ALM platform analysis scores.

Table 1. ALM platform overall analysis score.

	Fit	Partial fit	Gap
IBM Rational	12	8	9
Microsoft Visual Studio ALM	11	6	12
Rally ALM	11	7	11
Atlassian ALM	5	7	17

Table 2. ALM platform Birth/Growth/End-Of-Life block analysis score.

	Fit	Partial fit	Gap
IBM Rational	1	1	1
Microsoft Visual Studio ALM	0	2	1
Rally ALM	2	1	0
Atlassian ALM	0	1	2

[4] http://tasktop.com/ - Commercial organization, specializing in software development tool integration.

Table 3. ALM platform Business model block analysis score.

	Fit	Partial fit	Gap
IBM Rational	0	1	2
Microsoft Visual Studio ALM	0	0	3
Rally ALM	3	0	0
Atlassian ALM	0	0	3

Table 4. ALM platform R&D block analysis score.

	Fit	Partial fit	Gap
IBM Rational	10	3	1
Microsoft Visual Studio ALM	10	2	2
Rally ALM	5	4	5
Atlassian ALM	4	4	6

Table 5. ALM platform Production/CRM block analysis score.

	Fit	Partial fit	Gap
IBM Rational	1	2	2
Microsoft Visual Studio ALM	1	0	4
Rally ALM	1	1	3
Atlassian ALM	1	1	3

Table 6. ALM platform Analytics block analysis score.

	Fit	Partial fit	Gap
IBM Rational	0	1	3
Microsoft Visual Studio ALM	0	2	2
Rally ALM	0	1	3
Atlassian ALM	0	1	3

Table 7. ALM platform integration feature analysis score.

	Fit	Partial fit	Gap
IBM Rational	1	3	0
Microsoft Visual Studio ALM	1	0	3
Rally ALM	2	2	0
Atlassian ALM	0	2	2

Overall (Table 1) the highest score goes to IBM Rational and none of the platforms completely conforms to the proposed ALM Reference model. Tables 2 – 5 show scores for other blocks. Integration feature (Table 7) the highest score goes to Rally Software ALM.

6 Conclusions

Emphasis was put on looking at software products similarly as it is done in other areas, for example, car manufacturing. The reasons for this are to underline that the making process of software products is very much alike. Integration of tools and information flow becomes very crucial in this case. The elaborated methodology for building the ALM platform is model based, the latter being introduced also as part of the work. The reason for this is shortage of such models as shown by the research. Although this is an original work, the model itself is put together from already available information about the subject of software based products. The methodology itself consists of two parts – product lifecycle definition and lifecycle tool investigation. As our work shows, in majority of cases, ALM platforms are built on top of existing tools not obtained as out-of-box solutions. Nevertheless, testing the model and reference requirements on ALM platforms available on the market allowed us to conclude that none of those conform the model for 100%. The reasons behind this might still be very diverse interpretation of what is ALM by different vendors resulting into delivery of appropriate solutions as well as shortage of solid, industry accepted knowledge about ALM the same like it is about PLM.

References

1. Chappel D.: What is application lifecycle management?, http://www.davidchappell.com/WhatIsALM--Chappell.pdf/
2. Rossman B.: Application Lifecycle Management, pp 218, Tebbo (2010)
3. Woody L.S.: Where the acronym ALM does come from?, http://leonardwoody.com/2011/07/18/where-does-the-acronym-alm-application-lifecycle-management-come-from/ (2011)
4. BigLever software, Inc: PLM, ALM and PLE, http://www.biglever.com/technotes/plm_alm_spl.html
5. Klassen M.: PLM and ALM – strange but necessary bedfellows - http://www.eclipsecon.org/2013/sessions/plm-and-alm-%E2%80%93-strange-necessary-bedfellows, The Eclipse Foundation, 2013 – 27 p.
6. Serignese K. SD Times – Organization works to blend application, product lifecycle management - - http://www.sdtimes.com/link/34381, 2010.
7. PLM Technology Guide, http://plmtechnologyguide.com/site/?page_id=435/
8. IBM. Collaborative Lifecycle Management, http://www-01.ibm.com/software/rational/alm/collaborate/
9. Microsoft. Visual Studio ALM - http://www.microsoft.com/visualstudio/eng/alm
10. Rally Software. Rally ALM platform - http://www.rallydev.com/platform-products/deliver-features-users-love-faster.
11. Atlassian. - http://www.atlassian.com/software.

12. Gartner. Selection Criteria for Success in Choosing ALM Products - http://www.gartner.com/id=1839116/
13. Gartner. Magic quadrant 2012 - http://www.gartner.com/technology/reprints.do?id=1-1AX7YJM&ct=120614&st=sb
14. Forrester. Wave - http://www.forrester.com/pimages/rws/reprints/document/60080/oid/1-LMW1C9.
15. Ovum. Independent, objective analysis - http://ovum.com/section/home/
16. Qvum. Decision matrix on selecting ALM - http://download.microsoft.com/download/7/A/0/7A007614-A916-4A7C-ADC1-1B1EBC1F9A57/Report%20-%20Ovum%20Decision%20Matrix%20on%20Selecting%20ALM.pdf
17. TechExcel. ALM Tool vendor comparison - http://techexcel.com/comparison-of-alm-tools/.
18. Osterwalder A., Business model innovation: Wiley; 1 edition, 2012 – 288 p.
19. Business Model Foundry - http://businessmodelgeneration.com/.
20. A federal government website. Selecting a development approach - http://www.cms.gov/Research-Statistics-Data-and-Systems/CMS-Information-Technology/XLC/Downloads/SelectingDevelopmentApproach.pdf
21. Decision Sciences Institute. Business Analytics: The Next Frontier for Decision Sciences - http://www.decisionsciences.org/DecisionLine/Vol43/43_2/dsi-dl43_2_feature.asp

Appendix: ALM Reference requirements

1	**ALM Reference model: Birth/Growth/End-Of-Life**	
1.1	Product profile	There must be support for seeing general product information - name, status (idea, development, maintenance, ending), versions, lifespan and similar. Multiple products (portfolio) support is mandatory.
1.2	Product backlog	There must be a centralized storage of product backlog. It must be possible to filter it, based on various criteria (proposed, approved, denied, etc.). Important attribute of each entry is its financial value.
1.3	Product roadmap	There must be a way of describing product roadmap and product releases with names, dates and possibly other information.
2	**ALM Reference model: Business model**	
2.1	Idea validation	It must be possible to validate idea of a new product. Approach like “Business model generation” can be used. This feature must allow modeling business value.
2.2	Release validation	It must be possible to validate any new release of an existing product similar to 2.1 and it also must be linked. This feature must allow modeling business value.

3	**ALM Reference model: R&D**	
3.1	Release backlog	Depending on the method used, here must be a possibility to create subset of requirements from the product backlog according to product roadmap.
3.2	Waterfall methodology support	It must be possible to run development projects according to waterfall method.
3.4	Iterative methodologies support	It must be possible to run development projects according to iterative methods.
3.5	UML and other diagramming for requirements definition	It must be possible to complement requirements with diagrams in different notations.
3.6	Source control	Various types of source control must be supported by the platform.
3.7	Programming language independence	This part of platform must also be vendor independent - thus allowing performing work in variety of technologies (.NET, C/C++, Java) or it must be easily extensible to accommodate different frameworks.
4	**ALM Reference model: Production/CRM**	
4.1	Release management	There must be possibility to manage several releases of the product. It must be clearly visible in which state is each release. Besides, generation of release notes must be possible as well.
4.2	Production deployment	It must be possible to deploy the finished release into the production environment or mark the release as ready to manufacturing (RTM) in case of shippable/embeddable product.
4.4	CRM	It must be possible to use the same environment that is used for R&D also for handling support requests as well as perform CRM activities. This part of ALM platform must be integrated with ERP system of the enterprise or any other that holds customer/partner data.
5	**ALM Reference model: Analytics**	
5.1	Connections	Analysis block of the solution must take data from other blocks around it. If there is no built-in Analytics sub-system, that supports integrated work of blocks 1-4, it must declare options on connectivity with other analytic solutions/enterprise systems.
5.2	Social media monitoring	Analysis block must be social networking friendly. It

		must be possible to search in public social media data according to keywords. Example of such solution is "Hoot Suite"
5.3	Web data monitoring	It must be possible monitor and search information in public web according to keywords.
5.4	Existing data warehouses	There must be possibility to connect and make use of existing data marts, databases and other sources of data for analysis purposes.