Implementing Advanced Cloud Computing Solutions in Pastoral Venture Models

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ABSTRACT

In this paper nnovations are expected to affect the progress in environment. A majority of enterprises are effecting to cut back their computing cost from the options for virtualization. This need for lowering the computing cost has ended in the innovation of Cloud Computing. Cloud Computing offers better computing through improved utilization and reduced administration and infrastructure cost. Cloud Computing is separated around the world in distinguish format. This is the schema to emerge home based business opportunities and method finding new patterns of GPS service provider to user by time after technology being. This process is the modern computing from a shared manner, more reliable, cost effective and ease-of-use the popular technology. Cloud Computing offers the opportunity of a transformation in design development and then generation technology. Cloud Computing is with the infant stage therefore, the commercial enterprise needs to think using the business environment and hang up up their structure in cloud computing technology. Particularly in Indian scenario Cloud Computing has different obstacles in deployment section for technically and economical. India as a top market in everybody the method to your Cloud Computing technology to cultivate and reach Indian enterprises and serve them better and cost effective manner. The backbone infrastructure and supportive pillars is a teething trouble in between.

Keywords: Cloud Computing, virtualization..

I. INTRODUCTION

There have been many definitions of Cloud Computing by different researchers. Armbrust [1] defines in 2009 Cloud Computing as:

"Cloud Computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the datacenters that provide those services. The services themselves have long been referred to as Software as a Service (SaaS). The datacenter hardware and software is what we will call a Cloud. When a Cloud is made available in a pay-as-you-go manner to the general public, we call it a Public Cloud; the service being sold is Utility Computing. We use the term Private Cloud to refer to internal datacenters of a business or other organization, not made available to the general public. Thus, Cloud Computing is the sum of SaaS and Utility Computing, but does not include Private Clouds. People can be users or providers of SaaS, or users or providers of Utility Computing.

Cloud Computing Architecture

Cloud computing refers to the suite of technology innovations, including scalable infrastructure, multi-tenant infrastructure, virtualization, automation and self-service provisioning portals which underpin cloud services. NIST (National Institute of Standards and Technology) is a well accepted institution all over the world for their work in the field of Information Technology. I shall present the working phenomena provided by NIST of Cloud Computing. NIST [2] defines the Cloud Computing architecture by describing five essential characteristics, three cloud services models and four cloud deployment models [3].Figure1. shows the cloud computing architecture.

Figure 1: Cloud Computing Architecture.

Essential Characteristics of Cloud Computing

As described above, there are 5 essential characteristics of Cloud computing which explains there relation and difference from the traditional computing.

- **On Demand**

A basic condition that a cloud computing provider must fulfil is the ability to deliver computing resources whenever the customer needs them. From the customer's point of view the available computing resources are nearly infinite (i.e., the customer is not limited the set of servers located at one site and it is the responsibility of the cloud computing provider to have sufficient resources to satisfy the requirements of all their customers). Utilizing computing resources on-demand is one of the most desired capabilities for a large number of enterprises because it eliminates the need for planning ahead, purchasing, and installing the resources they will require at some point in the future. This enables the customer to avoid making an unnecessary upfront investment in servers. Furthermore, when comparing cloud computing with the traditional model of owning the servers, cloud computing will helps avoid the costs of having underused resources. Consequences of this feature of on-demand computing resources are a lowering of the entry barriers to some business models, as software vendors can develop applications without worrying beforehand of provisioning for a specific number of customers and then bearing with the risk of greater success than planned, leading to the service not being available or, worse, having very few users and a large capital expense caused by purchasing resources that are very underutilized.

- **Pay per Use**

Another new aspect of cloud computing is application of a usage based billing model. The customer pays only for short term use of processors or storage, for example this usage could be metered in increments of hours or days; converting what would have been capital expenses into operational expenses.

We can see that the concept of cloud computing is strongly related to the idea of utility computing. In both cases the computing resources are being provided on-demand, much as electricity, water, or gas are supplied by a utility company; but in the case of computing resources the waste product is largely heat and after some time scrap computing equipment - hence the customer is essentially renting these computing resources. However, unlike a traditional rental agreement where the resources would be physically located at the customer's premises, in the case of cloud computing the resources are simply some where in the cloud - rather than in a single physical location. Further note that unlike the case for water and gas, which when they are not used are available for later use - not using processor cycles of a computer does in fact waste these cycles - since they will not be available for usage later. Therefore it is advantageous for a cloud computing provider to accept business to utilize all of these cycles.

- **Rapid Elasticity**

Based upon the specific of a service level agreement, the cloud provider scales up or down the resources that are provided to meet the customer's changing needs. This service level agreement must define the response time for the cloud provider to adapt to the customer's needs. Such an agreement is needed by the cloud provider, because the cloud provider does not in fact have infinite resources, so Based depending upon the service level agreement the cloud provider has to find a set of allocations of resources that satisfy the current demands of the aggregate of their users while meeting the various service level agreements of these costumers - otherwise the

service level agreement may specify a penalty that the cloud provider has to pay to each customer for not meeting the relevant service level agreement.

- **Maintenance and Upgrading**

Because the cloud provider rather than the customer maintains the computing resource, there is an effective outsourcing of maintenance tasks. Thus the cloud provider maintains and updates the resources, whether the resource is hardware or software. Therefore all repairs and replacement of the underlying hardware resources are transparent to the customer, as they do not affect the customer's experience. While this might be true in the ideal case, there may be short intervals when a customer's image is migrated from one hardware platform to another in order to perform maintenance or repair of a given physical platform, during this period of time the customer might not have any of the resources associated with this image available.

- **Service Oriented Architecture**

Service-oriented Architecture refers to a modular design principle in software architecture. Service-orientation aims at separating individual functions into distinct units or "services", that could be accessed, e.g. via a network, by developers to integrate them in a reusable manner in their applications. The services communicate with the applications (or other services) that invoke them via their predefined interfaces. Ideally, those should be standard, available, documented and easily implemental. From the business perspective SOA should allow for reuse of existing investments through leverage of already bought technology, evidenced e.g. as plenty of companies are creating services extracted from existing applications to be mandated for further standardized usage company wide in the enterprise SOA.

II. MATERIALS AND METHODS

Methodology for Research

This Paper begins with introducing the topic area and research questions. Equally important is the literature that has been reconciled on beforehand. A literature review forms the basis for this research and provides sources to scientific papers that give insight into cloud computing in an organizational environment. Scientific papers are to be found about the risks and problems that appear with cloud computing. There are not yet many solutions that are linked with cloud computing problems, there are made only suggestions to solve the issues. Besides Scientific papers there are also several books published in the area of cloud computing. These books will help to form the basis for the literature review together with the scientific papers. Further additions for this thesis are found on websites, journals and blogs.

The interviews are focussed on organizations that use or possibly can use cloud computing as a customer. The amount of interviews is difficult to estimate on beforehand, but at the end of interviews with cloud users and a conversation via chat and phone with a cloud provider the results that came out are very similar. This could also be a limitation, because it is hard to generalize based upon few sources. However, based upon these interviews I do not expect to find major differences when taking more interviews. The organizations as chosen are based upon their location in the market. So we have a cloud provider, a cloud user, a cloud user which uses cloud computing also as solution for their customers, and a small ICT organization. If we look at for example the cloud provider Navayuga Spatial Technology, we can see that revenues are growing. This shows the growing use and potential of Cloud computing because their core business is Cloud computing. Other organizations such as Microsoft, IBM, CTRLX, Reliance, Infosis,TCS are also doing serious marketing in order to increase the use of cloud computing, which shows that it is really a technology than cannot be neglected anymore.

The (sub) research questions are the base for the following chapters. These chapters are shaped with both literature and information gathered from interviews. Cloud computing is yet in a beginning stage so it is difficult to find a lot of organizations that already implemented cloud computing. Therefore this thesis will be done in a combination of a case study and descriptive study.

After the chapters based on the sub research question, an analysis will show and point out how cloud computing could benefit organizations. The analysis will provide the basis for the answer to the research questions and the conclusion. The analysis of all the combined information will eventually lead to the answers of the sub questions and of the main research question. The risk assessment is based upon previous research and measures using anchoring. The assessment shows the most important risks with highest impact. The anchoring and assessment is done by me personally. I used the information gathered from the interviews and the literature to do so.

Information Sources

The main sources are the IT organizations that are being interviewed and also Cloud computing providers or organizations that are already using it. Other sources are to be found on the internet such as scientific papers and

seminars. The interviews will leave room for organization representatives to give their own input. The interviews contain open questions; closed questions will be avoided as they usually do not provide a lot of data and information. Papers, seminars, books and internet are used to support the literature review and analysis of the research. Theories such as i.e. Diffusion of innovation are obtained from both books and internet.

Fieldwork Research Procedure

As the interviewed organizations are very different there is no standard way of doing an interview. All the interviews do tend to be (semi) structured. The questions that are asked in these interviews vary and depend on what sort of organization it is. There are IT organizations which use IT to perform their core activity. They are mainly depended on their IT systems in order to perform their daily routines.

The IT organizations interviewed vary from rather small to multinationals. The other way of find out the opportunity in rural and semi urban area , interviews taken from the mango people, farmers and the developing authority as well as local IT technician for various government and private projects using cloud as well as basic IT technology. This is because we then get a good overview of all kinds of IT sensitive organizations and rural area. The larger organizations also tend to have a lot of different IT systems in contrast rural area has no system. It seems very challenging to find out the cloud models for It friendly organisation and area there is not IT support. The questions asked in the interviews leave room for the interviewee to comment themselves about the topic, in the area of the question. This provides additional information

Data Analysis Technique

For this research there are several general steps than can be distinguished. First of all the thesis starts off with a literature study in the area of cloud computing. It explains all the in and outs of the thesis topic. Next are the interviews that provide a base for the first analysis. Some small cases can be obtained from these interviews and these are then compared with theory in order to analyze the cases and say something useful about them. From all the interview data together we can extract a set of models. These models should then apply in general lines to other companies that are willing to use cloud computing from the customer side. From here on we can make a complete data analysis about the whole thesis. At the end we are able to provide the conclusions and thus answer the main research question. The conclusions are based both on sub-questions and the main research question. Figure 3.1 shows the data analysis technique with different prospects and steps to find out the required target.

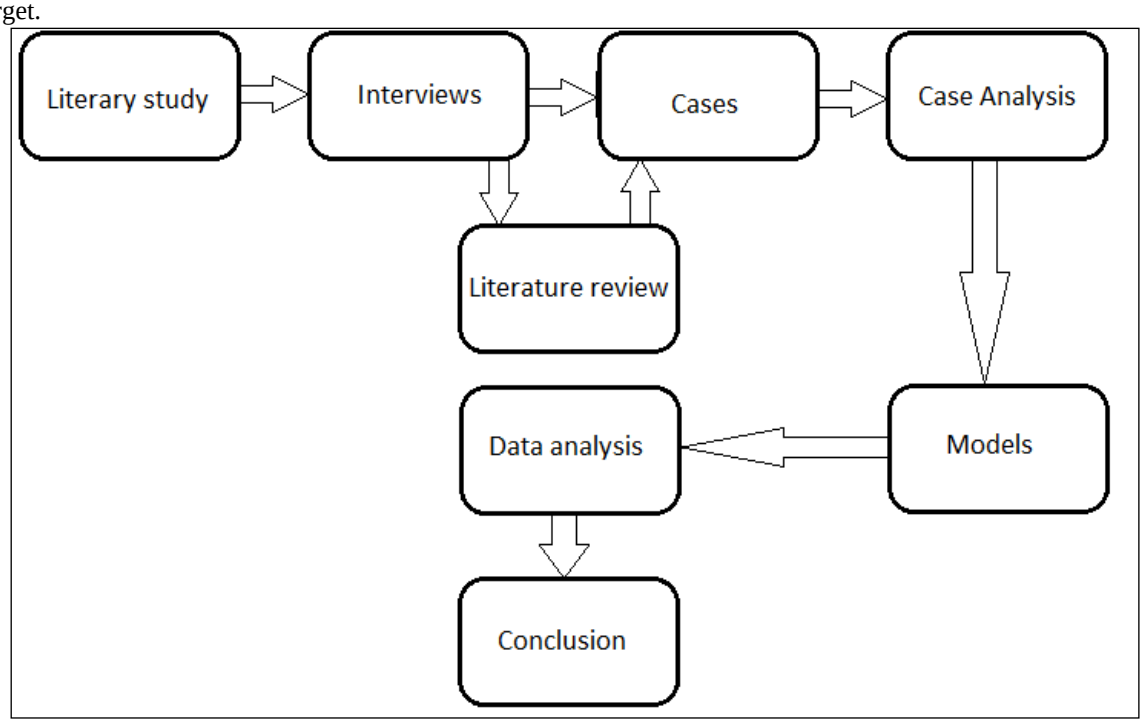

Figure 2: Data Analysis Technique

Overview of Alternative Strategies

This master thesis research is being done by using the methods of qualitative research. Other form of research is quantitative research. This would result in a completely other kind of research than this one. It would be more based on questionnaires or numerical data from certain analysis. Simulations could be held in order to test the risks of cloud computing, but it would not be as useful as an analysis which extracts data from real life

organizations. Simulations would simplify the reality to much in this case. Questionnaires are also out of the question because it would be meaningless to receive a lot of questionnaires from one organization providing different answers. Interviews are a much better solution for gathering information in this research.

Expected Results

In advance to the complete research there is in general a line of expectation and outcomes. These outcomes will be discussed in relation to the research (sub) question(s). In general the results of using cloud computing are expected to be positive. This is because there are already some organizations providing cloud computing services such as Google and Amazon. Also the technology of cloud computing is already in the phase were innovators start to take a small market share.

Organizations are expected to benefit from cloud computing as they will gain higher flexibility in using hardware and software. This can be when using it for temporarily extra computation power, but also for starting or expanding organizations. They are able to purchase additional services for just a fraction of the price they would have to pay when they want to buy it themselves. The organization gets very dependent on the service the providers give. The organizations are therefore exposed to a risk that cannot be handled directly by themselves but needs to be handled by the provider. The provider must be able to provide a certain amount of security in order to keep the organizations data and processes safe. It is expected that they have security software running in their clouds, protecting data and processes from any hazard. Also the physical location of the cloud has some form of protection. All together the infrastructure of the modern IT organization as we know it now will change in a more mobile and flexible organization. The IT infrastructure will completely be revised causing this higher form of flexibility.

Architectures

For a cloud solution there are several architectures possible. In figure 3 architecture is shown in which an instance of the product is running for every customer. By implementing this, the customer has its own private solution which might give more confidence in the security because the application of one customer is separated from the other customer.

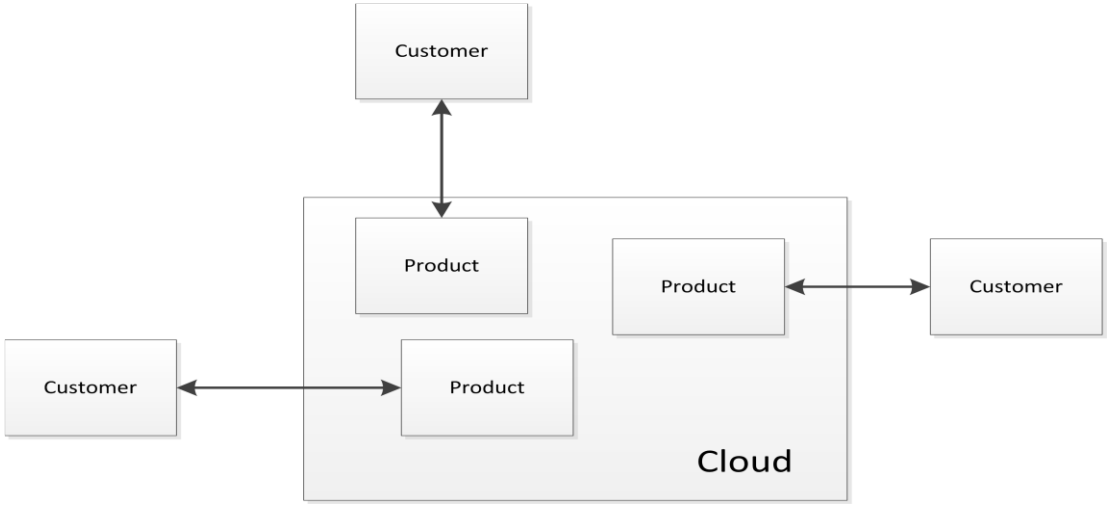

Figure 3: Cloud Solution with an Instance for Every Customer

Furthermore, more customization is possible. For the provider this solution results in more work because all separated instances have to be maintained, of course this could be compensated with the price. In figure 4 there is an architecture in which there is an instance of the product running for every version of the product. In this solution there can be several versions of the software next to each other. For the provider this will result in more software that has to be maintained. For the customer this means that he doesn't have the newest software automatically.

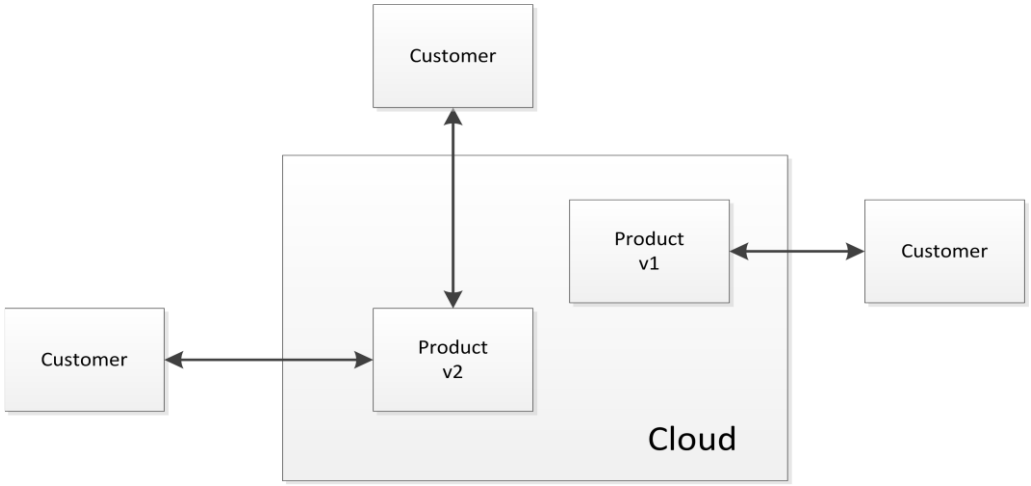

Figure 4: Cloud Solution with an Instance for Every Version.

III. CONCLUSON

We give an answer to the sub questions which then again results in the answer on the main question. The questions are answered with the use of the information gathered when making this paper. The information is extracted from interviews, available literature, and extracted models. As a reminder the main question:

"What effect can the use of Cloud computing have on IT intensive organizations in Indian Enterprise Environment and rural development?"

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