



ANALYSIS OF EXISTING PROCESS MODELS FOR APPLICATIONS MIGRATION PROCESS TO CLOUD

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Abstract

Enterprises are ready to go cloud way to utilize cloud's potential but without the biggest hindrance is the unavailability of systematic migration process, which this paper has tried to address. It will be good for an enterprise to go with Phased manner approach instead of big bang approach, while they embark of moving towards cloud. As migration to cloud in all three layers of cloud computing will be a mammoth task, if enterprise is taking cloud computing route for the first time or otherwise. Phased manner approach will also help stake holders to feel confident to their investment.

Only thing which is constant in information technology is CHANGE, so to keep pace with the ever evolving current technology paradigm and enhance the life span of existing application, which are developed over a period of time, is inevitable to migrate legacy application to current technology, in today's paradigm it is Cloud.

Key words: Cloud technology; Legacy application; Migration Process; Application Migration, LAMP2C

I. Introduction

IT industry has only one thing is constant that is change, which is inevitable in our ever evolving industry paradigm, similarly business landscape is changing at a fast pace as well. Like it or not, enterprise has to keep pace with technology trends prevalent in market, if technology benefits are in the interest application life cycle and enterprise. If an enterprise does not embrace the new prevalent technology then enterprise may face the challenges such as shortage of skilled

manpower, high cost of software maintenance, lack of scalability, business continuity, along with customers experience, enterprise image[12], etc.

Though enterprise may be ready to embrace new technology such as cloud, which deliver hardware and software resource as virtualize service[6] but the biggest challenge is that organization can't discard the past investment made in the current business critical and in use applications, which is built over a period of time with significant effort, time and cost to address a business requirement.

In order to embrace the new technology enterprise has three options with respect to their current application in the interest of the enterprise long term goal:

- a. Migrate existing application
- b. Replace existing application with any off-the-shelf application
- c. Re-develop the existing application

Replace or Re-develop option may not be feasible as organization may not like to put in all the effort, time and cost again, when they already have an existing application running. However at the same time, enterprise need to embrace new technology else they may face challenges in terms of skilled manpower availability, high maintenance cost, etc. so the only option available with enterprise is to migrate the current application to new technology i.e. Cloud.

An enterprise may understand the importance of moving legacy application to desired technology; however the challenge an enterprise faces is the uncertainty of where to begin the migration process. If enterprises do not carefully plan, execute and monitor the transformation

using established processes[7]. Migration of data and application to remote servers as required in cloud environment can be fraught with pitfalls. This paper address this uncertainty of “where to begin” and address the “Migrate existing application” to cloud. A framework is proposed for Legacy Application migration called Legacy Application Migration Process to Cloud (LAMP2C) so that organization has a clear and hazel free legacy application migration path to cloud.

II. Literature Analysis

In literature Analysis, papers are covered from the year 1997 to as recent as 2013. The search strategy is limited to research paper, articles and white paper published and freely available over internet.

- a) Muhammad Aufeef Chauhan and Muhammad Ali Babar has highlighted in there paper that application need to be migrated to cloud in order to utilize the cloud based infrastructure and services. Authors are of view that for successful migration a well-defined support is required as it will help to identify and address challenges associated with migration. In this paper author proposes a process framework for supporting migration to cloud computing based on their experience from migrating an Open Source System, Hackystat, to two different cloud computing platform[4]i.e. Amazon Web Services and Google App Engine based on their experience. Author has highlighted potential changes in migration and there solution along with lesson learnt to support the proposed process framework.
- b) Ganesh Olekar and Vikram Sreekumar in there paper has highlight the advantage of application migration to cloud[2] and strategies that can be implement the migrate legacy application . Author also highlights the benefits of hosting an application on cloud and challenges face while legacy application migration to cloud. Though in the paper they have not presented any migration framework but have shared the considerations that should be taken into account.
- c) In this paper[3] author (Pooyan Jamshidi, Aakash Ahmad, and Claus Pahl) has conducted a systematic literature review of 23 selected studies, published from 2010 to 2013. Author has classified and compared the selected studies based on a characterization framework, which is introduced in the paper. In this paper author's area of work is focused on the migration effort required for moving legacy on premise software to target cloud environments. Author's review reveals that there is a need for a migration framework, which is non-existence as off now. Paper also reveals that due to lack of frameworks, people do not have trust in migration.
- d) In this paper author (Stavros Stavru, Iva Krasteva and Sylvia Ilieva) has highlighted that software migration to cloud provides strategic and operational advantage but at the same time author has also highlights that there is a lack of mature process and method for the complex organizational and technical challenges [5]. In this paper author explains whether agile (Scrum and XP software development method) methodology can be utilized and fit to overcome the migration challenges. Author has also suggested the technique applicability and their inclusion in particular agile methodology.
- e) In this paper author, Doaa M. Shawky[6] has highlighted that to take full advantage of Cloud capability, system should be move to Cloud and in same sentence also highlight that migration to cloud leads to new set to technical challenges which can't be ignored. Paper highlights the need of a technique to locate components without actually moving them because of the challenge involved in selecting components for migration to cloud services as these components may have complex dependency on other application. Author proposes a decision making process based on a set of measurable factors in pricing models of cloud providers, keeping in view the coupling among different components of the system is measured. Then proposed cost measuring function is used to choose the optimal migration scenarios.
- f) Sitalakshmi Venkatraman and Bimlesh Wadhwa[09] in there paper highlights the challenges and issues in migrating Service Oriented Architecture (SOA) based application to Cloud. Author is also of view that, due to these challenges has led to slow

adoption of cloud. These challenges give way for the research and development in software engineering, to get the true benefit of cloud computing concepts. In this paper author has highlighted that there is a lack of focus on research and development in this area of software engineering and suggest that rethinking is required to exploit the software engineering principles behind Grid, SOA and Web technologies for a better realisation of services in cloud systems.

- g) Rashmi, Dr. Shabana Mehfuz and Dr.G.Sahoo[13] in there paper has highlighted that most of the organizations are not sure how go about the application migration to cloud and area they need to focus upon during migration. Author also highlights the challenges faced while migrating application to cloud and proposed a migration model, which can be used by enterprise. Author has proposed a five-phased waterfall model for migration to cloud but have not dwelled into the details of how. In real scenario, it may not be possible to follow the water fall mode because, as the application migration process progress, team may discover area, which was not considered or there was no visibility due to lack of appropriate documentation and application knowledgeable person in team. These new unforeseen challenges will make team to go to initial phase of analysis, which will have impact on delivery timeline.
- h) Muhammad Auefeef Chauhan and Muhammad Ali Babar has highlighted in there paper[14] that as cloud technology is gaining popularly in industries, so it is expected that companies will adapt this technology and start migrating there application/software to cloud however author of view that this not enough attention is given to as such migration process. In this paper author wants to contribute towards “how to migrate existing system to cloud computing”.
- i) Claus Pahl, Huanhuan Xiong, and Ray Walshe[18], has mentioned in this paper that though the Cloud computing has gained the attention but the adoption of the technology is yet to gain acceptance. The lack application/acceptance of cloud technology is because the question of how to migrate to

Cloud is unanswered for many. To answer the big question of migration to cloud from on-premise; author has undertaken a provider based case study on all the three layer of cloud computing i.e. Software As A Service (SaaS), Platform As A Service (PaaS) and Infrastructure As A Service (IaaS).As a result of this provider driven case study driven, author is trying come-up with layer specific process and discuss the commonalities.

- j) XinMeng, Jingwei Shi, Xiaowei Liu, Huifeng Liu, and Lian Wang[19], highlight the increasing popularity of cloud computing and the requirement of migration enterprise legacy application to cloud.In this paper author proposes an application migration solution (AMS) to migrate legacy application efficiently with the help of GUI recognition and reconstruction technology. GUI information can be divided into UI part and data part. In AMS, GUI is the starting point for retrieval of the information and same is used to generate the Web based application.

From the above literature analysis; researchers and enterprises are putting effort in developing migration framework but are trying to address a particular area of migration in bits and pieces and none has provided holistic legacy application migration framework to cloud. Same is highlighted by Pooyan Jamshidi, Aakash Ahmad, and Claus Pahl in there paper, where they have conducted a systematic literature review of 23 selected studies, published from 2010 to 2013.

III. Aim and Scope

Over the last few years, cloud computing paradigm has witnessed an enormous shift towards its adoption and it has become a trend in the information technology space. One of the biggest benefits cloud technology provides is that organization can focus on the business challenges instead of struggling with IT requirement to meet the business need i.e. license cost, server cost, storage space, etc.

Organization can reap the advantage of Cloud computing by migrating their legacy application to cloud. However, fact is that Legacy application concepts makes application migration a challenging task i.e. it not a straight forward task as it seems to be, especially when

migrating a legacy application, which is tightly coupled in nature.

Good amount of research work has gone into methods of migrating application to cloud however they it seems that all these methods are specific to a particular area/layer of the Cloud, so need of the hour is to have a holistic end-to-end legacy application migration framework, which helps enterprises to do their migration in more structured manner. Scope of the framework will be: Legacy application migration uncertainty of “where to begin” and “what process needs to be followed” to make the migration process a smooth journey. Framework which covers all the area of migration i.e. a) Pre-migration, b) Migration, c) Post-migration and d) Governance, which cut across layers of the application in cloud environment.

IV. Conclusions:

Literature review and analysis shows that good amount of research work has gone into proposing methods of migrating application to cloud however they it seems that all these methods are specific to a particular area/layer. At the same time many of the researchers have highlighted the importance of migration process and lack of the same, so need of the hour is to have a holistic end-to-end legacy application migration framework. Fact which needs to be highlighted is that the Legacy application concepts makes migration a challenging task i.e. it not a straight forward task as it seems to be, especially when migrating a legacy application, which is tightly coupled as compare to cloud application requirement. Cloud computing technology offers several benefits to users, which need no elaboration.

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