

Does My Application Belong in Public Cloud?

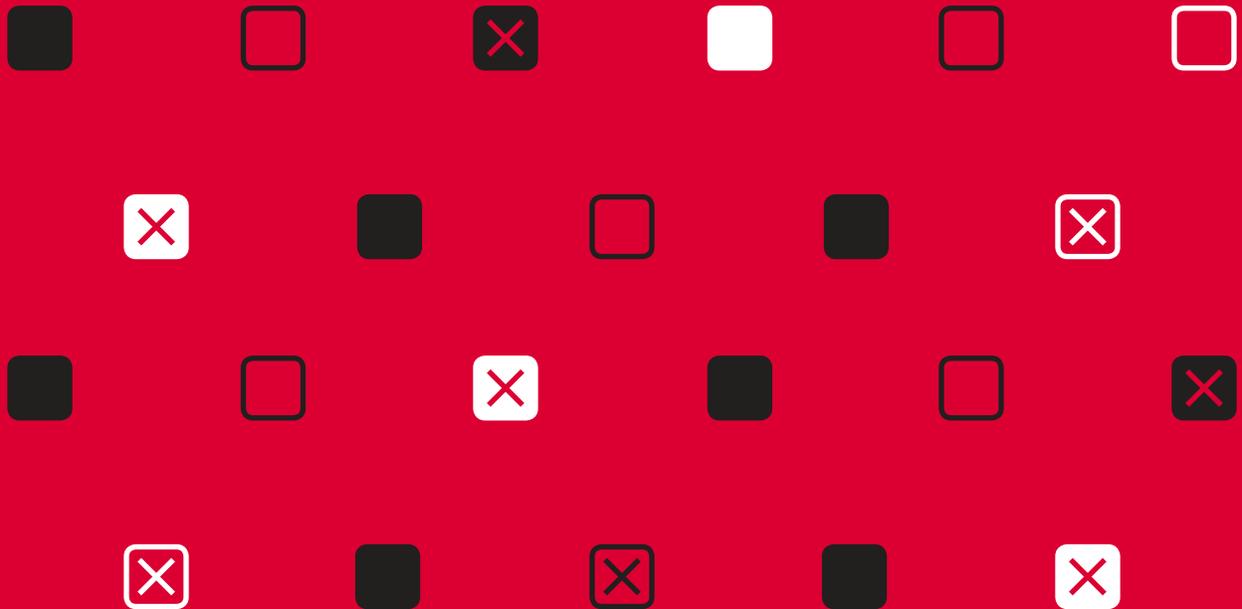


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Is Your Organization All in on Cloud?

So, word has come from on high that your company is all in on cloud. Your IT team may be subject to a new cloud-first corporate mandate—or you may have to pull off a mass migration to the cloud. But this isn't your first rodeo. You know from talking to your industry peers that careful planning and preparation will be needed to save you from certain “gotchas”. And the real effect—and cost—of that mandate is likely to be a little different than anticipated.

You need to ask yourself which of your company's applications actually belong in the cloud. If you move them to the public cloud, will they function well in terms of performance and cost? Can you quickly and effectively build an enterprise cloud foundation? If you've already asked yourself these questions, congratulations! You are ahead of the game.

Not Every Application Belongs in Public Cloud

It's a painful lesson that many companies have learned the hard way—that not every application is a good fit for public cloud. There are the obvious reasons like security and compliance requirements in certain industries. But there are also other less obvious considerations that are best identified upfront:

1. Re-writes.

Many enterprise applications were not designed with public cloud in mind—before they can be migrated they must be recoded, retested and refactored. That can add significant time and cost to a migration effort.

2. Resource utilization.

Applications such as relational databases assume the close proximity of compute, network, and storage resources to deliver the latency and performance required. If those applications are shifted to public cloud, resources like network bandwidth may become a bottleneck and certainly aren't “free” as they are on-premises. The result can be surprisingly high bills or, worse, outages that you have no control over.

3. Data gravity.

Akin to The Hotel California, you can check out any time you like, but you can never leave. Moving data and applications to public cloud creates a center of gravity that can result in lock-in, making it harder to reclaim those applications later on.

Before you contemplate any move to public cloud, you've got to closely examine the characteristics of your applications.

What Type of Application Is It?

The first and most important step in determining which applications belong in the cloud is to be aware that your applications fall into one of two general classes:

- > Traditional enterprise apps
- > Cloud-native apps



Traditional Enterprise Apps

This class generally includes the applications that were the mainstays of Enterprise IT before the cloud era. Examples include relational databases like SQL Server and Oracle, and the many other legacy applications that your business still relies on, whether commercial or developed in-house.

Enterprise applications often make assumptions about underlying infrastructure. For instance, they may have been configured to run in a particular virtual environment such as VMware or Hyper-V. They also tend to expect that data protection (DP), disaster recovery (DR) and other services will be provided outside the application.

Cloud-Native Apps

Cloud-native apps include web, mobile, and other applications that were designed from the ground up to run in the cloud. These apps are almost always designed to scale horizontally and to use resources elastically. They also don't assume much about the underlying infrastructure—including reliability and availability—and are designed with DP / DR designed into the application.

What Does This Mean for Cloud Planning?

Enterprise applications require careful consideration before moving to cloud, since these applications often benefit from the greater control that on-premises infrastructure provides. If you simply “lift and shift” these apps into the cloud, you may not be entirely happy with the results. It's worth understanding why this is the case (and why it may not always be a fair assumption).

Why “Lift and Shift” is a Bad Idea for Many Enterprise Applications

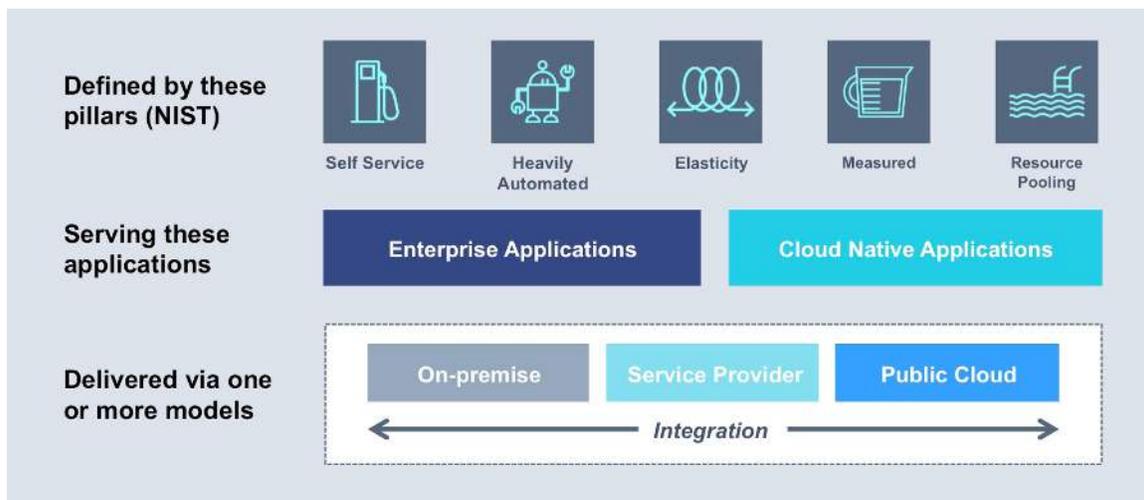
Lift and shift is the process of moving an enterprise application with minimal change to the cloud. Ideally, you'd just move an application with no changes, but that is seldom, if ever, possible. At a minimum, you'll need to implement new data protection and DR methods. In many cases, you'll have to do some coding, and you may have to refactor the application to run on cloud infrastructure. You'll certainly have to retest everything to make sure it continues to meet SLAs.

Even after you accomplish this, most enterprise applications end up being expensive to run in the cloud. The problem is that they aren't elastic. An application that needs four VMs and 2TB of storage may hold those resources 24 x 7 x 365 whether it's busy or not. Multiply that by 10s or 100s of applications, and the costs add up quickly.

More than one enterprise has been unpleasantly surprised by cloud costs for traditional apps. Unless an app is important enough to rewrite for the cloud, it may be better and more cost-effective to keep it on-prem.

Enterprise Cloud Offers Public Cloud Agility in Your Datacenter

It's probably obvious that cloud native applications need an agile environment—the ability to scale up and down quickly without administrator intervention. That can be delivered by public cloud, but many organizations are discovering that with the right infrastructure they can deliver AWS or Azure-like agility in their own data centers. That's called enterprise cloud, and it's illustrated in the following figure.



Five Pillars

At the top are established cloud pillars as defined by the National Institute of Standards (NIST): self-service, elasticity, resource pooling, and so on. Enterprise cloud provides all of these.

Enterprise and Cloud-Native Applications

The second layer is where enterprise cloud really begins to differentiate itself. An enterprise cloud must be able to run both traditional enterprise applications and cloud-native applications efficiently. An enterprise cloud provides the infrastructure and services needed to run both traditional enterprise applications and cloud-native applications in the same environment.

Multiple Delivery Models

Enterprise cloud does not have a singular definition: every enterprise will employ a variety of models according to individual need—a combination of private data center, public cloud, and cloud service providers. Being able to integrate between on-premises data centers, service providers, and the public cloud is a key element of enterprise cloud.

To deliver on the above capabilities, an enterprise cloud platform must provide:

- > Abstraction at the VM or container level to simplify management
- > Automation across the entire infrastructure, which is greatly enhanced by the right level of abstraction
- > Comprehensive APIs that facilitate easy integration, creating an extensible platform that you can build on over time

Strategic Projects Enabled by Enterprise Cloud

Enterprise Cloud brings agility to your data center, helping you work more efficiently. Here are three examples of what you can do with the time saved:

1. Experiment with new workloads:

Enterprise cloud is ideal for trying out new workloads such as DevOps, greenfield projects, non-production workloads, etc. In fact, experimentation is encouraged and expected.

2. Define SLA guidelines for cloud:

Don't defy physics. Certain workloads such as ERP applications may experience unacceptable performance degradation due to WAN latency when running in the cloud. This is an opportunity to define your performance SLAs for applications and set guidelines on what to run in the cloud.

3. Rewrite applications:

Take your time to break down existing applications into a "web services" for better application scaling, improved application responsiveness, or a reduction in development cycle time. But be realistic about the efforts and skills involved to rewrite an application and make sure there is truly a business benefit to be gained.

"MAP" Your Path to Success

Dividing your applications into enterprise versus cloud-native is just the first cut in deciding where an application belongs. For the second cut, there are three factors that provide deeper insight as to whether an application is better suited to the public cloud or on-premises, ideally as part of an enterprise cloud. This method applies to both enterprise and cloud-native apps. The three factors are:

- > Management
- > Agility
- > Performance

Management

For each application, it's important to ask whether or not the application requires a lot of IT oversight. Complex applications that require a lot of attention will be more cumbersome and costly to manage in the public cloud—especially at scale. On the other hand, an application that is easily managed by the application owner or line of business manager may be more suited to public cloud.

Agility

How agile is the application? Do you need to spin up and tear down instances on a regular basis? Does the application consume resources elastically, i.e., does it use a lot of resources during busy periods and very little at other times? Does the application run in a steady state, consuming the same amount of resources (possibly with predictable growth in consumption) day in and day out?

This is important because it has a direct impact on cost. Applications that use resources elastically are often a good fit for public cloud because they can get all the resources they need when they need them and you only pay for the resources when they are in use. Steady-state applications that have a lot of resources dedicated to them even when they aren't that busy can end up being very costly to run in the public cloud.

Performance

When it comes to application performance, the first thing you need to ask yourself is whether the performance of the application is important. If the answer is "no," you should rely more on the other two factors—management and agility—when deciding where an application belongs. If performance is important, then there are two additional aspects to consider:

- > Are the performance needs bursty (subject to spikes of intense activity) or steady-state?
- > Does the application scale horizontally or vertically?



Some applications have performance requirements that are very bursty. Examples include online retail applications subject to spikes in purchasing activity and virtual desktop infrastructure (VDI) with well-known boot and login storm behaviors.

If you have an application with bursty performance, how you satisfy that need depends on how the application scales. Applications that scale horizontally add resources to accommodate bursts. For instance, a cloud-native application may spin up additional instances as load increases. Applications that scale vertically, such as most relational databases, depend on having resources (CPU and I/O) pre-allocated to them to accommodate the largest bursts that are likely to occur.

The public cloud generally can't deliver the necessary performance for applications that scale vertically. Critical, latency-sensitive enterprise applications—such as databases and ERP systems—can usually deliver better performance on-premises at lower cost.

Below are a few examples evaluating common applications using the “MAP” approach.

IoT Analytics			
		Favors Public Cloud	Favors On-Prem
Management	Low overhead	✓	
Agility	Real-time response	✓	
Performance			
Importance	Low	✓	
Bursty or Steady?	Bursty and unpredictable	✓	
Scaling	Horizontal	✓	
BOTTOM LINE		PUBLIC CLOUD	

SQL database used by the finance department			
		Favors Public Cloud	Favors On-Prem
Management	Complex		✓
Agility	Low resource elasticity		✓
Performance			
Importance	High		✓
Bursty or Steady?	Predictable bursts		✓
Scaling	Vertical		✓
BOTTOM LINE			ON-PREM

Agile CI/CD used by DevOps			
		Favors Public Cloud	Favors On-Prem
Management	Low overhead		✓
Agility	Real-time response	✓	
Performance			
Importance	Low		✓
Bursty or Steady?	Bursty and unpredictable		✓
Scaling	Horizontal	✓	
BOTTOM LINE		ENTERPRISE CLOUD	

In these examples, the first would clearly be suited for public cloud while the second is better suited for on-premises deployment. Note that any of these examples can be accommodated in an enterprise cloud. The third has characteristics that would be difficult to accommodate in either public cloud or a traditional data center, making enterprise cloud the ideal choice.

How Do You Know When It's Time to Move an Application Back On-Prem?

There are three triggers that indicate it may be time to move an application back on-premises:

Performance degradation.

If an application performs poorly or unpredictably, or users are constantly complaining, that's a sign that the application is not well suited for cloud.

High resource utilization.

If an application is using consistently high compute, storage capacity, and/or network bandwidth—and driving up cloud costs—the application probably isn't elastic enough to deliver good cloud economy.

Complex management.

If a stakeholder such as a DevOps team or line of business is struggling to manage policies or performance in the cloud you may be better served moving the application back on-premises.

Prepare in Advance and Proceed with Caution

According to a recent IDC study, "82.8% of respondents have moved compute and/or storage services out of AWS in the last 12 months, with the largest migration back to on-premise¹. Why? In most cases, the public cloud simply didn't deliver on their application needs. Unpredictable performance and spiraling costs were key contributors.

Industry analysts expect on-premises IT to co-exist with public cloud for a long time to come. Smart IT teams are taking a thoughtful approach to application placement to optimize resources and cost.

Consider the approach described here when deciding where applications should live, and look to enterprise cloud as a solution that supports the needs of both enterprise applications and cloud-native applications. If you need the agility of public cloud, but you need closer control of cost and performance, there is a huge advantage to building out an enterprise cloud.

¹IDC, 2016 Amazon Web Services IaaS Compute Usage Trends, Doc # US41577816, July 2016