Cloud Migration Methodology

-Janaki Jayachandran (Director of Technology)

aspire
SYSTEMS
attention. always.

TABLE OF CONTENTS

Cloud has created an even field where the investment and size of the company no more matters.

Introduction

Several technologies are rapidly evolving on a day-to-day basis but nothing can come closer to the transformation that cloud has gone through in the last few years. The important aspect of cloud is the fact that it has impacted all the facets of both business and professional life of people. Significance of cloud strategy has reached the extent where companies can no more play the waiting game. Cloud has created an even field where the investment and size of the company no more matters. All that matters is the innovation that is created by the companies. In other words cloud gives the ammunition for even small players to overthrow the biggies in a short period of time. Therefore, it's extremely critical for organizations to carefully think through their cloud strategy.

Attributes of a Modern Infrastructure

It's very important to understand the benefits of cloud compared to traditional data center model. Let's analyze this by looking at some of the key infrastructure attributes that define a modern state of the art infrastructure.

Security - It should offer comprehensive mechanism to control security at various levels. The support availability for multiple encryption techniques and multi-factor authentication is a critical factor. Adapting to necessary security and compliance certifications is very important.

Traditional data center model

Availability - It should offer High Availability through multiple availability zones with independent backend resources (ex: power, bandwidth, etc.). It is advisable to have support in place for multiple regions so that when business expands it will be easier to scale the setup. Facilitating the Disaster Recovery features for both data and compute resources should be considered as a key process.

Scalability - It should support both scale-up and scale-out scenarios in an efficient manner. Scale-up deals with increasing the compute capacity in the given setup whereas scale-out deals with adding additional capacity. Flexibility should be maintained while computing resources of varying sizes for general usage as well as specific types for named use cases.

Reliability - The current industry standard of reliability support is 99.999999999 (11 Nines). This is extremely important for running business critical applications.

Elasticity - It should allow to use resources on-demand basis and apply charges only for the hours used. This attribute is very important to support different computing load patterns with minimal cost.

Global Presence - Enterprises spread across the world would leverage the local regions/zones for managing the applications. Therefore, global support would be very critical for a successful implementation and management.

Performance - It should be able to offer superior performance based on the requirement.

Infrastructure API - Expose APIs for leveraging the infrastructure resources and integration with external systems. All the resources should be made available in a programmable manner.

Management - A simple and intuitive way for managing the resources. It is also advisable to have simple and straight forward interfaces so that even power users can operate on the console.
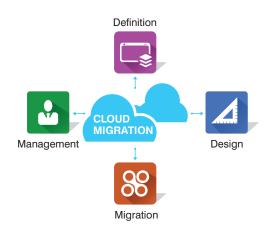
Automation - It should allow automation of steps/processes so that manual effort can be saved.

While Applications have been going through tremendous modernization it's equally important to have a modernized infrastructure to run those applications.

Return of Investment (ROI) Calculation that can establish the cost benefit analysis in an objective way.

Cloud Migration Methodology

Cloud migration methodology should take a holistic view of all the aspects involved in meeting the business and technical goals of an organization.

4 Major phases involved in cloud migration:
↪ Definition ↪ Design ↪ Migration ↪ Management
Let's take a deeper dive in to each of these phases.

Definition

This phase is the most critical phase as major decisions are taken in this phase, which sets the direction for the rest of the phases. The initial process is evaluating the business needs and the potential benefits that can be expected in moving to cloud. Based on the identified needs and benefits, Return of Investment (ROI) is calculated and that can establish the cost benefit analysis in an objective way.

Once the benefits and ROI are validated, a cloud migration strategy will be defined. This strategy will encompass the challenges, technical risks and solution approach. Based on the cloud strategy a migration roadmap will be developed, which will provide details on the phases involved, migration approach, cloud candidate list, etc.
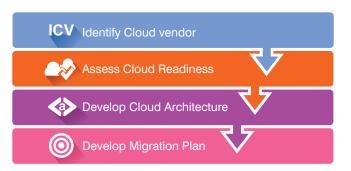

Design

Definition phase is followed by the Design phases where the cloud strategy and migration roadmap are put in to action. As a first step, parameters for identifying the cloud vendor are identified based on the business needs and cloud strategy. Potential cloud vendors are then rated against these parameters resulting in the ideal choice of cloud vendor.

Assessing the Cloud readiness is the next key aspect in migration as this will help in unearthing the risks and challenges in execution. As part of the cloud readiness the chosen application's architecture is reviewed for cloud suitability. The technology stack is also reviewed to validate it's fitment with cloud based model. This exercise could result in the list of changes that might have to be done in the existing applications in order to fit them for a cloud based model.

> *As part of the cloud readiness the chosen application's architecture is reviewed for cloud suitability.*

Based on the chosen cloud and technology matrix, cloud architecture is selected. This cloud architecture will cover the following

↪ Compute resource configuration ↪ Security architecture
↪ Network architecture ↪ Storage models
↪ Load balancing setup ↪ Back-up/Disaster recovery plan
↪ Setup for alerts/monitoring
↪ DevOps implementation plan

A migration plan will be drawn that will detail the phases involved, application batches for migration, staging setup, data migration plan and testing plan.

> Once idea or product is ready for the market, it's not necessary that it will always seize the market. Timing to market a product is crucial.
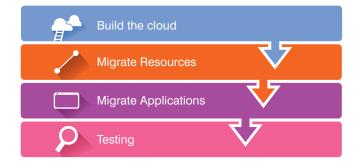
Migration

Based on the migration plan this phase could happen in an iterative manner. As a first step, cloud setup is done based on the finalized cloud architecture. The network, security, storage and other base architecture level setup will be executed first.

Once the basic cloud architecture is setup, resources will be moved based on the identified priority and also applying the dependency constraint. Resources can include storage, tools, contents and utilities. Followed by resources, applications will be setup in a similar way by applying priority and dependency constraints.

A thorough testing phase continues to ensure the following, Cloud architecture aspects like security, scalability, DR, etc.

� Completeness of resources migration
➤ Data validation ➤ Application stability ➤ Performance

> Resources can include storage, tools, contents and utilities.

- Build the cloud
- Migrate Resources
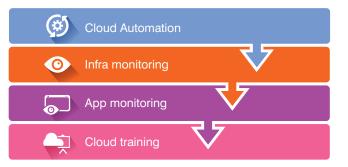- Migrate Applications
- Testing

Manage

This phase focuses on setting up the manageability aspects of the cloud environment. As a first step, automate as many steps as possible so that there is very minimal manual intervention involved. Automation will be done in the areas of auto scaling, configuration, back-up, DR and deployment.

Cloud monitoring is another key area that is important for cloud management. Implementation of monitoring at both infrastructure and application level by leveraging both the in-built tools offered by the cloud provider as well as external monitoring tools like New Relic.

It is advisable to do knowledge transfer to customer's team on the cloud deployment and management aspects.

- Cloud Automation
- Infra monitoring
- App monitoring
- Cloud training

Traditional data center model

Key Considerations in Cloud Migration

Below are some of the key considerations that have to be analyzed while deciding the cloud migration strategy.

Change in philosophy - "Design not to fail" to "Design for failure". In traditional approach you design your deployment architecture in such a way that it should not fail (at any cost – it does take a lot of cost). However, in the new cloud model best practices recommend you to design for failure, which is a totally different (but robust) approach.

Application migration approaches - there are multiple degrees of changes you may want to do to your application depending on your short term and long term business/technical goals.

Virtualization - This model facilitates a quick and easy migration to cloud as no changes will be required to the application. Ideal candidate for legacy applications.

Application migration - In this case your application will go through minimal architecture and design changes in order to make it optimal for a cloud model of deployment. For example, you may choose to use a No SQL database available on cloud.

Application Refactoring - This model will require a major overhaul of your application right from the architecture. This is typically done when you want to leverage the latest technology stack.

Data management - Plan for proper archival and backup strategy for your data. As a best practice, keep the dynamic data close to compute and static data close to the user. This can be done by leveraging caching and CDN techniques respectively.

Replatforming - Expect to have platform compatibility issues when you are switching from one platform to another (ex: Unix to Linux, Windows 2003 to Windows 2008)

Integration - If you are planning to retain some of the applications in-house (or in local datacenter), then you may want to look at the integration/performance aspects. All this while, the applications are collocated and hence, data transfer is easy. However, now the cloud migrated applications will have to talk over internet to the applications sitting in-house. This could lead to performance and bandwidth related issues.

> *As a best practice, keep the dynamic data close to compute and static data close to the user.*

Licensing - Verify if the current set of tools/software you are using support a cloud based licensing model. Particularly if you are planning to leverage the elasticity of cloud computing make sure that your licenses are compatible with such a setup.

Security - Revisit your security implementation in the application. Since all your data is stored in the cloud you may want to ensure that all the layers adopt the encryption best practice to ensure that data is not readable even when it falls in the wrong hands. Consider using security keys issued by a different source than the one you are using for deployment.

Automation - Look for automating as much as possible. Automation not only helps in improving your productivity but also eliminates possibilities of human error.

Decide your network configuration based on the internal and external communication requirements of your applications. Avoid using internet for internal communication between applications as this will not only increase your cost but also increases the security threat. Expose only minimal applications that are required to interact with the public world.

Vendor lock-in - Watch out for the vendor lock-in aspect, while you can simply stay away from utilizing the cloud vendor services that may not be the effective solution for your application. You need to weigh in the pros and cons of which services you want to use and to the extent you want to use.

Summary

Since cloud has been rapidly gaining pace it's extremely important the solution provider to be aware of the latest happenings and trends in cloud, so that the solution proposed is in-line with the future changes in cloud technologies. We hope this whitepaper provided you an overview of the various aspects to be considered in migrating to a cloud, and more importantly a structured framework for executing the cloud migration.

About Author

Janaki Jayachandran is the Director of Technology within Aspire's Centre of Excellence for Cloud. In this role, he is responsible for go-to market strategy, thought leadership and customer consulting. Janaki is an Aspire veteran with 15 years of industry experience and has helped several companies in transforming business model by leveraging cloud services. He is a prolific speaker at SaaS University, NASSCOM & Cloud Connect events

ABOUT ASPIRE

Aspire Systems is a global technology services firm serving as a trusted technology partner for our customers. We work with some of the world's most innovative enterprises and independent software vendors, helping them leverage technology and outsourcing in our specific areas of expertise. Our core philosophy of "Attention. Always." communicates our belief in lavishing care and attention on our customer and employees.

| SINGAPORE | NORTH AMERICA | EUROPE | INDIA | MIDDLE EAST | For more info contact |
| +65 3163 3050 | +1 630 368 0970 | +44 203 170 6115 | +91 44 6740 4000 | +971 50 658 8831 | info@aspiresys.com or visit www.aspiresys.com |

White Paper: Cloud Migration Methodology

6