Adopt a Consistent Cloud Approach to Simplify Management and Strengthen ROI

ON BEHALF OF:

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Adopt a Consistent Cloud Approach to Simplify Management and Strengthen ROI

Even if you've used cloud computing for years, it's never too late to adopt a comprehensive strategy to improve efficiencies across multiple systems and clouds. The payoffs? Lower TCO, higher ROI, streamlined management, and better governance.

When cloud computing came on the scene roughly 20 years ago, many companies made forays into cloud services without a solid plan for how or even why to use them. In those early days, business leaders chasing speed and flexibility commonly sought to move particular applications to the cloud, paying for them individually rather than as part of an overall strategy. Governance and data ownership were afterthoughts at best.

But such piecemeal moves to the cloud led to complexity and escalating cost. Even giant companies such as Netflix, which had major commitments to cloud computing early on, found themselves retrenching — even bringing some workloads back on-premise — when cost became an issue. Taking the time to chart a deliberate and measured cloud strategy might not have made everything perfect, but it certainly could have helped.

Putting together a comprehensive cloud strategy is a big undertaking and an important one. A full-fledged cloud strategy should take a consistent approach across multiple systems (including public cloud, private cloud, and on-premise) to ensure that features and services, compliance and security, governance and visibility, and data control are all working together and are managed from the

same place. Maintaining a flexible and scalable cloud strategy will help drive the highest performance for organizations while keeping costs from growing unexpectedly.

Plenty of considerations come into play when formulating a cloud strategy. It's best to start by defining the economic and business value of a potential move to the cloud. Toward that end, the first question is "How elastic is your demand," says Orran Krieger, a professor in the Department of Electrical and Computer Engineering at Boston University, where he co-leads the Mass Open Cloud Alliance. "If your demand occurs in bursts, as is the case for large retailers, it doesn't make sense for you to build, deploy, and maintain that compute capacity internally and then have your computers sitting idle for the other 360 days of the year," Krieger says.

The choice of cloud architecture — public, private, or, most likely, hybrid — is a central feature of the cloud strategy exercise. Hybrid cloud combines on-premise, public, and private platforms and offers the best of all worlds, according to computer scientists Arshdeep Bagha and Vijay Madisetti, coauthors of *Cloud Computing Solutions Architect: A Hands-On Approach* and other books. (Madisetti is a professor in the School of Cybersecurity and Privacy at the Georgia Institute of Technology; Bagha, a researcher, is a former instructor at the same institution). In their view, a hybrid cloud environment simplifies digital transformation by providing workload portability, strategic flexibility, and interoperability.

Along with a hybrid cloud architecture, many companies elect to go with clouds from multiple providers — another choice that should be deliberate and included in a cloud strategy, as opposed to growing organically over time. But the multicloud approach also increases complexity, and provisions will need to be made to ensure the consistency of operations across the heterogeneous environment. Selecting an operating system that provides reliable performance

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and robust security across multicloud instances is a way to reduce risk and complexity.

Other concerns range from people, organizational, and infrastructure requirements to a migration plan to a definition of how your data will be structured in the cloud. It's especially important to spell out data policy.

"You should clearly establish not only how your data should be structured in the cloud but also the tooling required to process and store your data, and a clear strategy around how your data is to be migrated to the cloud platform," Madisetti says. You'll also need to create an operating model that details how your cloud workloads should be managed as they are transitioned to, and run on, your cloud platform.

Where to Start? The Operating System

The selection of an operating system (OS), or systems, is the foundation of any cloud strategy. What key attributes should be considered in selecting an OS? You need to make sure your entire infrastructure is manageable, preferably from a single interface, while ensuring that workloads are consistently reliable, available, and secure.

Linux is the server OS of choice for 80% of the world's public and hybrid cloud environments, according to Madisetti and Bahga, with Windows rounding out the rest. For hybrid multicloud, Linux is even more prevalent, with good reason.

"Linux systems can run for years without crashing or needing to reboot, a great attribute when downtime can be disastrous for a company," Madisetti says. "Linux can also manage and run large numbers of multiple processes simultaneously, and updates are carried out seamlessly without the constant need for rebooting in Windows," he says.

Enterprise Linux has become a widely adopted choice for developing and running critical workloads in the data center, the cloud, and at the edge. "Enterprise Linux is really the standard," says Ian Campbell, CEO of Nucleus Research. Organizations using Enterprise Linux on the cloud get the same benefits as using it on-premise, and Linux can more easily integrate cloud and on-premise systems.

Linux is open source and, as such, is free to use in its most basic distributions. But many companies are now choosing to purchase an enterprise version that includes support, resources (such as developer tools), analytics to help proactively maintain the cloud

Making the Move: Cloud Migration Choices

Formulating a cloud strategy for your organization encompasses multiple variables that will affect consistency and performance. Experts interviewed for this guide recommend carefully considering which cloud migration approaches to adopt. Options include:

- **Rehost** (also known as "lift and shift"). This approach consists of moving workloads and applications into the cloud exactly as they are in the on-premise infrastructure. It's certainly the path of least resistance but one that generally represents a major missed opportunity to enhance digital capabilities and customer experience, notes Michael Schrage of MIT's Initiative on the Digital Economy.

- **Refactor.** This approach is usually chosen to add certain features, performance, or scalability that aren't feasible in the existing on-premise infrastructure. As such, it represents an advance over straight migration of existing workloads, says Vijay Madisetti of Georgia Tech.

- **Revise or rebuild.** These options involve fundamentally redesigning the workloads and applications that ran on-premise before deploying them in the cloud. This approach enables companies to take full advantage of the digital capabilities that drive modernization, Schrage says.

- **Cloud-to-cloud migration.** This takes place when one cloud becomes disadvantageous for reasons of capabilities or cost.

environment, and access to an ecosystem of partners for systems implementation and design. Paying for a full range of support and tools is efficient over the near- and long-term from a total cost of ownership (TCO) perspective.

Planning Ahead for Multicloud Complexity

Selecting cloud providers and using systems across multiple cloud environments deserves careful consideration upfront when putting together a cloud strategy, as opposed to adding new clouds on the fly, which is a common occurrence. Planning in advance for multicloud means you'll have the ability to make decisions that

head off nonoptimal situations, by using management services, for instance.

At this stage, most large organizations will use a multicloud approach to leverage the most advanced AI, analytics, and databases, and to reduce cost, among other reasons. Often, a company will use a different cloud from its main provider to get the best capabilities when standing up a new workload. But it's desirable to have the flexibility to move data from one cloud provider to another, and for that, you'll have to architect in the ability to move workloads. One way to approach this is by standardizing on a single operating system that works across all footprints. Small to midsize businesses are just as likely as their larger counterparts to use cloud services, but they may not take a multicloud approach in order to avoid increased complexity.

Cloud providers make it easier to move data onto their cloud than to pull it off, and for good reason: Once they make it too expensive, or too difficult, to move your data to a new provider, they've got a customer for life. As the number of suppliers dwindles, they may increase prices to reflect the value that current customers are receiving over time, as opposed to trying to accumulate as many customers as possible. In addition, "They often try to sign you up for extra features that aren't easily transferable to another vendor," Campbell notes. "A lot of the time, it's free to put your data in their cloud, but there's an egress fee that makes it expensive to get out."

Containerization enabled in Enterprise Linux makes data more portable, hedging against getting locked into one vendor. "That gives you flexibility," says Krieger, of Boston University. "And containerizing everything is a great way of ensuring you can move from one provider to another should you need to, and it also gives you that leverage, should you need to renegotiate."

Beyond potential cost constraints, having a multicloud environment amplifies resilience and robustness, notes Michael Schrage, a research fellow at the MIT Sloan School of Management's Initiative on the Digital Economy. "There is no single point of failure, or single cloud of failure, if you will," Schrage says. "That's a clear advantage of multicloud."

Cloud Deployment Considerations

There are many common pitfalls to avoid and potential challenges to overcome when planning a cloud deployment, Bahga and Madisetti say. These include:

• **Failing to consider the specific requirements of each application and workload.** It's understandable that a company would try to avoid this step — speed is always important — but that can lead to post-deployment problems.

• **Downtime or outages during the migration.** Conducting pre-migration tests helps ensure that the final migration has little or no impact on service. (For more on migration considerations, see "Making the Move: Cloud Migration Choices.")

• **Data losses and security breaches.** Companies should implement security measures such as privileged access management and app encryption to help prevent data breaches and losses during migration. It's essential to establish, test, and update backup and disaster recovery plans as well.

• **Resource and skill management.** Understand that hiring new IT management roles or even a specialized team may be necessary for a smooth cloud migration. Simplifying the cloud environment by standardizing on one OS across environments will ease IT management tasks and reduce the need to hire.

• **Cost management.** Carefully consider all expenses associated with cloud migration — from actual migration costs to future recurring expenses — to prevent unpleasant surprises. However, this is much easier said than done.

Another important consideration: changes in the buying process. Historically, IT organizations have had centralized control of on-premise technology purchases and deployment, as well as setting standards.

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With cloud, the buying decision is often decentralized and departmental. Users have more freedom to purchase what they want; they don't have to go through IT ops. Users self-provision compute resources and baseline software (including the OS). But all too often, this leads to local optimization as one group makes a decision that helps achieve its most important metric but can impact customer experience or another overriding objective, Schrage says.

TCO: A Changing Picture

Lower cost and, to a lesser degree, greater agility were the top reasons cloud architectures took hold with alacrity. There was an obvious business case to be made that shutting down a data center (a capital expenditure) and shifting compute workloads to a cloud provider for maintenance (an operational expenditure) would save money and look better on the balance sheet. TCO analysis is arguably more important than ROI when formulating cloud strategy, as it focuses on the real-world cost of using the investment, in this case, the cloud.

But as cloud usage (and the corresponding bills) rise, the TCO/ROI picture has gotten cloudier, Campbell says: "People are wondering, 'What is it now going to cost me every year for cloud, assuming there is going to be an increase every year?'" The costs of an on-premise environment tend to go up annually, too, but typically at a lower and more predictable rate than cloud costs. That's given many business and technology leaders pause. But by sticking to consumption-based cloud pricing, you can ensure any cost increase will be commensurate with usage.

Experts say the cost benefits still hold up in cases involving portability of workloads (as often seen in a multicloud environment) when there's no single-vendor lock-in and users can avail themselves of options such as spot instances (in which the customer pays significantly less than the on-demand cost to access the provider's excess capacity). "Spot instances reduce costs," Krieger says. But it can be risky to run mission-critical workloads on spot instances, which the provider is usually entitled to pull back without much notice.

Buying through cloud provider marketplaces can be another way to save money. Committing to a certain level of spending and then working that down by buying products or services on a marketplace is a good way of obtaining discounts. "Cloud providers are incredibly motivated to substantially increase the number of deals done through their marketplaces and will work aggressively toward ensuring more business is done that way," Madisetti says. That fact can work to the benefit of the end-user company when it comes to negotiating price.

Beyond cost savings, customers find cloud marketplaces compelling for another reason: The provider that hosts the marketplace takes care of operational hassles such as discovery, vetting, legal contracts, and reconciliation for its customers and ISV partners. "It becomes more and more attractive for these providers to channel more and more deals through the marketplaces," Madisetti says. "They know a customer with 10 ongoing contracts done through a cloud marketplace is much less likely to leave the service altogether."

Security: A Key Consideration

The matter of security — both cybersecurity and physical security — has always been central to cloud strategy. This was especially true in the early days when it was unthinkable to port mission-critical data (especially financial data) to the public cloud, where it was outside an organization's direct control and, in some cases, housed with other clients' data. Soon enough, it became clear that cloud providers have security techniques, technology, and practices that extend well beyond the purview of ordinary companies (even large enterprises). It's now commonplace for a customer to have a dedicated cloud server for its own data, rather than having to share with other organizations, which is a fundamental of cloud cybersecurity. Krieger says: "Where security is very important, you want to be separate from other customers."

Madisetti notes that cloud security involves multiple policy and governance considerations spanning everything from maintaining data availability and functionality to preventing unauthorized data access by outsiders, rogue employees, and other customers. Before engaging a cloud provider, it's essential to understand how it manages security incidents, including training, notification, and compensation for data exposure. The foundational layer on which you build your workloads is also critical when it comes to security. Take time to research the security-related differences between various operating systems.

Cloud is a central facet of an organization's digital transformation effort, but it should be part of the larger business strategy as well. "It's not about digital platforms, digital media. Cloud is a means to an end," says Schrage, of MIT. "The issue is about what you're really trying to do. What kind of relationship do you want to have with your best customers as opposed to your typical customers? How do you digitally want to do that?" Your cloud strategy should specifically speak to and support your business objectives, he adds, things like greater operational efficiencies, better customer and employee experience, and better management of customer data. ●

CHECKLIST:
CLOUD STRATEGY CONSIDERATIONS

The following are key factors to keep in mind as you develop your cloud strategy:

[✓] **Make sure your move to the cloud is rooted in business strategy** and supported by the economic equation. It's important to be clear on what's driving your need to move to the cloud, whether it's the ability to scale up and down seamlessly, access to an ecosystem of providers, improve performance — or another priority.

[✓] **Create a cloud strategy** that's both flexible and scalable to ensure the best performance and keep costs from growing unexpectedly.

[✓] **Standardize on a single operating system** to function as the foundation for operating and interacting with the workloads you run on top of it. Doing so will improve consistency and reduce the need for training.

[✓] **Work toward managing and monitoring your workloads** from a single console, which will help with visibility, analysis, and remediation across environments.

[✓] **Keep in mind that a hybrid multicloud approach simplifies digital transformation** by providing interoperability, workload portability, and strategic flexibility.

[✓] **Manage multicloud complexity** to safeguard the consistency of operations across the heterogeneous environment. Selecting an operating system that provides reliable performance and robust security across multicloud instances will reduce risk and complexity.

[✓] **Take a deliberate approach** when working with multiple cloud providers, keeping in mind that doing so increases complexity and requires extra attention to ensure consistency.

[✓] **Touch base with key partners** to ensure seamless connections throughout your ecosystem.

[✓] **Regularly review your cloud architecture** to ensure that everything is in compliance with government regulations and industry standards.

[✓] **Update your organization's overall backup and recovery plans** as needed to include all cloud components.

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She has more than 20 years of experience in B2B technology marketing. Before joining Red Hat, she was the sole proprietor of Marketing Matters LLC, a product-marketing consulting company for small tech startups. She has held various product marketing roles on both the distributor and supplier sides of the high-tech ecosystem, including director roles at Avnet Technology Solutions (now Tech Data), Exact Software, and NetSmart Technologies.

A Q&A With Melissa Lautzenhiser

In this conversation, Melissa Lautzenhiser, senior principal product marketing manager at Red Hat, answers questions about developing cloud strategies, using a hybrid cloud approach, migrating data to the cloud, and ensuring security.

This Q&A has been edited for clarity, length, and editorial style.

Q: How should organizations go about developing cloud strategies?

Melissa Lautzenhiser: It depends on whether you're starting from scratch or if you've got a toe in the water already. It's about what you're trying to accomplish: Is it about scalability? Is it about performance? Is it about your partner ecosystem? That's a big one if you want to make sure you can get to and connect with all your important ISVs [independent software vendors] and all the partners you have in your current system. As a strategy on the deployment side, it's important to think about how it's going to affect your current processes. Are you going to have to hire more resources or make drastic process changes? Organizations wouldn't want to do those things if they didn't have to.

One key way to streamline the process and take advantage of existing resources and best practices you've already established on-premise is to make sure you can also leverage those in the cloud. If you're already running most of your workloads and applications on a single operating system that you can rely on and that you have your staff trained on, it will likely make sense to standardize on that OS [operating system] and take it with you to the cloud. If you have a standard foundation with a common interface for how you operate and interact with the workloads you run on top of it, that's the most streamlined way to do it.

Q: How can organizations make sure those strategies are consistent?

Lautzenhiser: Standardization is key. It helps with consistency in a number of ways. Choosing a standard OS across the hybrid cloud, which includes a data center and one or more clouds, enables your staff to manage workloads with a common process across footprints without the need for retraining.

Monitoring and managing workloads is critical to business and customer success, so having an efficient way to do that is often priority number one. You can save a significant amount of time by managing workloads from a single console. This enables consistency in process and familiarity for staff. Production-grade operating systems will also include performance and analytics data and make best-practice recommendations that can help you avoid potential downtime.

You'll also want to consider your partner ecosystem. If you have ISVs that are critical partners, you'll obviously want to choose cloud providers and an OS that is certified with those partners so you can keep that consistency in a hybrid cloud model.

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Q: What are some options for migrating workloads to the cloud?

Lautzenhiser: There are multiple ways to migrate. One is a "lift and shift" model, where you have a workload on-premise and you want to pick it up and move it. In this approach, applications, systems, workloads, and data are moved from onsite to the cloud with little or no changes. Resources hosted in the data center are copied and "lifted" from the on-premises infrastructure.

Alternatively, there are command-line utilities available that convert RPM-based Linux operating systems (OS) to a fully supported Enterprise Linux OS instead of manually redeploying all your workloads. Red Hat offers a free tool called Convert2RHEL, as an example. For workloads that need a fundamental redesign, or for net new workloads, a full build or rebuild will be required.

Q: Where does a hybrid cloud strategy fit into a company's overall digital transformation efforts?

Lautzenhiser: Within the last five years, the trend to move to cloud has grown significantly. And there's a reason for that — it's so much faster and easier to scale and generally comes with greater cost benefits. The efficiency of it all has led most organizations to at least put some of their workloads in the cloud. There are still concerns, with added complexity and vendor lock-in being high on the list. Depending on the cloud you choose, you will get a variety of OS options, some being community-driven and lacking key enterprise-level features like a predictable life cycle, guaranteed and timely security patches, and customer support. You will also find different ISVs and cloud services from cloud to cloud, so do your research before you choose.

It's good to stay open to a multicloud approach, as some clouds will serve you better for certain workloads. Another benefit of standardizing on a single OS is that your moves from on-prem to cloud, from cloud to cloud, or even from cloud back to data center, will be infinitely easier and can help you avoid vendor lock-in.

Q: Is there a cost-of-ownership benefit to going with a hybrid model and having some of it in the cloud, as opposed to being all on-premise?

Lautzenhiser: Certainly. You don't have to have the resources to manage the hardware, for example, and you may be able to reduce the required physical space needed for your on-prem data center. You can also scale your business as needed and only pay for the cloud compute you use on a consumption billing model. Many cloud providers also offer committed spend programs where you can negotiate price based on a commitment of use per a given time period, generally a year.

Q: What do organizations need to consider in terms of security?

Lautzenhiser: Look carefully at the OS for security benefits. As the foundation for all your workloads, it makes sense to ensure security at that layer. For instance, look for built-in security features that address compliance with industry and government regulations, and built-in scanning and remediation. Also, having a modular package structure reduces your cybersecurity threat attack surface and better protects your systems in the cloud.

When it comes down to it, and you're banking millions and millions of dollars on your IT infrastructure — and all your customer satisfaction as well — you really need to have a production-grade operating system that you can count on. You want the security, the patches, the life cycle, and somebody to call if things go wrong.

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