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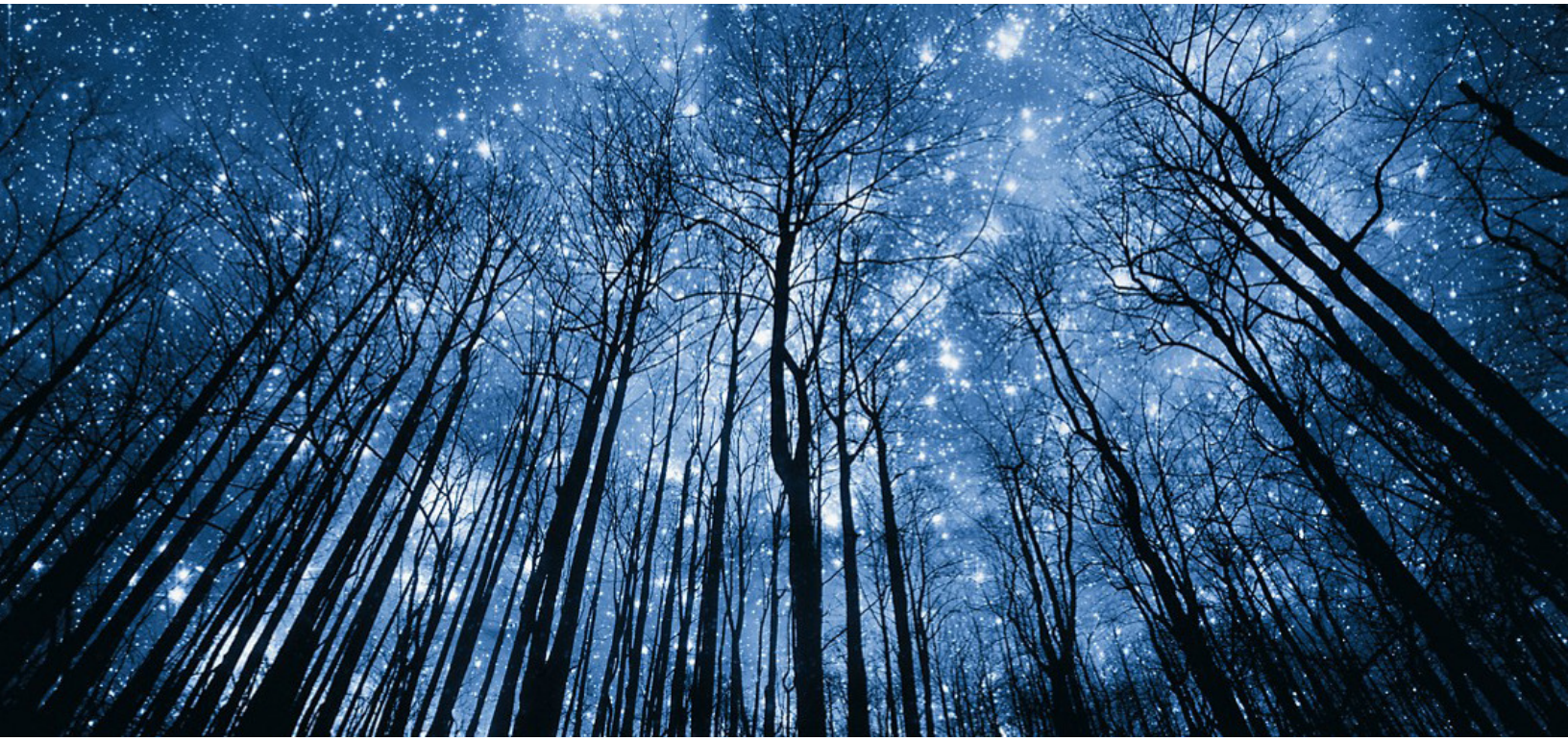
CLOUD HOSTING: TO REPATRIATE OR TO RE-EVALUATE



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Abstract

To survive in the dense jungle of the market, one must continuously compete and innovate. No longer is it a norm but it has become a ‘tech trend’ for the past few years. It is a necessity for companies today to migrate to the cloud if the business wants to maintain its standing among its peers. However, it is not all roses in this utopia. Sure, the cloud comes with excellent security, ease, and simplicity – but once a company reaches scale, the operational costs of maintaining cloud resources skyrocket. Just like how cloud computing took the market by storm, recently cloud repatriation has become a hot trend.

This paper intends to cater to the audience with more awareness about various sized businesses migrating off the cloud while capturing the below information.

1. Cloud and its Benefits
2. The mirage of the cloud
3. What is Cloud Repatriation
4. Why migrate off the cloud?
5. Companies and their reasons
6. When to Repatriate OR to Re-Evaluate

Introduction

The business world is at the stage of massive digital reform. If you have a service, online presence is a necessity. No longer does word-of-mouth or an advertisement in the newspaper travel faster than a campaign done on the Internet. In this new era of startups and large investors, any business can climb the ladder to become an enterprise-sized mogul in the industry. However, this brings us to wonder, with the day-to-day increase in footfall of customers, where is all this data going? Storage is not boundless, will the technology we utilize today be enough to hold the data of tomorrow? We need to understand what the reality behind the curtain of the technologies we use today is like and how truly limitless they are. To be able to continuously innovate and grow, we need to know how to optimize technology to the best of its capability.

Cloud and its Benefits

That is where the familiar term 'cloud hosting' comes in. It refers to the practice of storing and running computer applications and data on a network of remote servers, as opposed to hosting them on a single server or a personal computer. These remote servers are connected to the Internet and are managed by a cloud service provider. This allows for increased scalability, flexibility, and cost efficiency because resources can be easily scaled up or down as workload demands change. Businesses pay only for the resources they use, providing secure ways to access the resources they need to operate and expand.

The Mirage of the Cloud

With technologies such as 'cloud computing,' many significant possibilities can be expected. With all the incredible features of hosting one's workload completely on the cloud, it starts to sound too good to be true at some point. Sure, it is a popular method of hosting websites and applications adopted by tech giants worldwide. However, this method also has several disadvantages. One of the major factors is the limited control users have over their infrastructure. Businesses must depend on their service providers for regular maintenance and updates, which can be problematic if providers experience technical difficulties or outages. This may lead to website or application downtime, which can be costly for businesses that rely solely on their online presence to generate revenue. Another disadvantage is the security concerns associated with storing sensitive data in the cloud. Data stored on remote servers that are not under direct business control can be vulnerable to hacking and other cyber-attacks. In addition, businesses

may be at risk of data breach or loss if the cloud provider experiences a security incident. Cloud hosting also has limited uptime, which can impact the availability of a business website or application, causing lost revenue and damaging the company's reputation. Pay-as-you-go is a very promising feature when it comes to technology that requires scaling. However, this can also be challenging because it is difficult to predict costs as usage increases, which can lead to unexpected expenses. Another potential issue with cloud hosting is the risk of vendor lock-ins. Once a business becomes heavily invested in a particular cloud provider's service, it may be difficult to switch to another provider without incurring significant costs or disruptions. This can limit a company's flexibility and make it difficult to adapt to changing market conditions and technological trends. Finally, cloud providers may offer limited customization options, which can make it difficult for businesses to meet the specific needs of their websites or applications. This can limit a company's ability to innovate, making it difficult to remain competitive in the industry.

What is Cloud Repatriation

In 2021, the trendy concept of" Cloud Repatriation,' supported by many news articles, became known from varying-sized companies and organizations. Let us understand this point before delving into what and why. Essentially, it is a process of moving data, applications, and other resources that have been stored and managed in a cloud environment back to on-premises or in-house infrastructure. This trend has been gaining popularity in recent years as companies and organizations seek to regain control over their data and improve security, compliance, and performance. The reasons behind a business repatriating a cloud platform include operative expenses, compliance, performance, the high possibility of an outage, and vendor lock-in.

Why Migrate off the Cloud

David Heinemeier Hansson's (co-founder of 37signals) blog post 'Why we're leaving the cloud' blew up in the cloud computing scene when it came out in October 2022. Running their Basecamp and HEY, sub-companies of 37signals, for the last decade, they had concluded "Renting computers is (mostly) a bad deal for medium-sized companies like ours with stable growth. The savings promised in reduced complexity never materialized. So, we're making our plans to leave." Having run extensively on GCP and AWS, Hansson went ahead to further elaborate that there were two clear advantages of hosting on the cloud. First, running low-traffic applications with the full benefits of managed services makes life considerably easier. Second, unpredictable, or highly regular usage peaks can be managed. However, countering the pros with more cons, he stated that the premium they were paying was 'absurd.' Expressing that they can

simply buy hardware at half the price of those millions rather than paying it annually, comically adding "It's like paying a quarter of your house's value for earthquake insurance when you do not live anywhere near a fault line". In addition, much of the progress in tooling that enables the cloud is available in your machine because of its similar hardware to those used by cloud providers. Moreover, the reduction in the overhead management of cloud-hosting boasts was not really all that. Hansson felt that managing major services, such as Basecamp and HEY, was still a complex task at the end of the day, even though they had moved to the cloud as there was no reduction in the operations team. He also pointed out that their business model could easily be hosted on self-owned hardware, as their growth trajectory was predictable. In conclusion, Hansson argued that building and maintaining one's own infrastructure can lead to better performance, reliability, and overall control of the technology being used.

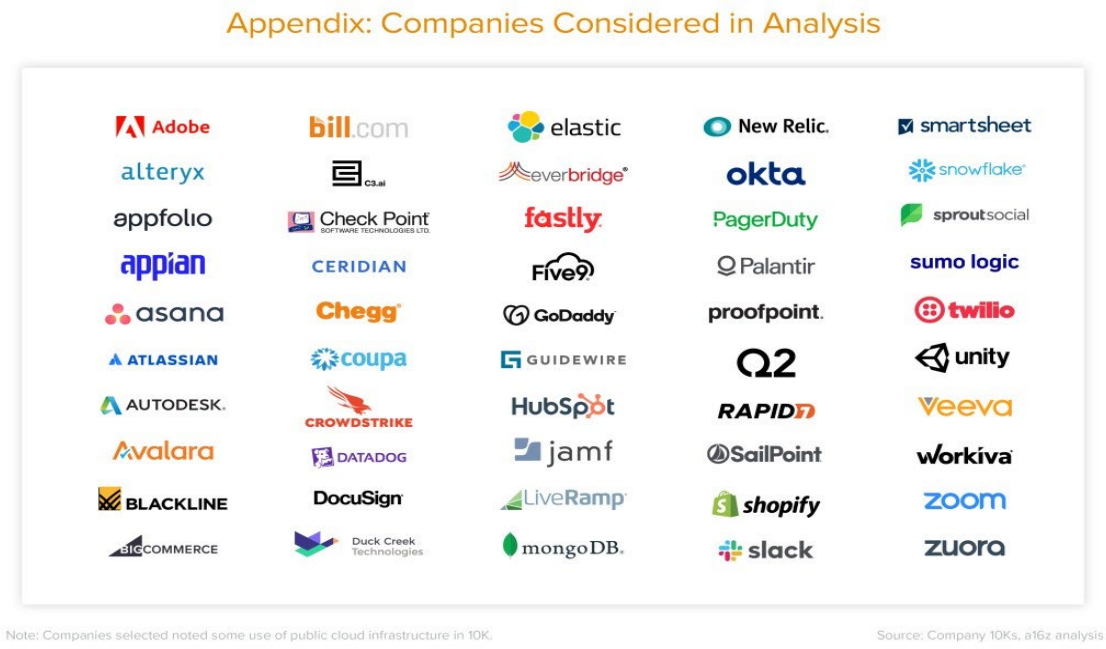

Figure 1 Company 10K, a16z analysis

Hansson's voice is not the only one in the pool of cloud repatriation advocates. Before Hansson's blog, Andreessen Horowitz had published an article 'The Cost of Cloud, a Trillion Dollar Paradox' by Sarah Wang and Martin Casado back in 2021, refer to figure 1 for companies considered in this analysis. This refers to the idea that while cloud computing can save organizations money on technology infrastructure costs, it can also lead to increased spending in other areas, such as data storage, bandwidth, and management. This creates a paradox, in which the overall cost of using cloud services may be higher than expected.

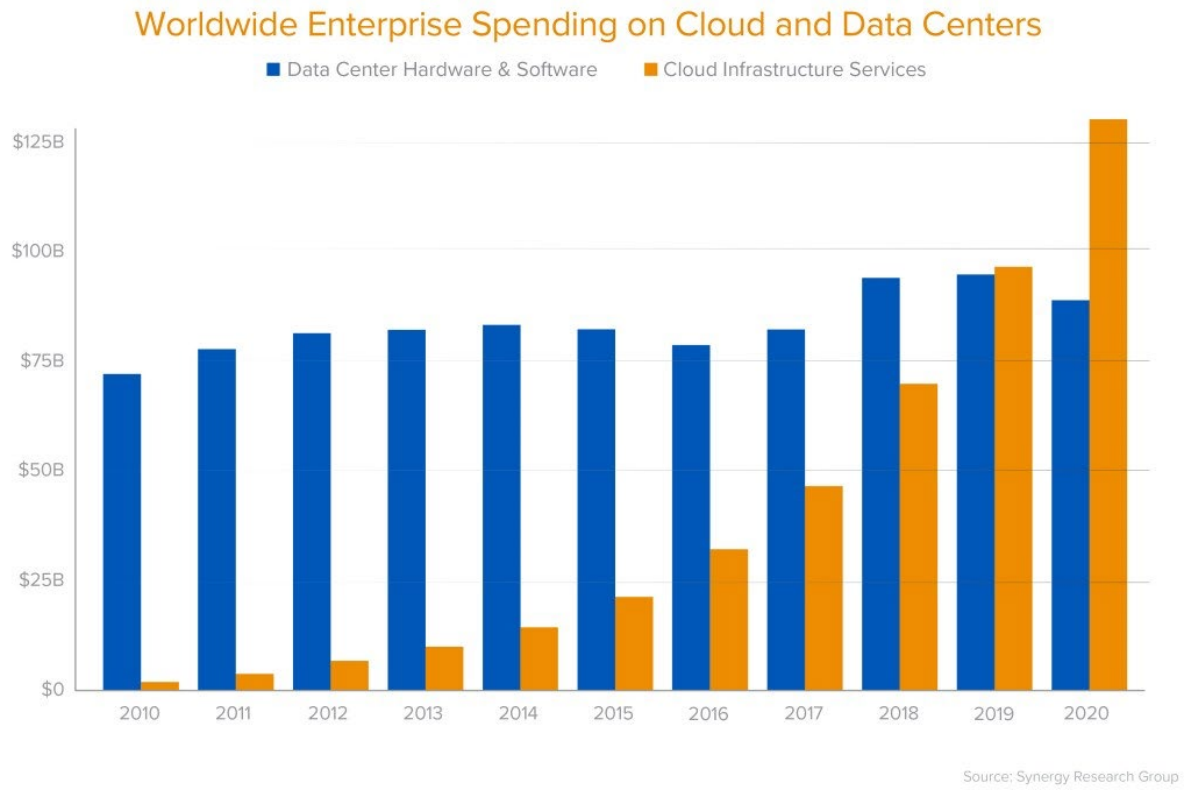

Figure 2 Synergy Research Group

Let us take a closer look at the analytics of these claims. Figure 2 shows that cloud revenue overtook enterprise spending in 2020, with average annual spending for data centers at 2% and for cloud services (IaaS, PaaS, and hosted private cloud) at 52%. However, the industry has matured in the past decade, and we can see a clearer image of how a cloud lifecycle affects the respective company's economics. Wang and Casado insist that with the growing awareness of long-term cloud implications, there is clear evidence that cloud offers are evident in the preliminary stages of the journey. However, once the company scales and grows, there is pressure to put on margins that can start to outweigh the benefits. As this shift occurs later in a company's life, it is difficult to reverse.

Dropbox Infrastructure Optimization Initiative Impact

Dropbox Historical Financials

	2015	2016	2017
Revenue	**$604**	**$845**	**$1,107**
Annual Growth Rate		*40%*	*31%*
Infrastructure Optimization Cumulative Net Savings	N/A	40	75
Cost of Revenue	407	391	369
Gross Profit	**$196**	**$454**	**$738**
Gross Margin	*33%*	*54%*	*67%*
Free Cash Flow	**($64)**	**$137**	**$305**
Incremental Margin vs. 2015 (% Pt)		**+21%**	**+34%**

Source: Dropbox S-1, a16z analysis

Figure 3 Dropbox S-1 filed February 2018

The cost of the cloud contributes significantly to the total cost of revenue (COR) or cost of goods sold (COGS), which is where repatriation comes in. Like Dropbox, a business might decide to take most of its workloads off of the public cloud or take a hybrid approach like CrowdStrike and Zscaler. Either way, those who have taken such steps have reported significant savings. In 2017, refer to figure 3, Dropbox detailed in its S-1, a saving of $75M in a two-year period by shifting to a "lower-cost, custom-built infrastructure in co-location facilities." They observed a gross margin increase of 33% to a whopping 67%, which contributed to a change in infrastructure optimization and an increase in revenue during the two-year period. To quote directly from Wang and Casado's analysis of lost market capitalization, "As growth (often) slows with scale, near-term efficiency becomes an increasingly key determinant of value in public markets. The excess cost of cloud weighs heavily on the market cap by driving lower profit margins." According to Wang and Casado, an estimated potential of more than $500B in market value is being lost among the top 50 public software companies that are currently utilizing cloud infrastructure. Additionally, Thomas Dullien, a former Google engineer and co-founder of the cloud computing optimization company Optimyze, stated that repatriating $100M from the public cloud reduces approximately half of the annual total cost of ownership (TCO) from servers, cooling to network, real estate, and engineering costs. This corresponds to the public cloud list prices being 10-20x, assuming a further drop of 30-50% (after discount) operating margin. This signifies that potential company savings through repatriation would be higher by managing one's own hardware so if you choose to operate at scale, it is not surprising that your infrastructure bill doubles.

Companies and their Reasons

Despite the challenges and costs of cloud computing, it remains an important and valuable technology for many organizations. Wang and Casado make the case that, in no way, suggests repatriation one way or another. They want to emphasize that "infrastructure spending should be a first-class metric, " where companies should optimize early, often, and even outside the cloud. Before deciding to move to the cloud, organizations should carefully evaluate the costs and benefits of cloud computing and consider whether it is the right fit for their specific needs. If they choose to move to the cloud, they should ensure they are aware of the potential costs and challenges that come with it.

Kurt Marko, the author of the article 'A Case for Cloud Repatriation, ' makes an excellent addition to Wang and Casado's discussion. Companies should be cautious and keep in mind that repatriation is not suitable for all organizations and that it can be costly and complex. He also pointed out that not all companies have the same needs, and before making any decision, it is important to evaluate the specific requirements and constraints of the company. In most cases, it is not a simple switch from the cloud to on-premises. It is important to consider the current state of the company and its future growth plans.

After understanding Hansson's unwillingness to continue using the cloud because of the high premiums versus their capable business model, Wang and Casado's addition to cloud cost affects business margins which in turn affects the market cap to Marko's reasoning to not one size fits all. We can conclude that – hosting the entire or majority of the workloads on the cloud is not the most optimal solution as it may cause one to run into regulatory compliance, security and privacy concerns, cost considerations, and better performance.

When to Repatriate or Re-Evaluate

Some best practices suggested by Wang and Casado for SaaS-based companies, to overcome the ballooning cost of the cloud, are

1. Tracking Cloud Spend as a KPI – Need to make infrastructure the key performance indicator for the business. Spotify is a notable example of this best practice. They have their own homegrown tool that tracks cloud spend. The business is then able

to enable engineers alongside their finance team to take ownership of the cloud spend.

2. Incentivize saves in cloud spend – Provide engineers with short-term incentives like the ones used in sales (SPIFFs), so the engineer that saves any part of the cloud spend by optimizing or shutting down workloads will get a spot bonus. Which will in turn cost less to the business and return a higher ROI.
3. Optimization – Through incremental optimization of infrastructure decisions via third-party tools can provide quick gains in existing systems, which may range from 10-40%.
4. Always know, repatriation is a possibility – No need to wait till the cloud gets more costly later in the company's evolution. Make sure system architects are aware of repatriation from the get-go. Because by the time cloud costs start to catch up to or outpace revenue growth, it would be too late.
5. Repatriate in Increments – There is no reason not to repatriate in increments and in a hybrid fashion. Repatriations can be made to take off resource-intensive workloads.

When we discuss repatriating in increments, that introduces a new concept - 'Hybrid Cloud.' A hybrid cloud is a combination of using on-premises infrastructure and one or more public cloud services. This approach provides businesses with the best of both worlds, allowing them to take advantage of the flexibility and scalability of the public cloud while still maintaining control and security of their on-premises infrastructure. One of the main reasons any business might opt for a hybrid cloud is flexibility. The public cloud provides businesses with the ability to scale resources up and down as needed, without the need for significant upfront investments in hardware and infrastructure. This allows businesses to quickly respond to changes in demand and stay competitive in their market. At the same time, businesses can keep their sensitive data and applications on-premises, where they have more control over security measures and can ensure compliance with regulations. Moreover, another reason to opt for hybrid cloud can be for cost savings. Public cloud providers offer cost-effective solutions for businesses that need to store and process large amounts of data. However, storing all data in the public cloud can be expensive. By using hybrid cloud, businesses can take advantage of the cost savings offered by public cloud providers while keeping sensitive data and applications on-premises. This can help businesses to reduce their overall IT costs. Furthermore, a hybrid cloud approach can also help businesses to meet compliance requirements. Some industries have strict compliance requirements that may not be met by public cloud providers. By using a hybrid cloud, businesses can store sensitive data on-premises while still taking advantage of public cloud services for non-sensitive data. This can help

businesses to ensure compliance with regulations and be able to avoid costly fines. Business continuity is another advantage that hybrid cloud offers. In case of any disaster, hybrid cloud approach ensures that company's data and applications are still available and accessible. This helps to minimize disruption to the business and ensure that customers can continue to access services.

Companies should also consider using different cloud providers for several reasons:

1. Redundancy and failover: By using multiple cloud providers, companies can ensure that their data and applications are available even if one provider experiences an outage or other technical difficulties. This can help to minimize downtime and protect against data loss.
2. Cost savings: Different cloud providers may offer different pricing models and features, which can help companies to find the best solution for their budget and needs. Using multiple providers can also allow companies to take advantage of different pricing options, such as reserved instances or spot instances, which can result in significant cost savings.
3. Security: Using multiple cloud providers can help to reduce the risk of data breaches and other security incidents by spreading data and applications across multiple locations. This can make it more difficult for attackers to target a single point of failure and can also allow companies to take advantage of different security features and compliance options offered by different providers.
4. Innovation: Different cloud providers may offer different tools, services, and platforms that can help companies to innovate and stay competitive in their industry. By using multiple providers, companies can take advantage of the latest technologies and services and can explore new ways of working.
5. Flexibility: Using multiple cloud providers can give companies more flexibility and control over their infrastructure. Companies can use different providers to host diverse types of applications and data, such as using one provider for storage and another for computing, this can help to optimize performance and cost.
6. Avoid vendor lock-in: By using multiple providers, companies can avoid becoming overly dependent on a single provider, which can limit their flexibility and make it difficult to switch to a new provider if necessary.

We need to keep in mind, however, that space is not limitless. As more and more businesses go digital, more data will be generated in milliseconds. The "great global data storage crisis" is a growing concern among scientists and industry experts. With the amount of information being generated set to increase by 300% by 2025, current storage solutions may not be able to keep up

with this demand. This could lead to a shortage of storage space and difficulties in managing and processing the vast amounts of data that will be generated. This issue is related to closely related to decision-making when it comes to cloud repatriation. The main reason is data sovereignty and security. As the amount of data being generated and stored increases, businesses and individuals are becoming increasingly concerned about the security and privacy of their data. With cloud repatriation, companies can bring their data back to their own data centers, where they have more control over security measures and can ensure compliance with regulations. This can help to alleviate the data storage crisis by providing more storage space and improved security for sensitive data. Another reason for cloud repatriation is cost. As the data storage crisis grows, businesses may find that public cloud providers are becoming increasingly expensive. By repatriating data to their own data centers, businesses can reduce their overall IT costs and avoid the high costs associated with public cloud providers. Additionally, cloud repatriation can also help to improve performance. By hosting data and applications close to end-users, businesses can reduce latency and improve the overall user experience. This is especially important for businesses that need to provide real-time services or support critical applications.

Conclusion

In conclusion, cloud repatriation is not an either-or decision, it is not binary choice between cloud or on-premises. The use of the cloud is a spectrum and companies can choose a hybrid cloud approach that allows them to keep sensitive data on-premises while still taking advantage of the public cloud for other use cases. To repatriate, one must re-evaluate, how much, for how long, what workloads etc. There are many factors that businesses need to take into consideration before making such decisions.

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