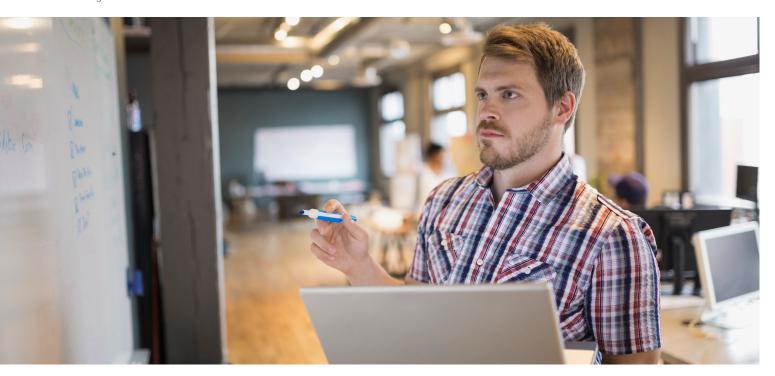Quest®

Cloud Migration is More than Lift and Shift

Best practices in preparing to migrate applications and workloads to the cloud

Written by Chris Jones, Product Manager, Quest® Software, and Nick Cavalancia, Consultant, Techvangelism

Wouldn't cloud migration be a lot easier if you could simply cut and paste your on-premises application into cloud-based infrastructure?

If only it were that easy...

The reality is that when you migrate workloads into the cloud, you work within a finite set of purchased resources. Sure, you're purchasing access to infinitely scalable storage and compute, but not with infinitely scalable money. To avoid ruining your IT budget, you need more than lift-and-shift tactics; you need a cloud migration strategy before you have moved even a single byte of production data into the cloud.

This paper examines the questions to ask as you're preparing your application migration to the cloud. IT architects, directors and managers will find approaches for properly planning cloud and workload migration.[1]

THE RISK IN MIGRATING TO THE CLOUD

Regardless of the cloud destination — large vendor, small vendor, leased space, own data center in the cloud — risk is unavoidable. That's because the cloud is what you make it. It can wind up costing more than on-premises infrastructure, it can lower performance, and the migration process can affect your business both positively and negatively.

As mentioned above, while it's true that you can always draw on unlimited cloud resources, it's also true that you must always pay for them. So, if you make the wrong choice about workload migration to the cloud, your application may still work and your users may still be able to connect to it, but it will cost your organization a great deal more money, especially if you over-allocate resources.

Suppose your cloud migration introduces performance problems. Latency can arise because of hybrid architecture or because peak input/output operations per second (IOPS) were degraded due to inaccurately selected storage. When your

customers click "Buy" on Instagram and are left waiting for your shop to load, they will leave and never come back.

By nature, you have less insight into and control of the physical infrastructure supporting the cloud, compared to the hardware within your own data center. So, if you don't properly plan and provision your cloud infrastructure properly, it can affect your business overall.

That is why a cloud migration strategy is better than a lift-and-shift approach.

MOVING TO THE CLOUD IS A GOOD IDEA. ISN'T IT?

Migration for its own sake or because "everybody is doing it" is short-sighted. As your parents said, if all of your friends jumped off a cliff, would you?

The momentum behind cloud migration is strong, but the cloud is not necessarily a good match for every workload, organization and business situation. For example, when one company has been divested, or spun out, from another, the unexpected need to exit the main company's data center may arise. It is tempting to make a fresh start in a public cloud without evaluating the data center option. However, once the dust has settled and the bills for services and storage begin arriving, execs start looking more closely at whether particular applications would run more cost-effectively in the cloud or in a traditional data center.

Thus, the main criteria for a successful migration include performance, availability, agility and cost.

Application performance for apps running in the cloud should be on par with performance on premises, not only for internal users but also for external and remote users. You should enjoy more "nines of uptime" as you offload your worries about availability from on-premises infrastructure to the cloud. For agility, count on being able to spin virtual machines up and down without delay to address short-term spikes in your computing needs.

And, in the long run, the cloud should pencil out. It should help you lower your total cost of ownership. Otherwise, why even do it?

WHAT SPECIFICALLY SHOULD YOU MOVE?

Companies that adopt a cloud-first policy run the risk of moving workloads they're not yet ready to move. So it's important to ask, "What specifically should we move?" or "What can we do that is native to the cloud?"

It has become common for development and testing groups to move to the cloud because they can spin up resources when needed and turn them off afterward. For them, the cloud affords capacity and agility without additional capital investment.

Many companies start out by moving the task of data replication to the cloud. Often, they end up building an entire disaster recovery plan around it, which is akin to planning an actual cloud migration. Note, though, that if you rely on the cloud for disaster recovery, there will come a day when your operations are in the cloud. That requires more than lifting and shifting; it requires correct architecture and lots of testing.

GETTING THE ARCHITECTURE RIGHT

You know all that effort you've invested in optimizing your on-premises environment? You'll need to invest it in optimizing for the cloud, too. Why? Because again, while you have access to unlimited storage, compute and networking resources in the cloud, you'll soon discover the need to use only a finite set of them, or else ruin your budget.

Migrating to the cloud doesn't mean you can forget about software, either. You'll still need to manage, patch, secure and configure operating systems and ensure that the applications you rely on will continue to run normally in the cloud. And you have to keep an eye out for dependencies among those applications — for example, between your own Exchange environment and Active Directory — just as you did when you ran them in your data center.

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THE PATH TO THE CLOUD IS PAVED WITH A PLAN

So, the first step in developing a cloud migration strategy is to focus on the architecture for your cloud environment. "We have 47 VMs on premises," you say, "so I guess that means we'll have 47 VMs in the cloud." Not necessarily. Where will your data be? Will it go across geographies or stay in one place? Are you subject to ingress/egress charges? When will your data be backed up? Or are you responsible for that? The environment will no longer be yours, so you have to focus on its architecture.

Next, what about your workloads and their storage/compute/networking requirements? In your own data center, nobody charges you for poorly written SQL queries, but when you're paying for compute, wasted processing time is wasted money. Knowing what your normal usage looks like today will give you insight into how it should look once you're running those workloads in the cloud.

Keep in mind that you have no storage or compute if you have no networking. The availability of all your applications and workloads depends on internet access. Even if you've thought architecture and migration completely through, your operations are dead in the water without the internet. Will you need a second internet service provider to ensure availability?

Security has to figure in your cloud migration planning. Anything you put into the cloud you automatically entrust to whoever owns the infrastructure. How secure is it? How (and how often) can you test it to satisfy yourself that only authorized users can access your data there?

Those questions along with compliance requirements drive some companies to go hybrid and keep some data in their domain on premises. But having two networks also means an expanded attack surface. And growth into new data from machines and the Internet of Things brings new exploits and vulnerabilities as well.

CASE STUDY IN CLOUD MIGRATION

Consider an online business weighing migration of a particular workload to the cloud.

- **Application services / business services —** The company starts by defining business services, groups of servers and applications that support the business. In that process, it comes to understand that a large part of its revenue is dependent on timely email communication. Looking at the other side of that coin, it can begin to assess the impact that the loss of email will have on the business should the migration not go as planned.

- **Discovering dependencies —** The company now manages IT operations through business services and the application and infrastructure within them. From this it identifies an application it wants to move. Next, it maps out the dependencies between that application and others in the environment. Not only does this help avoid lost revenue in case of migration problems, but it also yields valuable data on individual elements. The company can use that data to prevent and recover from outages by knowing what's downstream from the application.

- **Know where the budget is going —** Once the application is in the cloud, the company will easily know how much it costs each month. But cost figures in the data center are rarely as granular as monthly — they are usually calculated annually — so it can be hard to reach like-to-like numbers that show how the move to the cloud has affected costs. That's why it's useful to determine a cost in the data center per gigabyte of memory and storage, per gigahertz of CPU and per megabit for networking, then associate them. That will allow for meaningful comparison of costs later between data center and cloud.

- **Measure twice, cut once —** It's tempting to budget for resources based on average performance over a given period of time. But just as a car built for an average speed in the city of 35 miles per hour will be of little use on the highway, deploying to cloud resources created around the average performance of corresponding on-premises infrastructure will be inadequate to handle spikes. It's far better to know the peaks of resource consumption throughout the day and ensure they're not obliterated by taking averages or risky measures that overstate quiet hours.

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- **Post-migration: Track and report —** In the new cloud environment, smart companies continue optimizing the balance between cost and performance. Within each service like Azure and AWS are production workloads, servers and a tenant with multiple subscriptions. What is the relationship between all of those services and the costs that they're generating each month? Just as in the data center, it's necessary to constantly review and assess resource allocation. In the cloud, that means ensuring that every VM costs the right amount each month.

The essence of a cloud migration strategy is to manage the environment by application services while knowing costs.

CONCLUSION: MIGRATE WHEN IT MAKES SENSE. NOT WHEN POLICY DICTATES.

Application migration to the cloud will never be as easy as cut-and-paste or lift-and-shift. While some IT groups are obliged to follow a defined, cloud-first policy, the policy is no guarantee that the migration will succeed, that performance will improve or that costs will fall.

The likelihood of a successful cloud migration increases with planning, to avoid the risks inherent to a move to the cloud, such as cost, performance, business impact and the limits of budgeted resources. Success depends on knowing what's in your data center to begin with and planning the architecture that will deliver applications and services at a similar or better level of performance as before.

ABOUT FOGLIGHT FOR VIRTUALIZATION

Foglight for Virtualization lets you visualize, analyze and optimize your virtual infrastructure. With Foglight for Virtualization, you can clean up waste and expose the impact of changes, both VMware- and user-initiated. Its support for multiple hypervisors lets you drive your organization's virtual and cloud migration strategy across VMware, Hyper-V and OpenStack. Plus, the monitoring, automation and real-time analytics in Foglight for Virtualization

complement other cloud migration tools by helping you detect waste and reclaim over-allocated resources, ensuring that you buy hardware only when necessary.

For end-to-end cloud migration planning, Foglight for Virtualization offers unmatched operational analytics for costs in the data center and combines it with a real-time marketplace with pricing for all available AWS and Azure instances (virtual machines). This allows you to develop cost models for your cloud migration in minutes instead of weeks.

By examining 365 days or more of data, Foglight analyzes the resource consumption and performance of a VM, factoring in peaks and troughs. As a result, Foglight is able to provide the best-fit, lowest-risk recommendations for any cloud, public, private, MSP or colocation scenario. To reduce risk even further, you can adjust the input to the Foglight migration engine to balance cost and performance as your needs dictate.

Foglight for Virtualization Cloud Migration Modeling quickly determines the best fit for your virtual machines based on the data you choose, the risks you accept and the cloud vendor you prefer. It provides details on how your costs and performance are likely to change after migrating to the cloud.

ABOUT THE AUTHORS

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Nick Cavalancia of Techvangelism is a Microsoft MVP for cloud and data center management. With over 25 years of enterprise IT experience, Nick is an accomplished consultant, speaker, trainer, writer and columnist. He has achieved industry certifications including MCSE, MCT, Master CNE and Master CNI.

You know all that effort you've invested in optimizing your on-premises environment? You'll need to invest it in optimizing for the cloud, too.

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