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Proposing New Method for Secure Immigration from Tradition Business into Future and Standard Business

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Abstract: Today with the technological developments in the field of computers and software, the automation through computerization has entered widely and deeply in almost every field . It has become very common to run an enterprise through sophisticated computer software. As it is well accepted fact that technology is changing rapidly hence, the need to keep upgraded with latest trends is key to success. Specially for the big enterprises where the challenge is not only to keep the enterprise running but also to collaborate with other enterprises doing similar business. The difficulty is not only in the information exchanges but also in sharing the concepts across the organizations. In today's business context mergers and acquisitions another common move and integrating two organizations running on legacy is a marathon effort. The enterprises which are running on the legacy systems build long back and are being maintained internally or externally need to be adopted with standard solutions after a limit. In a sense, it becomes mandatory for their survival. It is must, if ICT has to be really a value add and enabler to business. This study reveals the approach how the transformation can be done smoothly from LEGACY to standard solutions.

Key words: Computerized automation, ICT progress, IT in enterprises, solutions, Iran

INTRODUCTION

Many big enterprises which are using software systems since, long back to run their enterprise. Initially, they started with the objective to ease some of the activities and later they were converted to semi-automated systems. Finally with time, they evolved as a back-bone of the organization. Such a set of software are called LEGACY today. With this situation in hand the big organizations are facing a challenge to transform their systems according to the modern packaged/standard solutions. The need is due to numerous reasons, e.g., solutions using s/w which are no more supported, difficult to handle new business concepts, collaboration with other enterprises for the integrations and exchange of information, consolidation of functions and data, understanding the precise key functions of software and their impact on data challenges in merger and acquisitions due to heterogeneous systems, etc. The LEGACY software reaches to a level when it starts costing high for their maintenance and also becomes difficult to find expert resources to maintain them. Resources which are working on the legacy they become almost irreplaceable causing ultimately to face softer issues also in resource management. Many organizations started to replace their legacy systems to the new sustainable solution but they face lot of challenges and a lot of effort and money is wasted in this journey. This study attempts to provide structured approach with practical industry experiences to manage legacy transformation. I will be presenting here with my experience of managing LEGACY Software solutions for >11 years to one of the world's leading microelectronics company (Bainbridge *et al*., 2001).

Transformation from LEGACY to standard solutions not only requires the management commitment to move but also requires the sound strategy with the constraints of transformation without a key data loss or function loss. On top of these we need to do this with almost ZERO downtime. For a quiet some time two systems need to co-exist and function correctly. Big-bang transformation is not easy in most of the cases hence, the transformation has to go in phased approach. Phases should be divided in such a way that does ensure the smooth changes with ZERO impact on business. All this is really not a piece of cake. This study will help to all such organizations which are seeking/exploring for the above said transformation.

MATERIALS AND METHODS

Following is the research methodology being used for the research.

Type of study: Explanatory research as the study tries to explain why and how, there is a need to develop a

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scientific approach to get rid of legacy software in big enterprises. The work has been done and evaluated in context to the complete legacy solution of enterprise and understanding the causes and issues due to this and steps taken to replace the legacy by the standard solutions (Bergey *et al*., 2000).

Area of study: The research is typically in the field of software engineering and specially under the maintenance and migration project.

Universe and sample: The study being presented is in context to all big enterprises which are running on LEGACY home grown software and now looking forward to adopt the standard solution. Specific samples and cases are exemplified based on experiences in ST-Microelectronics Pvt. Ltd. (Michael and Michael, 1993).

Data collection and proposed tools: To support the study and work undertaken the data has been collected for the executions of different phases in the organization to transform the legacy software with the standard solution. Matrices reviewed and analyzed to finalize the approach and the review feedback has been taken as input to the next steps of transformation. Tools used were mostly excel (macro) based systems and REMEDY tool to track the reported issues into the system.

Data analysis and techniques to be applied: DATA analysis has been done by various reports and KPIs (key performance indicators) were used to measure the health of legacy systems and understanding the trend of sustainability based on these indicators.

RESULTS AND DISCUSSION

Let's understand the various causes, i.e., WHY part of the problem. What are the reasons which compel us to look for the replacements of existing legacy?

Lack of packaging: As the LEGACY systems grow organically in phased manner the modules become quiet independent and they follow entirely different approaches of development and maintenances. For example: a typical enterprise solution will have modules like referential systems, quotations and contracts, sales, post sales, planning and confirmation systems, logistics, billing and invoicing systems. And all these modules may have different set of users in business domains and accordingly different IT teams maintaining these solutions. It is natural that with different communities requesting for the changes in application and different people working to develop the same may go with different approaches. And since, after certain level of stabilization resources either levels the organization of move to other projects with time. Further changes to the software are done by people who do not understand the functionality in totality and attributing to make the systems difficult to maintain. Different modules of the software talk less to each other. Only minimal level of integration remains with lose coupling. Finally, we reach to a break even when management has to take decision of replacing the LEGACY (Deursen *et al*. 1999).

Redundancy: Very often, it happens that we have different modules maintained by different teams and primarily used by different set of business users but still they need the cross info for effectiveness. For example, the sales users need to show the logistics and billing info for their orders and customers. But as the different modules don't talk each other so easily and hence, one module needs to replicate a functionality of other modules causing the redundancy and then finally resulting into overall less robust solution.

Out of support: Most of the legacy systems are now in a technology which is outdated and out of support. So, it is risky to remain in such a solution. The COBOL based systems on HP3K machines are one such example.

Issues in Collaboration with partners: Today, the automation is not only needed inside the enterprise but also need to collaborate with other enterprises which are doing business together. For example, supply chain integration is one example of such collaboration. Where customer sends their demand projections based on their fab outs and supplier uses the same to feed their production plans and shipments are made accordingly. We can't imagine implementing this without evolving our systems from legacy to standard software (Lauder and Kent, 2000).

Scarcity of skilled resources: With time it is becoming difficult to find the skilled resources to manage and maintain the legacy software and engineers like less and less to work on such solutions and hence is another reason to look forward.

Software distribution and web support: We know that legacy systems are mostly in old technologies and they require specific software installations on PC and is a challenge to manage the consistent version of software world-wide. Also, they are not web based solutions and

Fig. 1: Legacy transformation phases

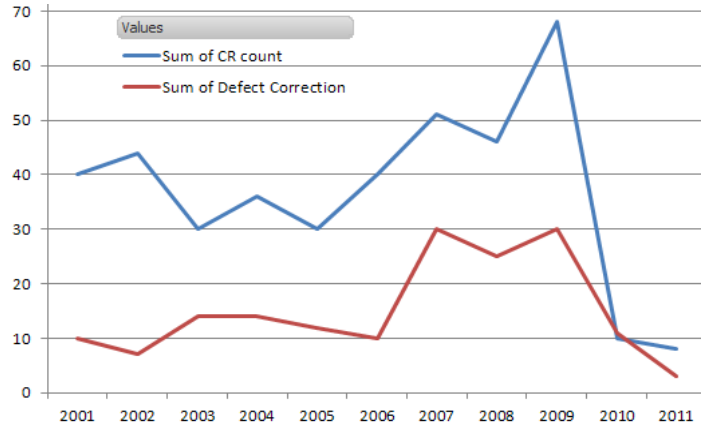

Fig. 2: In 2010 quote and contract-transformed from LEGACY

hence there is a pressing need to transform legacy into standard packaged solutions which are web based and also possibility to support mobile computing on hand held devices.

Increasing maintenance and support cost: Is another indicator which tells us the need to get rid of legacy. Comparisons clearly tell us that legacy s/w are hard to change and if changed they are more likely to have regression bugs degrading the robustness of the solution. For this, we need to derive size vs. effort ratio of CR. Higher the ratio higher the maintenance cost (Fig. 1-3).

LEGACY phase out ten pointer matrix: When we are in the process of evaluation of phase out LEGACY software, we need to work out a matrix like shown in Table 1.

Legacy to standard solution: challenges and steps: Based on above analysis once the management has decided to phase out legacy software every enterprise will face several challenges in general. In this study, the challenges and main steps are listed below.

Choosing alternatives: First step to phase out LEGACY is choosing the right alternative. Based on existing functionalities, we need to evaluate various alternatives available in the market and choose the best option. Here, not only the business sponsors, key users need to be involved but key IT functional experts and enterprise architects also need to be involved who understand the sustainability of the chosen option. Based on merits and demerits management takes the final call.

Natural inertia: It's general, human nature to resist the change, specially when people are comfortable and more importantly habitual of using something. Same applies to software solutions also. Users which are using a system, since years in spite of criticizing the solution they resist

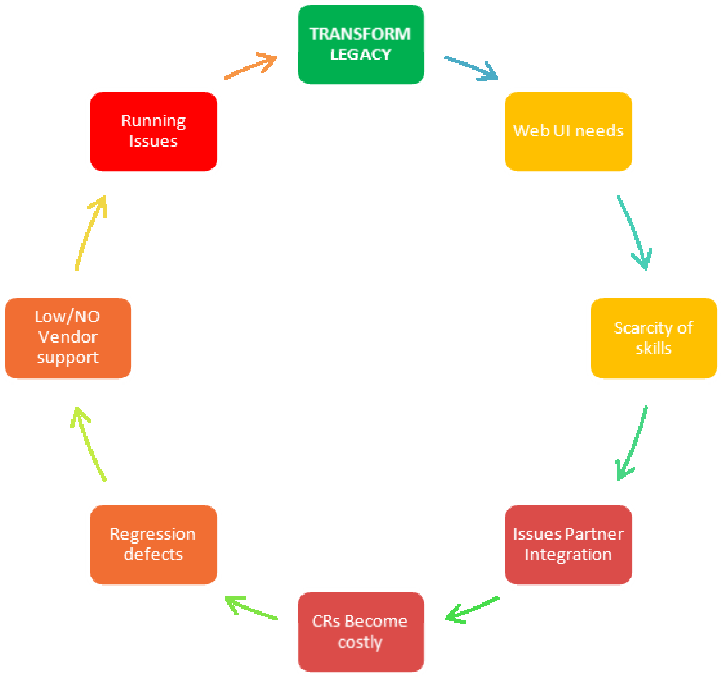

Fig. 3: Legacy transformation phases

Table 1: Evauluation of phase out legacy software

Indicator	Weight Factor (%) (X)	LEGACY s/w score (Y) At scale of 1-10	Weighted factor (X*Y)
State of packaging	10	6	60
Issues in Integration with partners	15	7	105
Effort vs. CR size	10	8	80
Vendor support	15	7	105
Skilled Resource availability in LEGACY	15	8	120
Running issues (incidents)*	10	6	60
NEED of WEB supported UI*	10	8	80
Regression DEFECTS with CR	5	8	40
Evolution maintained Internal/Outsourced	5	4 [0 : internal è10:outsourced]	20
S/W running support Internal/outsourced	5	7 [0 : internal è10:outsourced]	35

to replace it as well and this compels to continue change requests to adopt the new needs. This results into a vicious circle of change and its impact in the form of regression errors. Solution to this problem is management commitment, therefore, the top management need to give the clear directions to take the move highlighting the benefits to the organization.

Fear of losing jobs: With old legacy software we definitely need more resources on the ICT side to maintain the solution and also on the user's side who use the solution. They become experts of their own areas in LEGACY. Hence in general, people fear of losing the jobs and hence, they do not buy in the phase out project. This causes inherent friction among the team. Potentially, it may attribute into inherent non cooperation. Here, again management need to address these softer issues to motivate majority of people.

Legacy experts indispensability syndrome: At one side where, we face the scarcity of the skilled resources in IT to work in LEGACY on another side this rare key legacy expert people are usually carried away by indispensability syndrome. With the legacy software phase out they not only fear to lose job but also resist the change as with the move they will no more remain key and indispensable. Such resources usually don't share their knowledge and experience gained through several years. Management need to address such softer issues.

Lack of documentation: Most of the LEGACY systems are running on the basis of individual heroism and lack in proper documentation and hence is a major challenge to replace the systems. Still IT needs to re-collect whatever is available and synthesize them to minimize the risk of understanding.

Blueprinting: Preparing blueprint before the implementation is another big challenge on LEGACY phase out. We need to choose the supper key users of the software and IT legacy experts to brain-storm, share experiences and converge to a common blue print. While doing this we need to be careful in choosing people from all business and functional dimensions, i.e., if you think to phase out companies 'sales and purchase order' systems then, you need to have business users who are working with distributers, OEMS and EMS customers separately. Similarly people from different type of ordering systems like samples ordering, literature ordering, internal ordering, etc., have their different kind of needs and hence, the proper representation in the team will help.

Big-bang or phased transformation: In the journey of LEGACY phase out it's one of the most important key questions. While BIG-BANG approach is too risky and a challenge to keep the continuity, the phased transformation is a marathon project in itself and may last for years to replace the complete solution. It is suggested to follow the phased transformation approach if the enterprise is using huge data intensive software and there are several modules in the LEGACY. For example, a typical enterprise having : referential systems, profiling systems, quote and contract, sales and purchase order, post sales, scheduling and order confirmation, logistics and picking, billing and invoicing, returns management, etc. In such cases, we need to transform LEGACY in phased approach. While doing this is key to take care of the integration points as one module will be moved out of LEGACY while others still remain in LEGACY.

Management commitment: While replacing the big legacy software management commitment is key to address all the issues and challenges in this journey of transformation. Management need to demonstrate this commitment at different stages. Right from the blueprint definition, we need to limit the wish list from business users and focus only on the required functionalities. We also need to show the courage to get rid of some fancies implemented in LEGACY. Apart from this all the challenges mentioned above can be addressed well once we have the management commitment.

Priority to the project: While working to phase out legacy management need to put top priority on the project. Business key users need to make aware that all the energy will be focused to do the phase out project and not diverting to other things which can wait. The module under phase out must be declared frozen for any changes otherwise will again attribute to inconsistency.

Degree or customization: Once the best suited alternate solution is chosen by the management the implementation team needs to control the degree of customization. Need to understand that any customization to standard solution is costly to maintain. Most of the vendors don't support the portion which is customized for specific enterprise. So, we should go for customization under the limits of the package and standard solution.

Contract management with vendors: When evaluation is done, vendors to a lot of marketing gimmicks. DEMOS to win the project are most of the times have many false verbal commitments. While doing contract with vendors enterprise needs to take care of all these points. We need to clearly state the clauses in contract. Contract should not only cover the SOW (statement of work) for the phase out but also the support modes and cost of support, licenses, etc.

KPI definitions: Every project in this tough business scenario need to prove it's ROI (return on investment) so right from the beginning of the project management and business need to define a set of KPIs (key performance indicators). This ensures the viability of the solution and also a measurement criteria to declare and asses if the LEGACY phase out project is successful or not.

Arranging for parallel run (co-existence): This is key strategy to move in such a manner that for a certain period the solutions can co-exist in production environment till the smooth phase-out is ensured. If it's not possible the QA dry runs need to be ensured with the similar inputs as in production environment. Internal IT needs to help for developing the interfaces to keep the data in sync to the new solution. This may be challenge as the data structures of legacy are entirely different than the newly chosen alternatives.

Runbook preparation: Before going to production there is a need to prepare a run-book with all the dependencies, people responsible and accountable to execute the steps of deployment. Any project plan like MS-project can be used to prepare the run-book. Appropriate downtime need to be agreed and communicated inside and outside the enterprise.

DRP (Disaster Recovery Plan): Apart from usual risk and mitigations in a project, there is a need to prepare for any potential disaster. Key idea behind, this is to maintain the continuity of the function. Possible situations and actions to recover, estimated time to recover, etc., need to be listed and prepared to handle the situation.

CONCLUSION

As we have seen, above most of the big enterprises have their 70-80% key business functionalities running over LEGACY software which are now no more a viable solution in today's scenario. Most of the enterprises spend a significant portion of their IT budget to supporting legacy and KLO (keeping the lights ON) on their legacy applications. At the same time, IT need to support business becoming more competitive and less costly. Also, the increasing expectations from businesses put pressure on IT to work as business enabler. Legacy transformation thus becomes key to supporting new business initiatives, linking IT strategies to business goals, responding to market changes and optimizing the ROI (Return On Investment). This is why, BITA (business IT alignment) is another key point in the journey of transformation. This all pushes us to think for transforming the LEGACY to the standard package solution like ERP (enterprise resource planning). We know that LEGACY software have taken this shape in gradual manner and every component developed independently. They talk less to each other and have lot of redundancy in components from referential to SALES, order confirmation and supply chain, billing and invoicing. Systems are hard to understand which precise functionalities, data are and how they are linked. Any changes to adopt changing business scenarios start resulting in regression errors skilled resources become almost un-available and also, it is hard to manage collaboration with business partners, web enablement, support mergers and acquisitions. This all result into waste of money, effort, resources, etc., still business not getting the value from IT what it should. In this situation many organizations spend huge cost and effort in replacing the LEGACY to new packaged solution but often they don't succeed simply. The study tries to un-cover all such scenarios and solutions to them which should result in success more likely. The transformation conditions also explained above in the form of a logical formula with weighted cost to take the decisions. The transformation of systems is more appropriate when an enterprise finds itself overcrowded with applications and functions resulted from local software adoptions, mergers and acquisitions or when various business units have a tradition of operating independently since old times with home grown or locally purchased solutions. We land up in a situation where versions of the same software, different systems performing the same function and outdated code can leave an organization's processes, data and services fragmented, redundant, inefficient and expensive and error prone. Precautions and steps of migration or transformation also highlighted in this study.

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