

Application Migration to the Cloud – Challenges and Best Practices

This blog will talk about application migration to the cloud, specifically:

- What is application migration to the cloud
- Steps for migrating applications to the cloud
- The challenges of migrating mission-critical applications to the cloud
- Signs it is time to improve your cloud strategy
- The benefits of using the Silk Platform

What is Application Migration to the Cloud

Application migration to the cloud is the process of moving a software application from an on-premises server to a cloud provider's environment. The cloud migration process includes transferring the database, data, application, and IT processes to the cloud.

The Steps for Migrating Applications to the Cloud

The first step is to take stock of your application portfolio. Some applications may be low-hanging fruit and quick wins in the cloud, while other applications will require refactoring or redesign ahead of cloud migration or special services on top of cloud native infrastructure to meet demanding requirements for performance or security. As we will discuss below, you will need to consider the cost of running and managing each application on-premises compared to the cloud. At the end of the day, the most effective environment for each application is typically based on cost, performance, and security, and there may be other considerations, such as ease-of-use or advanced services and features.

Step 1: Identify the Application and Assess its Cloud Readiness

Once you have identified a candidate application for cloud migration, take a look at its cloud readiness, including the application architecture, its dependencies on other systems and the underlying operating system, hardware, storage, and backing services, and its data and workload requirements. Consider how much

data will need to be moved to the cloud. Keep benchmarks of workload performance on-premises that can be compared to trials in cloud environments.

Step 2: Are Application Updates Required to Migrate to the Cloud?

When assessing the application for cloud readiness, you may decide to:

1. Refactor the application for the cloud
2. Lift and shift the application to the cloud
3. Modernize the application with containers

A description of each approach and when to consider it is below. Note that #1 and #3 may sometimes overlap and be the same.

Refactoring – or rewriting – an application for the cloud is the recommended approach by public cloud vendors. The goal of refactoring an application is to take advantage of the features and functionality specific to native cloud computing environments. Your application will run faster and be more cost-efficient in the cloud, while your developers can leverage new cloud capabilities that can increase speed, flexibility, and quality. However, refactoring an application, while maintaining all of your rich features and high customer experience, can take years depending upon how complex the application is. Also, the cost, risk, and chance of failure are high. Keep in mind that shifting data from one public cloud to another, or back to on-prem, may require a rebuild and there is the potential to be locked-in to a single vendor.

Lifting and shifting is the process of copying your application (installer and file system data) and reinstalling it in the cloud on a platform (typically Windows or Linux). Lift and shift is faster and presents less risk and cost than refactoring, but you may not get the features and scalability that come with native cloud.

Containers can help you gradually migrate an application to the cloud without needing to refactor the entire application ahead of cloud migration. Containers allow you to lift and shift some of the application components while refactoring others to reduce Time to Mitigation (TTM), cost, and risk.

A container is an executable unit of software in which application code is packaged along with its libraries and dependencies so the application can be run anywhere. Containers encapsulate only the runtime code required by your application. You can self-execute these containers without maintaining the overhead of running the whole environment. If you need additional features from the application, you can access them through a shared common library.

Remember that not every application should leave the enterprise data center and migrate to the cloud. Pay special attention to applications that are mission-critical, have high throughput, require low latency, or have stringent data residency requirements.

Step 3: Do a Cost Assessment and Review the Benefits Driving Cloud Adoption

Now armed with an understanding of the application's cloud readiness and the approach to cloud migration, it is time to do a cost assessment of running the application on-premises vs. the cloud. This includes the time and effort it takes to refactor or update the application for cloud migration. You will need to look at your investments in hardware infrastructure and software and their associated costs, and the cost structure provided by cloud vendors. Compare the performance and cost of workloads running on-premises vs. in the cloud.

Also, and importantly, take an inventory of the business benefits driving cloud adoption.

Step 4: Identify the Right Cloud Environment

Enterprises have more than one cloud environment to choose from:

- Public cloud – Access compute resources via the internet and shared across organizations
- Private cloud – Access compute resources via the internet or private internal network and not shared across organizations
- Hybrid cloud – Mixes public and private cloud models
- Multi-cloud – Uses more than one public cloud vendor

As you consider the cloud environment for the application, also consider how well it will perform once it is migrated. Without proper planning, a migration could degrade workload performance and lead to higher IT costs which negate the benefits of migrating the application to the cloud.

Step 5: Identify the Right Cloud Service Provider and Make the Move

The big Cloud Service Providers (CSPs) are Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), Oracle Cloud, and IBM Cloud Services. Note that no two CSPs are the same. When evaluating which CSP to use, you will want to evaluate the options that each provider offers and how they support your business plans.

Factors to consider include (as borrowed from a tip on [Cloud Industry Forum](#)):

- Certifications and standards
- Technologies and service roadmap
- Data security, data governance, and business policies
- Service dependencies and partnerships
- Contracts, commercials, and SLAs
- Reliability and performance
- Migration support, vendor lock-in, and exit planning
- Business health and company profile

Be prepared to monitor cloud bills to avoid unexpected surprises.

The Challenges of Migrating Mission-Critical Applications to the Cloud

Enterprises have been willing to dip their toes in the cloud by migrating applications that are not mission-critical, saving their “crown jewel” applications for a future round of cloud migration. This allows the enterprise to start taking advantage of cloud benefits without exposing themselves to unnecessary risks by running mission-critical or line-of-business applications in an environment that does not fully match the feature/functionality, resilience, or performance of their on-prem production environments.

When it comes to mission-critical workloads, concerns about performance (IOPS, throughput, and latency) cause enterprises to pause and evaluate their options. Public clouds can only guarantee certain levels of IOPS and latency requirements. Sometimes, IT leaders discover that their applications do not work as well in the cloud as they did on-premises.

Unpredictable cloud bills have also proven to be a challenge, and performance is a major lever driving up cloud spend. In addition to the complexity of migrating mission-critical applications, there are real concerns about performance and cost.

Signs That It's Time to Improve Your Cloud Strategy

Performance issues

If you migrated an application to the cloud and now experience unstable performance or long wait times, it is time to improve your cloud strategy. Perhaps, for agility reasons, you moved a mission-critical workload to the cloud

and it needs higher performance than it is receiving, or maybe your workload previously ran as expected, until the amount of data grew, and changes were made to the workflow. Take a look at where your workloads live to determine if there is a way to increase performance ahead of making a move to another environment.

Unpredictable cloud bills

If cloud bills have become unpredictable and leave you with sticker shock, it is time to revisit your plans for cloud governance and cloud spending. If you are pushing for high levels of performance, you will pay for it. As your capacity in the cloud increases over time, whether it's from growth of data or data clones and snapshots taking up space, it will increase your cloud bill. There are many tips for reining in cloud spend. In “[**Control the cloud spend and avoid unexpected costs,**](#)” TechTarget advises there is a learning curve to avoid overspending after a migration or cloud-native deployment. Increased costs do not have to be permanent. The article expounds upon four tips, including:

- Account for cloud computing costs
- Pinpoint application performance issues
- Minimize cloud scaling costs
- Avoid wasteful spending

The Benefits of Using the Silk Platform

Our company, Silk, works with enterprises migrating mission-critical applications to the cloud. The Silk Platform is a virtualized layer that sits between your full application stack and cloud infrastructure to supercharge your databases – giving you 10x the performance compared to cloud native environments and saving you 30% on cloud costs.

Users have the ability to natively move data to other substrates and to cloud providers without the need for any reengineering, reformatting, or rework.

The benefits of using the Silk Platform include:

Performance – Silk offers consistent low latency combined with high throughput data performance for mission-critical applications. With a cost model that doesn't link performance and capacity, you never have to worry about paying for capacity you don't want to achieve the levels of performance you need.

Advanced data services – Silk offers a rich data services stack comprised of real-time data reduction, instantaneous zero footprint clones, data at rest encryption, FIPS 140-2 compliance, and native replication services built on a symmetric active-active highly scalable true Tier 1 enterprise-class software defined architecture. Silk customers save an average of 30% on their cloud bills thanks to gains from performance and rich data services.

Data mobility for hybrid cloud – Silk gives you the flexibility to leverage workloads on the infrastructure that makes the most sense for you, while allowing you to take advantage of all the benefits your environments of choice offer. By decoupling the data from the underlying infrastructure, the Silk Platform provides easy mobility of data between different environments. There is no need to refactor or pick and choose which components to migrate. Yet you get the full functionality and benefits of the public cloud as though you were going cloud native.

Resiliency – The Silk platform provides no-single-point-of-failure architecture, full availability covering zone or region outages, and cross-cloud availability. You can implement effective disaster recovery or business continuity strategies as systems are resilient and self-healing, recovering automatically from hardware failures.

Take a look under the hood at [Silk Platform architecture](#). You can contact us anytime to discuss your application migration needs.

About the Author