**Title: Migration to the Cloud- Requirement Analysis**

**Name: Ritu Choudhary**

**Abstract:**

Cloud computing is a business paradigm, where cloud providers offer

resources (e.g., storage, computing, network) and cloud consumers use them after

accepting a speciﬁc service level agreement

Cloud computing is a business paradigm, where cloud providers offer

resources (e.g., storage, computing, network) and cloud consumers use them after

accepting a speciﬁc service level agreement

Cloud data migration is the process of moving information, application data and services to the cloud. Cloud requirements change over time, so it is important to understand those dynamic requirements. The success of data migration process depends on planning, analyzing. This concept paper aims to focus on requirement engineering for cloud computing area such as application requirement, security requirement, Cost, business objective and understanding business needs, discovering the end-to-end functionality and IT involvement. Gathering requirement is a continuous process throughout the project. It plays important role in successful cloud data migration.

**Introduction**:

Migration to the cloud should include different steps, strategies, and considerations. To build a migration roadmap, it is important to understand your requirements- what to migrate. Data-gathering, analysis, dependencies, and strategic roadmap are phases of any successful framework. There are five aspects where we should have better understanding in order to achieve successful framework- Business Requirement, Technical Requirement, Financial Requirement, Application/Workload, Cloud Strategy.

Cloud computing supported the world’s economy, global supply chains and remote workers during the coronavirus pandemic. It will remain important for organizations for many reasons such as increased scalability, business continuity and cost efficiency in 2021.

### There are three Basic steps for a Successful Migration Process: Plan and prepare for migration, choose your cloud environment (single cloud environment or multi-cloud environment) and Migrate applications and data & review. (Bozicevic, 2018)

**Method of Approach**:

I have investigated various blogs and research paper which describes the requirements of cloud migration process. I will have clear insight on how migration works and what are the requirements and how to work based on those requirements. By reading those blogs, it was obvious that how important is to have the requirements analyzed first and what to take into consideration when organization requests for an RFP to migrate their services and applications from on-premises to cloud. Working on this paper has given me a good understanding of how migration works and trained me to work on an RFP where an entity is demanding services.

**Findings:**

I could discover the different types of requirements and challenges or roadblocks should be considered migrating to cloud. The different types of considerations that needs to be made for making the migration successful without putting an organization into a risky position. Cloud providers must ensure the reliability and integrity of data with strict compliance policies. Scalable IT resources can help the business expand existing resources to accommodate their business needs. There are some challenges and strategies mentioned to overcome those challenges. (Team, n.d.)

Requirement management can help the program to avoid or mitigate consequences of changes or any risks.  Thorough analysis and management of requirements can help set up the foundation for system affordability. Requirements management is the process of documenting, [analyzing](https://en.wikipedia.org/wiki/Requirements_analysis), [tracing](https://en.wikipedia.org/wiki/Requirements_traceability), [prioritizing](https://en.wikipedia.org/wiki/Requirement_prioritization) and agreeing on requirements  It is a continuous process throughout a project. (Requirements management, n.d.)

## **Requirements Gathering** is one of the major parts of cloud migration. It is important to understand following five elements for successful cloud migration: (Requirements Management, n.d.)

1. **Business Requirements:**

What are business requirements that would want any organization to migrate virtual machines (VMs) to the cloud? Is there a problem with the data center? Is there a problem with storage? Is your equipment nearing the end of its life? It's critical to comprehend the business case for cloud migration. How else would you know whether you were successful?

1. **Technical Requirements:**

Another element is to find the technical requirements. Are there any subscription or organizational specifications that must be answered in the architecture? What are the authentication and authorization requirements? RBAC (role-based access control)? Are there any firewall restrictions? Any restrictions accessing internet? For any cloud architecture, these are some simple considerations.

1. **Financial Requirements:**

What are the primary goals for outcomes from operating workloads in the cloud (such as projected cost savings or increased revenue from e-commerce), as well as budgetary constraints (how much money has been allocated for the migration and when it is expected to be completed)? Although they aren't needed for an evaluation however, you could interpret the results of the assessment tools. It is required for developing a migration strategy.

1. **Applications/Workloads:**

This is critical to understand the objective of assessment. You should know which applications or workloads you want to migrate. The evaluation should concentrate exclusively on those workloads, and it should be followed by a detailed understanding of the environment and migration goals. Which ones are the most important? Why did you choose those virtual machines? Is there something you need to be worried about with those workloads (clustering, licensing, etc.)? It will also assist in the discussion of reserved instances and whether the roles of the applications are known (whether they are steady, unpredictable, or cyclical).

1. **Cloud Strategy:**

What kind of licenses are you going to use? When looking at assessment, this is crucial since most tools have licensing choices (EA, pay as you go, discounts, etc.). The cost analysis is helped by understanding how it is meant to work. What is the strategy’s objective? Is it easier to start with the cloud? Is it a hybrid? It is crucial to know what the cloud's plans are in order to assist with design and integration.

Below are the following requirements of cloud migration: (Requirements Management, n.d.)

1. **Automation:** Applications can scale well within the cloud. Automation is crucial to meet the capacity requirements within the allocated budgets.
2. **Flexibility:** Flexibility is important to implement one of more major public cloud providers with a hybrid cloud environment.
3. **Visibility and control:** Enable visibility and control across the infrastructure so that organization will be aware of any risks in advance.
4. **Cloud Experts:** Having Cloud experts is the best practice to ensure successful migration.
5. **Custom Migration**: Create custom integrations/migrations and maintain them to avoid expensive resourcing investments.
6. **Security**: Securing the network infrastructure becomes critical across the entire infrastructure and strategies need to be adapted to proactively monitor for cyber threats.

Understanding above requirements will assist us in focusing on our RFP project for cloud service acquisition.

There are three basic gathering requirements for Migrating project over cloud.

**Scope:** The scope definition on a migration project, like any other project, is crucial. Discussions about the scope should consider whether to include the following: Migrating all features, phasing in bits of functionality over the course of a deployment schedule, adding or modifying functionality, upgrading user interfaces. Before moving on to the requirements process, it's important to decide if all functionalities will be migrated at the same time. (Beatty, n.d.)

**Understanding Business needs:** It is very important to understand the business requirements before migrating to cloud. If the original system has a detailed requirements specification, you can reuse the specification to build the new system. You can start with the original specification, and then ask users to know how they use the functionality.

**Working with end users**: You must also use the end users in any specifications gathering effort. Working with users at a higher-task level will help you understand the priorities of their activities. While that understanding of their position is still critical, it is also critical to comprehend how they perform the tasks in the current system. The difference with migration efforts is that much more time and effort will be spent learning how the new method is used. (Beatty, n.d.)

There are several challenges occur when migrating to cloud such as Financial cost, Adoption resistance and skill shortage. (Team, n.d.)

1. **Financial cost:** There are various costs of migration include rewriting application architecture for the cloud, investing in people and tools needed to migrate successfully, Training users on the new systems, performance issues, including latency, interoperability, dependencies on non-cloud applications, downtime, and bandwidth costs.

#### Solution:

There are three strategies which can keep cloud computing costs low of any organization.

* Analyze your business objectives and requirements, the current state of your IT operations, and the cloud options available thoroughly. This will help you detect issues, opportunities, and needs that you can then prepare for.
* Migrate operations in batches so that organization does not have to invest as much money up front, giving them more flexibility and options.

#### Understanding the financial risks and benefits that can help manage your decision. One can consider option to migrate to a hybrid cloud

#### 2. Adoption resistance:

#### People avoid change and migrating to cloud brings a lot of change and interruption with new systems, processes, and even leadership.

#### Solution:

#### Having leadership buy-in is the great approach to understand the business need and objectives for the migration and have them communicate to the organization.

#### Prioritize usability and integration when choosing cloud solutions for your applications

#### Hire highly skilled employee to train and support employees on the new applications.

## **Skill shortage:**

## One of the main problems is to find people who have the skills to achieve an effective migration. Having cloud skills are important remain competitive.

### **Solution:**

The best long-term plan is to promote cloud skills internally that will provide several advantages.

There are seven tasks that should be on your cloud migration checklist.

### 1. Consider the application or data

### 2. Evaluate costs

### 3. Choose your cloud environment

### 4. Choose a cloud service provider

### 5. Rethink governance and security

### 6. Prepare for cloud-to-cloud migration challenges

### 7. Define your cloud migration strategy (Rando, 2019)

**Recommendations**:

Requirement engineering play a crucial role in successful cloud migration. I strongly recommend that one should ensure requirements and analysis are done thoroughly. Also, consider the challenges in migrating to cloud and work on strategies to overcome those challenges. I would recommend following below best practices to successfully migrate to cloud. (Beatty, n.d.)

* Map Out a Migration Strategy
* Create a Cloud Governance Framework
* Optimize the Network
* Train Staff Early
* Properly Manage Software Licensing
* Automate Where PossibleMonitor Cloud Usage
* Leverage Service Provider Support (8 Cloud Migration Best Practices to Make Sure You Do It Right, 2018)

Always consider gathering requirements before migrating over cloud. There are requirements gathering steps and different types of requirements mentioned above to consider and implement accordingly.

**Value**:

**Team’s Value to RFP:**

Since requirements management is the first step and baseline of cloud migration, it will add a great value and contribution to my RFP as a requirement analyst. While working on concept paper, I am working on understanding all user requirements for cloud migration such as functional requirements, technical requirements, financial requirements, Service requirements, System requirements, Security requirements, Organizational requirements, Integration requirements, Implementation requirements, Training and support requirements which will be required for our RFP.

**Value to Education:** Doing this research, working on requirements, analyzing and strategies that are helpful to understand my RFP, acquisition, integration which will help me to acquire knowledge on cloud migration. Since almost all IT organizations are migrating to cloud, understanding cloud migration, and researching on it, will help me understand the baseline of RFP and what are the requirements for cloud migration. Considering my IT background, having knowledge on cloud migration is additional skill for me which will help me in future. I recommend that one who should have knowledge on this area to be updated in the competitive market.

# References

*8 Cloud Migration Best Practices to Make Sure You Do It Right*. (2018, Dec 12). Retrieved from altexsoft.com/blog/cloud/8-cloud-migration-best-practices-to-make-sure-you-do-it-right/

Ana Sofia Zalazar, L. C. (2017, April). *Analyzing Requirements Engineering for Cloud Computing*. Retrieved from https://www.researchgate.net/publication/315913697\_Analyzing\_Requirements\_Engineering\_for\_Cloud\_Computing

Beatty, J. (n.d.). *Gathering Requirements for Migration Projects*. Retrieved from https://seilevel.com/requirements/gathering-requirements-for-migration-projects-part-1

Bozicevic, V. (2018, July 11). *Cloud Migration: 3 Basic Steps for a Successful Migration Process*. Retrieved from https://www.globaldots.com/blog/cloud-migration-process

Mock, K. (2017, Oct 17). *Requirements for Cloud Migration*. Retrieved from https://blogs.infoblox.com/community/6-cio-requirements-for-cloud-migration/

Rando, N. (2019, Oct 04). *7 must-have steps for a cloud migration checklist*. Retrieved from https://searchcloudcomputing.techtarget.com/opinion/What-to-include-on-your-cloud-migrations-checklist

*Requirements management*. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Requirements\_management

*Requirements Management*. (n.d.). Retrieved from https://www.dau.edu/tools/se-brainbook/Pages/Management%20Processes/Requirements-Management.aspx

Team, L. C. (n.d.). *Overcoming the most common cloud migration challenges*. Retrieved from https://www.lucidchart.com/blog/challenges-with-moving-to-the-cloud

Teson, M. (2018, Jul 11). *A Cloud Migration Framework* . Retrieved from https://blog.cdw.com/cloud-computing/a-cloud-migration-framework-part-2

**Acknowledgement:**

The research topic in the area was supported by Dr. Rich Halstead-Nussloch. I would like to thank professor for guiding and encouraging me to do research in this area.