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Analyzing the Functionalities of Cloud Data Migration Techniques and Tools from Various Cloud Providers

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Abstract—Cloud computing services are becoming more and more popular. However, the high concentration of data and services on the clouds make them attractive targets for various security attacks, including DoS, data theft, and privacy attacks. Additionally, cloud providers may fail to comply with service level agreement in terms of performance, availability, and security guarantees. Moreover, users may choose to utilize public cloud services from multiple vendors for various reasons including fault tolerance and availability. Therefore, it is importance to have secure and efficient mechanisms that enable users to transparently copy and move their data from one provider to another. In this paper, I Explore that the functionalities of various migration tools for migrating data from various cloud to various cloud with data security. By using these tools, we can migrate the data very securely and in time from various cloud providers.

1 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.

1.1 Major phases involved in cloud migration

Definition → Design → Migration→Management

Let's take a deeper dive in to each of these phases

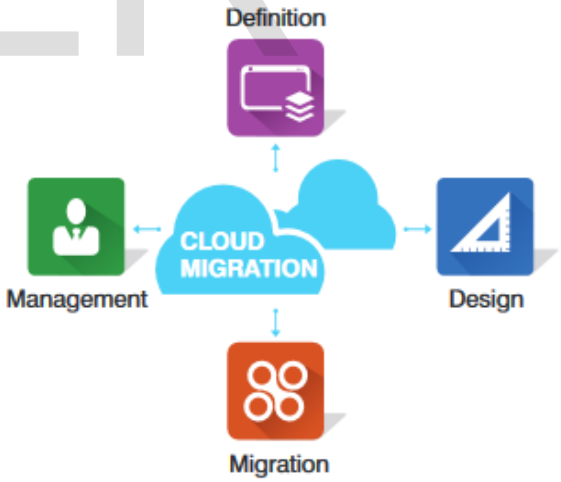
3 Definition

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 beexpected 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.

2 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 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

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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.

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

→Development implementation plan

6 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

5 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 minimalmanual 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 inbuilt tools offered by the cloud provider as well as external monitoring tools like New Relic.

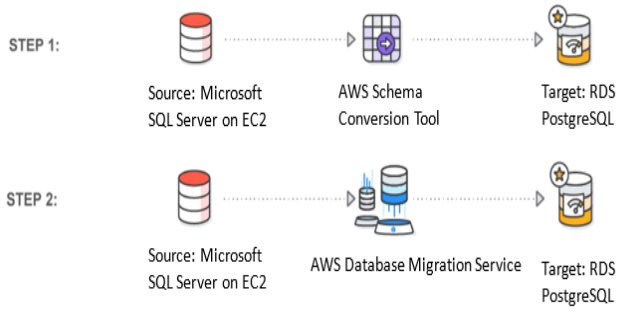
5.1 Key Considerations in Cloud Migration

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

6.1 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.

6.2 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.

6.3 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.



6.4 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.

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

Here are five of the best cloud migration tools for business:

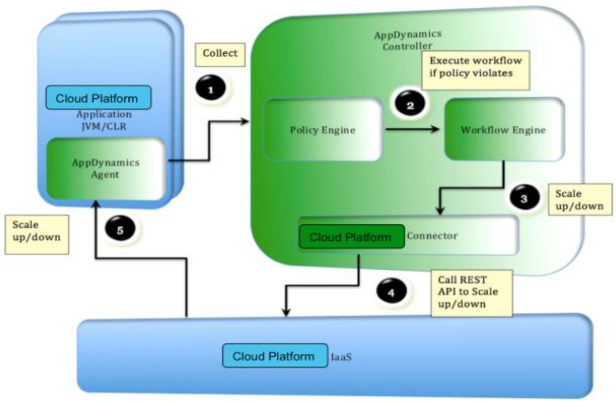
8 AWS DATABASE MIGRATION SERVICE

Amazon has been powering a large portion of the cloud computing world ever since it launched Amazon Web Services (AWS) in 2006. When you consider the company's ruthlessly data-driven approach to business, it's no surprise that they have a top-notch database migration tool. They know the most common problems businesses face when moving to the cloud and designed this tool to solve them.

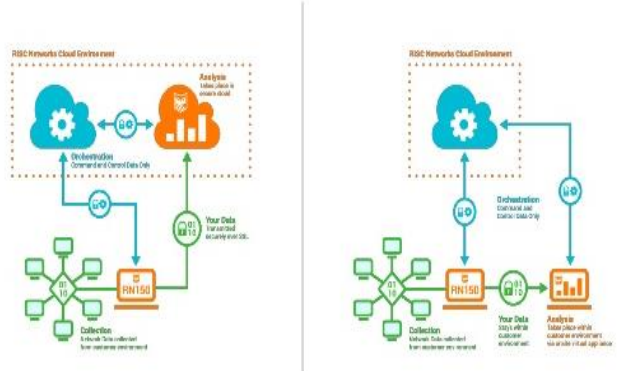
For example, a common complaint is that heterogeneous migrations from one platform tothe next can be very difficult. After all, there are a lot of different IOT cloud platforms to work with. The AWS Database Migration What about downtime? Amazon points out that "The source database remains fully operational during the migration, minimizingdowntime to applications that rely on the database." With an easy-to-use user interface and a robust back-end that runs on Amazon's proven cloud computing platform, this is a powerful tool for database migration. It's hard to imagine a better way to put your in-house data onto the cloud.

7 CLOUDSCAPE

What if you believe in the power of cloud computing but have no idea how to integrate it into your business? Cloudscape is a great tool that helps you identify the first steps. You need to start by developing a better understanding of your business' data. Cloudscape measures the information floating around your company, looking to see what data goes where and determining the best way to organize it. You'll see how data that is currently scattered around your organization could be organized into simpler and more effective silos. After your seven-day analysis, Cloudscape can help you compare prices between different cloud services that will help you improve your business. After implementing new services, you can measure ongoing data trends to seehow your cloud



Service makes it easy, enabling you to move between platforms without hassle.



computing decisions affect your bottom line.

9 SCIENCE LOGIC

You might have a good understanding of the technical aspects of cloud migration, but still need more data to make your final decisions. Science Logic is an elegant cloud migration tool that offers in-depth and widely compatible IT data analysis and monitoring.

This service uses a simple interface to help you parse large amounts of information. As the company homepage puts it, it offers "One consistent and intuitive UI, one data store, one operational platform—no agents to deploy, no additional modules to integrate, no version dependencies." You won't have to waste time dealing with a convoluted onboarding process. Science Logic is quick to deploy and easy to use.

You use Science Logic by following a logical progression of analytical activity. First, you'll get a baseline understanding of the way your business operates and determine how to classify network activity. Then, you'll monitor this system and develop a visual map of the relationships between various departments. Finally, using this information, you can implement profound cloud-based automation strategies to free up your staff for uniquely human tasks.

10 APP-DYNAMICS

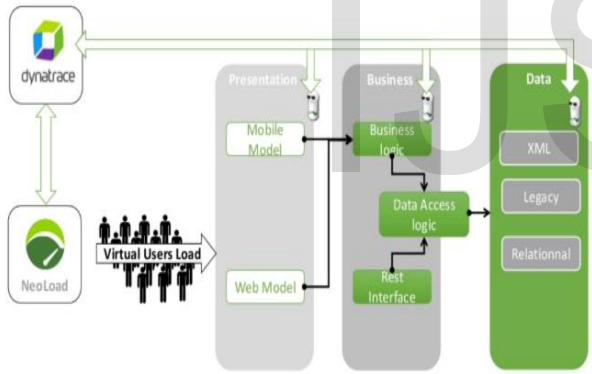
App-Dynamics automatically detects all your application components in Microsoft Azure, including Microsoft Azure services like Azure Service Bus, Azure Message Queue and Azure Blob Service. The Application Flow map shows all your application's dependencies and the response time between each tier.

Some businesses are obsessed with the customer-facing aspect of their digital operation. They would love to utilize cloud computing services to ease the burden on their workforce, but can't risk any negative impact to the customer experience. If you fall into thiscategory, App-Dynamics could be the perfect cloud migration tool for you.

If you aren't tracking the user experience, how will you know when something goes wrong? App-Dynamic grabs every instance of a crash or pageload delay and looks for trends to help you fix issues that could cost you customers. They offer "End User monitoring" to show you how your third-party apps are affectingperformance.

The proprietary "Business IQ" system built into this tool helps you see the exact effect that your front-end system is having on your bottom line. You'll see how much money you lose as the result of mobile app crashes, desktop browser glitches, and much more. By easily identifying your most costly issues, you can make your customers happier and earn bigger profits in the process.

11 DYNA-TRACE



12 CONCLUSION

Themigration toolscloud brings scalability, elasticity, agility and reliability to the enterprise. To take advantage of the benefits of the cloud, enterprises should adopt a phase-driven migration strategy and try to take advantage of the cloud as early as possible. Whether it is a typical 3-tier web application, nightly batch process, or complex backend processing workflow, most applications can be moved to the cloud. The blueprint in this paper offers a proven step by step approach to cloud migration. When customers follow this blueprint and focus on creating a proof ofconcept, they immediately see value in their proof of concept projects and see tremendous potential in the cloud. Cloud has been rapidly gaining pace its extremelyimportant the solution provider to be aware of the latesthappenings and trends in cloud, so that the solution proposed is in-line with the future changes in cloud technologies.

Dyna-Trace is an application performance management system with an interesting set of features. As the APM provider with the top market share, it's easy to see that many companies are getting a lot of value from this service.

The foundation of this service is in its comprehensive data analytics. You can measure the rate that users are picking up onyour new features, look for dependencies within your application stack, and identify "root cause" issues well before they result in a problem for a customer. These features are combined with a host of more basic options, such as visualizing your data flow across mobile and desktop devices worldwide.

One of the more interesting features that Dyna-Trace has to offer is an AI-powered assistant named Davis. Davis is available 24/7 as you're front-line of support for questions about the tool. They also offer the "Dyna-TraceUFO," designed to help distributed Dev teams keep in sync in real-time. Your business will be more coordinated and quicker to solve problems when it's got Dyna-Trace to work

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