Migration to Cloud and Implementation

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Abstract

Over the past decade, cloud services have rapidly become one of the most defining technologies in IT. The hype surrounding a full blown migration may seem a best fit for all—but is this really the case? Is cloud something that could truly benefit your business? Let's go ahead with the discussion on the strategies and benefits of cloud migration from existing systems in our organization. This white paper brings out the main key points of migrating our old legacy systems to advanced cloud systems.

This whitepaper is designed to help organizations that are considering migrating a portion or all of their applications/services to a public cloud environment. The information presented is based on the many on the many factors and methods in cloud migration.

Introduction

Organizations need to take a hard look at their existing investments in infrastructure -- from hardware to application portfolios to network architecture and beyond -- to determine if a move will be beneficial. Some of the migration questions are technical, such as whether a given application can perform adequately in the cloud; some questions will involve nontechnical, budgetary issues, such as whether a cloud migration is cost-effective given current investments in infrastructure.

Here we explore factors that should guide a cloud migration strategy and help determine whether to move on-premises workloads to the cloud. One of the first considerations is an organization's existing data center investment. Despite technologies such as server virtualization, there are real costs associated with deploying on-premises servers. There are not only licensing costs involved, but also costs associated with hardware resource consumption and support infrastructure. As such, there is almost always a significant investment associated with an on-premises server. Outsourcing a server's data and/or functionality to the cloud may mean abandoning you're on premises investment unless an on-premises server can be repurposed. Although this rip-and-replace approach to cloud migrations may not make financial sense for organizations that have a large investment in an on premises data center, an organization can still benefit from migrating certain on-premises resources to the cloud.

No matter how good it is, any server hardware eventually becomes obsolete. Enterprise-class organizations have traditionally coped with this expected obsolescence by adopting a hardware lifecycle policy. An organization, for example, might choose to retire servers after five years. That being said, an organization could integrate a cloud services roadmap into its hardware lifecycle policy. Doing so allows IT teams to migrate on-premises resources to the cloud instead of moving them to newer hardware.

The prospect of using cloud services is often particularly attractive for smaller organizations and startups. In the case of a smaller organization, the use of cloud services provides access to enterprise-class hardware and fault tolerant features that would otherwise be unaffordable. Similarly, startups can benefit from cloud services because they can get their operations running quickly without having to invest in on-premises data center resources.

Why Migrate?

Many organizations today are looking for ways to cut costs but at the same time drive competitive differentiation via greater business agility. They see adopting public cloud services as a way to accomplish these goals faster. But are agility and cost savings the only reason IT organizations are adopting or considering adopting public cloud services? The answer is simple: no. To understand another underlying driver, consider two of the most populous countries in the world – India and China. Many of their citizens are just now getting internet access and only through the use of a mobile device. They represent an enormous untapped market opportunity for many companies. Now, consider the dramatic growth and adoption of mobile apps. Mobile apps have reset user expectations in terms of performance, scalability, and availability. They expect, based on other consumer-targeted web applications, that any internet-enabled application will perform flawlessly. Tied into that flawless performance is scalability. With the ability for mobile applications to go "viral", mobile application solutions need to be able to handle spikes in traffic. Perhaps most important is global availability. Will the application be available and perform well for the fastest growing segment of the internet-enabled population?

All of these factors tie into the two other "Whys" of cloud migration – cost and agility. To build a resilient application that delivers consistently good performance across the entire globe, an organization would need to open up a data center or, at the very least, engage in contract discussions with several different data center providers across the globe. They would have to have the ability to automatically scale as demand increased (i.e. auto-scaling) – to handle fluctuating demand. This combination results in exorbitant costs on both time (handling contracts with different providers) and money. Public cloud service providers offer all of these capabilities. They typically offer high levels of customer self-service - usually as simple as selecting some parameters and clicking a button to deploy capabilities. Public cloud providers also offer support for auto-scaling natively within their product set to handle spikes in demand and need. Further, these instances can also be brought down automatically once the spike in demand has passed. Finally, they offer a global services footprint, allowing organizations to deploy resources across most geographies. The other key benefit is agility. Enterprises can very quickly create and launch new services in the public cloud, without much investment in supporting infrastructure. And if a test of the new service doesn't work they can easily bring it down.

What is Migration and What are the Steps that go into It?

Build vs. Buy

First, an organization has to decide what type of public cloud service they want to use. Or more simply, do they deploy this application as a PaaS, SaaS, or IaaS based application? For example, does it make sense to run an exchange server in an IaaS environment or use Office 365 as the platform? Is that organization going to use all of the extra capabilities they would have in Exchange in a cloud environment or can they settle for the core capabilities provided by Office 365?

Forklift

An organization also has to decide their approach to cloud adoption/migration. Are they going to forklift applications? If so, what is the purpose? Is it to provide for colocation? If the purpose is to provide colocation and you will not be using any of the on demand optimization abilities offered by public cloud

providers, you may find running it in a public cloud to be not nearly as financially effective as going with a traditional colocation service provider.

Embrace

In the embrace stage, organizations begin to design their applications and deploy them with the cloud and cloud capabilities in mind. This is often done in small steps. For example, instead of deploying 10 Gigabytes of storage at the outset for a particular application, you will deploy the application with a much smaller block of memory and design the application to add more memory as needed.

Optimization

This is where the most cloud-mature organizations sit in this lifecycle. In this stage applications are constantly honed and developed in a devops fashion. Truly designed to take full advantage of the powerful capabilities public cloud providers offer, this is where the true cost benefits begin to show themselves. Whereas organizations who first begin using public cloud services may only use 10 – 15% of the capacity of the compute they are paying for, mature organizations at the optimization stage use the majority of the compute they have purchased. Because they continually optimize and their applications are built for an auto-scaling world, they can run close to full capacity and know they will simply scale-up when they need to.

Organizations would be wise to question the statement, “I put some applications in the public cloud and they are costing me way too much money.” Often, this results from a situation where an organization “forklifted” an application to the cloud and it wasn’t designed/optimized for a cloud environment. The key is to use the cloud the way it was designed to be used.

Requirements for Successful Migration

In the case of application servers, administrators must consider whether the application can function in the cloud. Likewise, the application’s performance must be considered. Compatibility usually isn’t a big problem for newer applications that run on top of modern operating systems. It is also easy to assume that performance won’t be an issue for such applications because most cloud providers will allow hardware resources to be allocated to hosted servers on an as-needed basis. However, two major considerations must be taken into account for such applications.

The first is performance. Even though you can provision the hosted application server with nearly unlimited compute and memory resources, Internet bandwidth may impede application performance. It does little good to have a high-performance hosted application server if Internet bandwidth limitations stand in the way of a good user experience.

The second consideration is application portability. Although it is often easy to migrate a virtualized application server to the cloud, the application might have external dependencies that rule out (or greatly complicate) a cloud migration. For example, the application might have an Active Directory dependency or require access to an on-premises SQL server database.

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Another consideration for moving application servers to the cloud is hardware scalability. Some IT analysts have suggested that cloud services are ideal for hosting hardware-intensive workloads because cloud services generally offer nearly unlimited scalability. While a cloud service provider can usually scale its offerings to meet even the most demanding workloads, this scalability comes at a price.

Infrastructure as a Service provider such as Microsoft and Amazon Web Services charge customers a resource consumption-based monthly fee. As such, a cloud-based high-performance computing environment can become cost-prohibitive. Recently a client told me, for example, that it costs more than $10,000 per month to operate a single high-performance application in the cloud. The bulk of the cost is due to CPU and disk I/O consumption.

What Makes Successful Migration

Administrators in charge of legacy applications might feel swept aside by the boom of cloud-native applications, but even small changes can bring legacy apps onto cloud resources. IT equipment vendors and other detractors cite cloud failures -- poor performance, flaky application behavior, exploding costs -- to sow fear, uncertainty and doubt about legacy application migration to cloud. But the continued success of Amazon Web Services (AWS) and other providers belies claims that public cloud can't handle enterprise systems. For example, American Airlines moved some of its most visible applications to IBM's cloud, and General Electric closed dozens of data centers to move thousands of applications onto AWS. Cloud infrastructure as a service (IaaS) products, such as AWS Elastic Cloud Compute (EC2), are only one type of migration destination. Other companies use SaaS products that clone the features of legacy ERP, customer relationship management (CRM) and other systems. For example, both Oracle and Salesforce have wooed large companies to migrate processes and management to their SaaS options. Keep an open mind when you evaluate both the type of applications to migrate and the category of cloud services to adopt. Looking across the cloud service hierarchy, certain application types work best on certain services. IaaS is a good fit for VM infrastructure, both SQL and NoSQL databases and custom applications built on open source platforms. Web apps, mobile or internet of things app back ends, custom Java and other business applications are good targets for migration to platform as a service (PaaS). SaaS choices favor line-of-business systems, such as CRM and ERP, or productivity, communication and collaboration services.

Strategies Used for Migration

There are three common approaches to migrating applications to the cloud, according to Laurent Lachal, senior analyst of Infrastructure Solutions at London-based analyst firm Ovum. The first two approaches are "lift and shift" and refactoring. The third and more sophisticated option is extension or redesign.

Lift and shift means moving an application directly to a cloud host. In many cases, the approach works fine -- but it won't take advantage of the cloud platform's full capabilities. A somewhat better approach, according to Lachal, is refactoring, which involves making modest application code changes to ensure a smoother migration. The best approaches, though, are extension -- or heavily modifying code to fit the new cloud environment -- or a complete redesign to optimize the application for cloud.

How to Achieve Public to Private Cloud portability

For organizations that want to move beyond public cloud and into hybrid cloud, the ability to move workloads between public and private environments becomes crucial. To smoothly transition workloads

between public and private clouds, organizations should use cloud management and orchestration tools that can provide visibility across consumption models through a single pane of glass, said Mark Bowker, senior analyst at Enterprise Strategy Group, based in Milford, Mass.

A common misstep for companies is to grow accustomed to a highly virtualized on-premises environment and then set up additional public cloud infrastructure without ensuring consistency between the two. “That means the tools will not span the environments, so you don’t have a hybrid cloud -- just two different consumption models,” Bowker said. The “secret ingredient” is a cloud management tool that comes with a virtual environment, such as VMware’s vCloud or vRealize, he added. Portability between public and private clouds shouldn’t be difficult to achieve. And despite legitimate concerns about cloud vendor lock-in after moving to public cloud, those concerns are often exaggerated, Bowker said. At many levels, IT has dealt with lock-in for years. And some forms of lock-in -- such as standardization on a particular operating system -- can be helpful in spanning public and private clouds. Hypervisors from vendors such as Mware and Microsoft can also help manage virtualization across clouds.

Conclusion:

The world is moving towards cloud as it has great advantages like cost effective, no worries for maintenances, speed and great packages with benefits. Our organization needs to adopt to cloud as our systems are old, they have low performance and required high maintenance. I am putting this proposal to migrate our legacy systems to cloud, this will be beneficial to understand all the factors related to cloud migration.

In conclusion, migrating to the cloud is also not an easy task, but with the right tools, right resources, right planning, and right personnel, it can be done.

References:

1. DESMF: DoD Enterprise Service Management Framework (DESMF), Edition III, 4 Mar 2016 (http://dodcio.defense.gov/Portals/0/Documents/DESMF%20EDITION%20III%20Signed%20June2016.pdf)

2. ITIL: The IT Service Management Forum, “An Introductory Overview of ITIL® 2011” (https://www.tsoshop.co.uk/gempdf/itSMF_An_Introductory_Overview_of_ITIL_V3.pdf)

3. NIST: Cloud Reference Architecture (NIST SP 500-292) (http://ws680.nist.gov/publication/get_pdf.cfm?pub_id=909505)

4. P3M3: Introduction to P3M3, Version 3, July 2016 (https://publications.axelos.com/p3m3/Guide/Introduction.aspx)

5. Cloud Security: Cloud Security Alliance, “Security Guidance for Critical Areas of Focus in Cloud Computing v4.0,” 2017 (https://cloudsecurityalliance.org/download/securityguidance-v4/).