The Blueprint for Cloud Success 2023 Strategic Planning

THE BLUEPRINT FOR CLOUD SUCCESS

ABSTRACT

In this paper, we will highlight the importance of a multi-cloud strategy which includes the right mix of on-premises as well as off-premises investments based upon application and business requirements. This paper will outline the various approaches to cloud migration including the pros and cons such as: "lift and shift", and "resize and rehost" vs "re-factor, re-platform and rewrite". It will also delve into the topic of technical debt, which organizations have accumulated as a result of virtualization (Debt is accumulated when the software upgrade cycle is not in sync with the hardware upgrade cycle) and how it can impact cloud adoption. This paper will outline use cases that are suitable for public cloud as well as the trend of repatriating workloads from the public cloud when applications are better served by private or hybrid deployments. Finally, the paper will disclose best practices for driving successful cloud adoption leveraging both existing virtualizations as well as the emerging container strategies for enabling a true multi-cloud operating environment. This will include real-world statistics-based work with organizations in SMBs, mid-market and large enterprises.





INTRODUCTION

Spending on cloud computing in 2020 grew 33% with cloud services now accounting for \$142 Billion of total technology spend.¹ With cloud now approaching 20% of overall global IT spend, the trend is clear, organizations of all sizes are embracing cloud computing. Cloud computing provides a transparent and consistent operating model which is viewed as superior to traditional IT operating environments. Cloud computing promises agility and scalability not available in traditional IT operating environments. Cloud computing also comes in various forms: private, public, and hybrid. Cloud computing is an operating model, not a target state.

A LOOK BACK AT RECENT HISTORY THE RISE AND FALL OF THE CLOUD-FIRST STRATEGY

One of the more interesting developments over the last few years was the rise and fall of the cloud-first strategy. A cloud-first strategy is often viewed as an edict that all application workloads should be migrated to public cloud. This approach towards modernizing IT operations has not delivered the value and benefits organizations expected.

First, not all applications are best suited for cloud deployment. A variety of factors including user demographics, service level, security concerns, technical dependencies and financial drivers impact the business case when determining if an application is suitable for cloud deployment.



Second, establishing a cloud-first strategy can result in a lack of accountability to present a business case for change. The mandate should be to optimize your spend and to lower your risk, not to solely migrate your workloads. A cloud-first strategy can result in increased costs, unforeseen risks, and unpredictable results.

The majority of surveyed organizations reported unexpected costs when migrating all of their applications to public cloud.²

To avoid the issues commonly associated with a cloud-first strategy, organizations should consider an alternative approach to cloud adoption. Organizations should analyze their current IT portfolio to determine which applications will have near-term and/or long-term benefits from hybrid cloud deployment. Application workloads should be prioritized for treatment and migration to a cloud-based platform based on the level of effort as well as expected benefits. Each application will fit somewhere in the continuum of resize, rehost, replatform, refactor, retire, rewrite or retain.

APPLICATION TREATMENT	APPLICATION TREATMENT OUTCOME
Resize	Reduce or add capacity based upon workload utilization needs
Rehost	Migrate the workload to a new Infrastructure as a Service (IaaS) or Platform as a Service (PaaS) execution venue
Replatform	Upgrade legacy hardware and operating system environments to enable cloud deployment
Refactor	Repackage or re-architect the application workload to take advantage of Containers and Platform as a Service (PaaS)
Retire	Eliminate application workloads no longer in use
Replace	Migrate workloads better suited for Software as a Service (SaaS)
Rewrite	Invest in the development of a cloud native Application
Retain	Leave application workload in current configuration and in its current execution venue

Furthermore, a repeatable process should be implemented. Intelligent workload placement requires an assessment of an organization's tolerance for change and aligns to an organization's priorities to grow revenues, improve profitability and lower risks. Without having a repeatable process for making workload placement decisions organizations are putting their applications at risk.



"While cloud-native application development is an integral component of an organization's digital transformation, the reality is that not all applications have a business case to be rewritten. A successful DevOps practice needs to embrace agile approaches to evolving applications over time as well. This includes resizing, replatforming, refactoring, and rehosting applications to make them suitable for cloud." Ethan Michaud: Managing Director, DevOps - Moody's

Application Portfolio Remediation Workflow

The following workflow is to be followed to deliver continuous optimization



Furthermore, a repeatable process should be implemented. Intelligent workload placement requires an assessment of an organization's tolerance for change and it aligns an organization's priorities to grow revenues, improve profitability and lower risks. Without having a repeatable process for making workload placement decisions organizations are putting their applications at risk.

their lifecycle

REPATRIATION IS A THING

(PaaS), or Software as a

Service (SaaS)

As many organizations have rushed to "lift and shift" their workloads to the public cloud, they have begun to discover that the economics of public cloud is not always better than the economics of a well-run data center. The transparency of public cloud pricing has created the illusion that the public cloud is less expensive compared to a traditional well-run data center.



In practice, the public cloud is less expensive for certain use cases. The economics of public cloud makes great sense for ephemeral workloads (e.g. development, testing, and disaster recovery), data archival, and small compute configurations. That said, public cloud can also be up to two times the cost of the unit economics available in a data center. This is especially true for workloads that require constant access and continuous use (e.g. production) with high levels of security and service level requirements.

82% of organizations surveyed leveraged a "lift and shift" approach to public cloud migration has experienced increased costs.²

The economics of cloud depends on a business' scale and IT purchasing power. As the purchasing power of an organization increases the economics of operating data centers becomes much more competitive with the unit economics of public cloud. For very large organizations, the unit economics of the data center can be more attractive than the comparable costs in public cloud.

As organizations have internalized the true cost to operate their workloads in the public cloud, a trend has emerged to repatriate public cloud workloads back into their data centers. Repatriation is the scenario where a workload is created in or migrated to cloud only to be migrated back to the organization's data center.

Unexpected costs are not the only drivers for repatriation in the market. Service levels and security gaps are also driving repatriation. This is not an issue with the capabilities of public clouds per se, the problem is organizational maturity, not public cloud capability. Business units and IT organizations are underestimating the people and process changes necessary to operate cloud environments effectively. Today organizations lack technical and business operational maturity in the public cloud environment with the internal IT skill sets that are trained for inhouse data center deployment and management. Over time organizations will get better at delivering high levels of service and ensuring secure operations in the cloud.

Repatriation is not always a negative outcome. Repatriation can be an expected outcome in a healthy cloud computing operation. One of the greatest benefits of the public cloud is the speed with which new products and services can be prototyped. Advanced cloud operators leverage the public cloud as an inexpensive way to design and deliver new services quickly. This gives a "time to market" advantage as well as limits invested capital in ideas that have yet to be proven viable. New services that prove to be viable in the market can continue expanding in public cloud to scale or relocate to private alternatives. The unit economics, service level, and security capabilities of mature data centers are still very compelling. The decision to move often comes down to the cost of relocation and a comparison of relevant features between venues.



TECHNICAL DEBT IS HOLDING YOU BACK

While all organizations are excited to achieve the benefits of the cloud model, especially the promise of agility, many organizations underestimate the level of investment and costs associated with making their application workloads cloud ready.

Over the last 10 years, virtualization has disrupted the way organizations deploy and manage applications in on-premises data centers. The benefits were clear: higher utilization of IT capacity resulted in a lower total cost of ownership. As such, the vast majority of organizations operate the majority of their applications in a virtualized environment.

One unforeseen consequence of the extremely successful adoption of virtualization in the data center is the impact of virtualization on the software lifecycle. Before the widespread use of virtualization technologies, organizations would upgrade their hardware and software as an integrated process. Post virtualization, it was no longer necessary to upgrade your software when you upgraded your hardware. This has resulted in many organizations accumulating significant technical debt as software updates were no longer a mandatory component of refreshing the underlying hardware.

Delaying software updates creates significant risks for an organization. As software approaches end of life, the software manufacturer offers fewer security patches and updates. Furthermore, when software is unsupported, the software manufacturer stops providing security patches and updates altogether. Therefore, a continuous process of software upgrades is essential for minimizing the potential for and impact of cyber security threats.

The majority of companies interviewed reported 60-70% of their operating systems were either running an unsupported or soon to be unsupported version. $^2\,$

A second unforeseen consequence of virtualization adoption in the data center is the impact of virtualization on the hardware upgrade cycle. Virtualization provides greater levels of reliability and availability by abstracting the software layer from the hardware layer in technology deployment. As hardware ages, it becomes less reliable. Prior to virtualization, organizations would regularly refresh their hardware on a three to five-year cycle to prevent outages caused by aging hardware. Post-virtualization, organizations have been able to extend the usable life of their x86 hardware beyond a typical refresh cycle by using the virtualization platform as a mechanism to keep software running even when underlying hardware ages and hardware failure rates increase.



While leveraging virtualization best practices does help organizations avoid the risks associated with a hardware failure becoming a business outage, delaying hardware upgrades do put an organization at risk. Refreshing hardware regularly ensures an organization benefits from the security, performance and reliability enhancements that are continuously being introduced into the market by hardware manufacturers.

The current generation Intel Xeon scalable processors optimized for both public and private cloud deliver up to two times the performance of prior generations for analytics and database workloads.³

Virtualization is not the only source of technical debt. Many organizations are also running significant business-critical workloads on legacy physical x86 and non x86 platforms. These legacy platforms tend to be more expensive when compared to cloud alternatives but are also extremely reliable and highly performant. The catalyst for change in these environments is more often business risk than cost.

In addition, the mainframe and midrange systems implemented in the 1980s and 1990s were delivered on proprietary hardware architectures and platformspecific software. The lack of open standards and modern software frameworks make it difficult to maintain and support these systems as the world has moved to open and extensible application architectures. Furthermore, the greatest risk comes in the form of a lack of available skilled resources to operate these environments moving into the future. As such, most organizations must find ways to lessen their dependence on these legacy platforms and must proactively eliminate this technical debt from their business operation.

Paying down your technical debt requires a well-thought-out strategy that balances quick wins with long-term investments. Technical debt has been accumulated over decades of technology adoption and evolution. This debt will not be eliminated in a calendar quarter and it could take considerable time and planning to eliminate. In addition, the acknowledgement that technical debt will be an ongoing issue is critical to a business's long-term success. A debt reduction plan needs to be a continuous process. If organizations are not proactive, the debt they eliminate from their traditional IT operation will reappear in their cloud environment.



Modern software runs best on modern hardware. Waiting too long to refresh hardware or avoiding regular upgrades to software adds risk to the security and performance of an organization's workloads while also delivering suboptimal total cost of ownership. It is important to understand the benefits of modernizing hardware and software together in both private and public cloud.



Paying down your technical debt requires a well thought out strategy that balances quick wins with long-term investments. Technical debt has been accumulated over decades of technology adoption and evolution. This debt will not be eliminated in a calendar quarter and it could take considerable time and planning to eliminate. In addition, the acknowledgement that technical debt will be an ongoing issue is critical to a business' long-term success. A debt reduction plan needs to be a continuous process. If organizations are not proactive, the debt they eliminate from their traditional IT operation will reappear in their cloud environment.

LOOKING FORWARD DATA-DRIVEN DECISIONING

Moving forward, more organizations will acknowledge that the complexity and variability associated with making cloud decisions requires a data-driven decision making process.



Historical approaches to technology procurement and operations are being disrupted by the proliferation of infrastructure, platform- and software-as-a-service (SaaS) alternatives available in the market. There is now an array of options to consider ranging from modernizing the data center to hosting applications in co-location or regional data center providers, to leveraging public cloud services.

Each venue presents its advantages and disadvantages concerning agility, economics, service level, and security. Organizations will need to invest in defining their blueprint for multi-cloud operations which includes both governance of supplier use as well as policies that guide desired business outcomes.

Organizations will need to develop policies and procedures that govern the use of supplier offerings. One of the greatest advantages of utilizing the public cloud is the ability to quickly procure, provision, and operate technology workloads. This agility also presents a risk to the business. The consumerization of IT service procurement and operations makes it easy for a line of business to launch a new service without considering the impacts associated with supplier proliferation, compliance, audit, and long-term total cost of ownership. With a welldocumented policy governing cloud usage, a business can provide the agility desired without adding risk to the business operation.

"As adoption of public cloud accelerates, organizations must dedicate resources to govern public cloud consumption to ensure a compliant and secure operating environment. Organizations should also integrate workload placement and code execution venue decisioning into their DevOps pipelines and continuously analyze their cloud environments to rapidly identify and remediate security risks." Charles Gautreaux: CTO, Cloud Services - AIG

A strategy must be built to continuously evaluate opportunities to achieve an agile, secure, and high performing IT operating environment. Many organizations are beginning to discover that while the offerings, as well as associated service operations in the public cloud, are consistent, performance, security, and capabilities do vary across data centers for each provider. It is not uncommon for performance to vary significantly across data centers for the same service. As such, organizations need to adequately execute performance testing of their applications in the venue where they plan to deploy to ensure quality. In addition, certain security and technical capabilities are only available in certain geographic regions. Therefore, to be successful in making sound workload placement decisions you must be aware of the variability of service level, security, and technical capabilities across provider data centers and providers.



The most successful organizations implement a continuous process of discovery and analysis to ensure maximum value for their technology spend. Organizations need to invest in automation and tools that will help to drive a consistent experience across public and private cloud data center operations.



Delivering Continuous Optimization of Technology Spend

The following workflow is to be followed to deliver continuous optimization

BALANCING THE IT BUDGET

Transparent pricing continues to be a driver for cloud growth. The consumptionbased pricing provided by the public cloud is an alternative to traditional IT pricing. Consumption-based pricing allows for greater transparency into the unit economics of the IT spend. Cloud pricing also eliminates the need for upfront capital investment, making it more attractive when compared to traditional onpremises cost models.

Developers and line of business application owners alike prefer the transparency of public cloud but are also finding it difficult to predict their ongoing costs due to the frequency with which public cloud pricing changes.

In 2018, the top 3 public cloud vendors by revenue (Amazon, Azure, and Google) changed their pricing 150+ times, increased the number of infrastructure and platform options to choose from by 475.96%, introduced multiple new licensing models, opened 22 new data center regions, and added support for more than a dozen new security certifications.⁴



The public cloud market moves fast. As such, it has proved challenging for organizations to predict their future public cloud spend as well as manage their current spend. While the pricing of the public cloud may be transparent, the variability and complexity associated with consumption-based models available in the market are confusing to the consumer long term. To deal with these challenges, organizations must implement spend management and continuous spend optimization strategies to ensure the business receives the best value for their IT spend.

The economics of traditional IT lacks transparency and, while it is not nearly as variable or complex as the public cloud, it is also expensive when compared to cloud alternatives. That said, there is tremendous potential to deliver both transparency as well as improved economics in the data center.

First, organizations must begin adopting a software-defined data center architecture powered by hyper-converged infrastructures to drive down the costs to operate application infrastructure in the data center. Hyper-convergence eliminates unnecessary costs associated with integrating and operating disparate storage, networking, and compute environments.

Second, organizations should begin to embrace pay-as-you-go pricing onpremises. Many of the hardware and software OEMs now offer this model as an alternative to large upfront capital investments traditionally associated with a technology refresh. Embracing consumption-based pricing in the data center will showcase the lower-cost unit economics available in the data center when purchasing or leasing technology at scale.

MULTI-CLOUD IS THE FUTURE

As organizations reduce their technical debt, improve the economics and cost transparency in the data center, and establish best practices for making workload placement and optimization decisions they will uncover the right mix of onpremises and off-premises technology investments. The data shows that most organizations will operate in a multi-cloud environment leveraging the best that private and public cloud can afford.

To succeed with a multi-cloud strategy, organizations will need to invest in packaging, automation, and tooling that provides continuous optimization through intelligent workload placement and decouples applications from the infrastructure that supports them. Another significant trend moving forward is the adoption of containerization as a multi-cloud enabling technology.



Containers are providing an abstraction layer on top of the multi-cloud infrastructure that enables consistent and reliable execution regardless of the venue from which the containers run. This technology is the next innovation in a line of evolution that decouples the application from the data center where it is executed. Containers present the opportunity to make an application portable thereby eliminating the potential for cloud service provider lock-in.

A sound multi-cloud strategy also ensures the right competitive motivation in the market. While empowering your business with agility and choice, a business with a multi-cloud strategy ensures there is enough competition in the market to ensure that suppliers continue to innovate and price their offerings competitively.

When implemented correctly, a multi-cloud strategy will deliver a consistent experience regardless of where a data center is located and who operates that data center.

CONCLUSION

Cloud computing is an operating model, not a target state. The path to a successful cloud operation starts with an honest assessment of an organization's readiness to embrace the changes required to receive the benefits cloud can afford. This journey may take several months or years depending on the size and complexity of the organization and its existing investments in technology. Once correctly implemented, a multi-cloud strategy will improve the unit economics and agility available in the data center while also driving intelligent use of public cloud services.

Here are actionable recommendations to ensure cloud computing success:

- Focus on assessing application workloads and their dependencies not on infrastructure. Each application should have a treatment plan that includes some combination of recommendations to resize, rehost, refactor, replatform, rewrite, retire and retain.
- Implement a workflow to continuously assess and optimize technology investments. The workflow should provide a decisioning framework for both new workload placement as well as optimization of existing deployments
- Execute a program to assess and eliminate technical debt. The program should prioritize both lightweight and heavyweight transformation targets to deliver long-term reduction in risk and improvement in the total cost of ownership
- Establish governance around public cloud usage to ensure a compliant and secure operating environment. This includes an investment in tooling and automation to integrate workload placement and code execution venue decisioning into DevOps pipelines.
- Invest in packaging and automation solutions that decouple applications from the underlying infrastructure that supports them. To realize the full benefits of multi-cloud, application workloads must be portable across execution venues.





ABOUT CLOUDGENERA

CloudGenera provides vendor-agnostic information technology analysis that allows organizations to choose the technology solution that best fits their needs. Headquartered in Charlotte, North Carolina, CloudGenera is one of the fastest growing technology companies in the United States and is internationally recognized as a thought leader in cloud transformation. The company's highly visual software automates cloud decisioning for a clear view of available private, hybrid, and public cloud solutions, eliminating costly and error-prone manual evaluation methods and speeding enterprise time to digital transformation. With CloudGenera, some of the world's largest organizations have transformed their technology operations to realize the business benefits of cloud. For more information, please visit www.cloudgenera.com

¹ Canalys calculates 2020 public cloud spend to be \$142B

² CloudGenera surveys public, private, and government organizations, analyzing 100,000 plus application environments annually to calculate current and future state costs to determine the return on investment from cloud migrations.

³ Intel Xeon Scalable Performance Claim:

https://www.intel.com/content/www/us/en/processors/xeon/scalable/software-solutions/xeon-scalable-enterprise-solutions-infographic.html

⁴ 2020 statistics referenced in this paper were compiled and analyzed by CloudGenera CloudResearch. CloudGenera CloudResearch continually analyzes the qualitative and quantitative capabilities of 400+ cloud service provider catalogs worldwide.

