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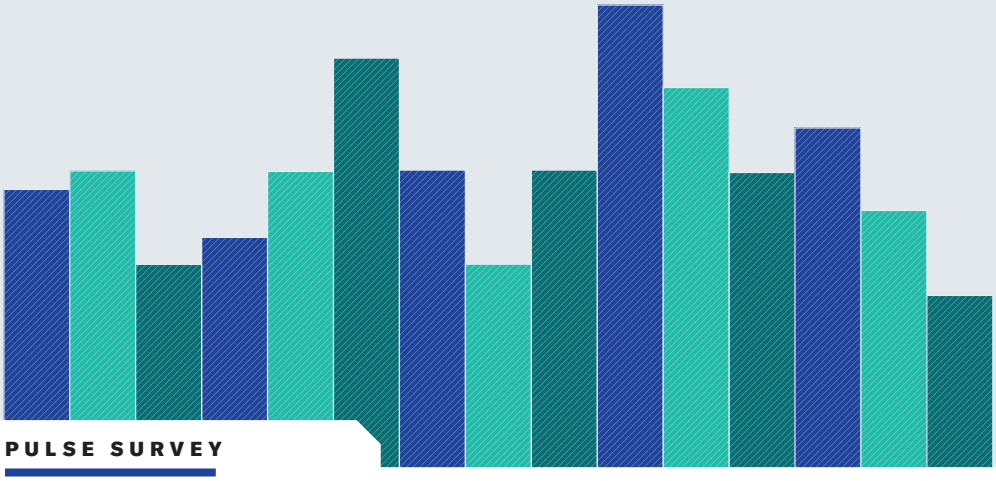

PULSE SURVEY

Strategies for Managing Multi-Cloud Environments

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As enterprises have moved their workloads (applications and data) to the cloud, hybrid and distributed cloud environments have become more common. In fact, as you will see in this Harvard Business Review Analytic Services report, operating in multiple clouds has become the norm for most companies. A big focus for companies now is managing the growing complexity and run costs of these hybrid, distributed cloud environments while accelerating innovation to keep pace with customer expectations.

Managing multi-cloud complexity requires new approaches to IT operations that enhance automation and simplification. It requires implementing development, security, operations, and site reliability engineering (SRE) practices into how you design, build, deploy, and operate your applications and workloads for the cloud.

We recently introduced Hitachi Application Reliability Centers to help our clients accelerate innovation by migrating, modernizing, and automating their cloud workloads reliably and at scale. These centers deliver SRE-driven cloud consulting and managed services to help organizations automate workload management and achieve a seamless experience, whether workloads reside in the data center or across distributed cloud environments.

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Roger Lvin
President, Digital Solutions
Hitachi Vantara

Strategies for Managing Multi-Cloud Environments

Managing multiple clouds has become the norm as companies seek to improve their operations and accelerate their digital transformations. Yet many of them struggle to manage their clouds effectively and to keep pace with the talent and skills needed to do so, according to a survey of 283 business respondents by Harvard Business Review Analytic Services.

Companies are coping with a legacy of decisions during the past several years to adopt public cloud applications and services. Business and IT leaders sought to deploy new digital capabilities quickly, gain flexibility to meet demand for computing and infrastructure services, and save money. In the past couple of years, firms have accelerated their cloud investments in order to support remote work and deliver digital services to customers.

However, in pursuing the benefits of cloud technology, they have not always coordinated their purchases across business units or created consistent policies for operating their clouds. Now they are realizing they may be spending money on services they don't need, missing opportunities to optimize the performance of their clouds, which may be siloed, and finding gaps in how they manage and secure corporate and customer data.

"No matter who you ask, they'll tell you that they're spending too much on cloud," observes Mary Johnston Turner, research vice president, Future of Digital Infrastructure, with market research company IDC. As they work to rationalize their cloud assets, they are also pursuing "a more governable, reliable, interconnected environment," she says.

Among survey respondents—who are familiar with how their organizations approach cloud technology—a large majority (85%) say they use at least two clouds, with 25% reporting that their organization employs five or more. **FIGURE 1** Most (77%) consider having a coordinated approach to managing

HIGHLIGHTS

85% of survey **respondents use multiple clouds**, with one-fourth employing five or more.

77% consider a **coordinated approach to managing their clouds** to be essential.

27% have **created a cloud center of excellence** to share best practices and coordinate their use of cloud.

Due to rounding, some figures in this report may not add up to 100%.

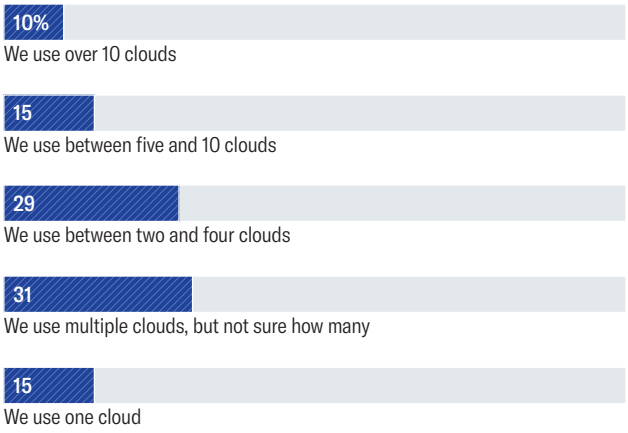
Among survey respondents—who are familiar with how their organizations approach cloud technology—a large majority (85%) say they use at least two clouds, with 25% reporting that their organization employs five or more.

FIGURE 1

Multiple Clouds Are the Norm

Most organizations are using at least two clouds.

In your estimation, about how many clouds does your organization use, whether public or private? [SELECT ONE]



Source: Harvard Business Review Analytic Services survey, October 2021

them essential. The findings suggest, however, that most organizations do not yet have key policies and practices in place that would support a higher level of coordination.

"I think the reason people sometimes struggle with [managing their clouds] is they don't start with 'Let's build a strategy about what we actually intend to gain from the public cloud and from the internal cloud environments,' and from there, 'What are the principles by which we want to operate these environments?'" says an infrastructure services executive with a global financial services firm. The company runs its IT infrastructure and business applications using internal and public clouds. "Any organization has a limited capacity for what they can support, what they can manage, and what they can continue to maintain. Driving some consistency around how technology is consumed is incredibly important for long-term sustainability."

Without a consistent means to determine where, when, and how to run their cloud workloads, organizations may find it challenging to capture all the benefits they anticipate from these investments. As a result, they may spend more than they need to on services, miss opportunities to improve application performance and enhance business processes, put their data at risk, and make it more difficult to continue modernizing.

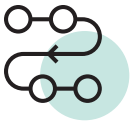
An Evolving—and Complex—Landscape

Companies today run a wide variety of infrastructure and application workloads in their multiple clouds. "Nobody set out planning to have a complex multi-cloud state. It just happened," observes Melanie Posey, research director, cloud and managed services transformation, with 451 Research, S&P Global Market Intelligence's enterprise technology research unit.

Consider that more than three-fourths (79%) of respondents to the Harvard Business Review Analytic Services survey operate cloud-based infrastructure such as data storage, compute, databases, networking, and desktop virtualization. Almost as large a proportion use the cloud for business productivity applications such as videoconferencing, collaboration platforms, and email/office productivity (74%) and business automation applications such as customer relationship management, enterprise resource planning, and data analytics (70%). Also in the mix are IT operations workloads (58%), application development (46%), and business continuity/disaster recovery (41%). It's clear from these results that companies are using the cloud to operate many aspects of their businesses.

This multi-cloud environment evolved over more than a decade. Business leaders initially took advantage of the ease and speed with which they could build digital applications in the cloud, often without involving enterprise IT. They then turned to cloud providers for advanced services like chatbots and speech recognition, observes IDC's Turner. At the same time, their companies continued to maintain applications that could not, for various reasons, run in a public cloud; these may be in a private cloud on premises, or managed by third-party service providers.

Adding to the complexity, organizations employ multiple approaches to structuring their cloud workloads. When asked which of several typical approaches to cloud migration and adoption they were currently using or had used in the past, many respondents chose more than one answer. Half report



Without a consistent means to determine where, when, and how to run their cloud workloads, organizations may find it challenging to capture all the benefits they anticipate from these investments.

re-platforming their applications (that is, moving them to the cloud with limited changes)—the most selected option. Almost as many (47%) cite replacing legacy applications with cloud-native versions.

The decisions about how to build cloud applications are intertwined with decisions about where to host them—and they depend on many factors. "Different platforms have different security postures, different capabilities," says the executive at the financial services firm. The company is subject to regulations governing data privacy and security in every country where it operates, so the location of an internal data center, or that of a cloud provider, has an impact on how and where to run a given workload, the executive says.

Similarly, 451 Research's Posey says that she sees many companies pursuing a multi-cloud strategy on purpose because they identify specific platforms as best suited for certain use cases, such as complying with data privacy or sovereignty mandates, or specific workloads, such as data analytics.

A Need for Coordinated Management

The bottom line, says Turner, is that "the vast majority of organizations expect they're going to continue to rely on this mix of public and private, or multi-cloud," together with traditional on-premises infrastructure and so-called edge technologies, like sensors that use the cloud to transmit and store data. "It's increasing the pressure to have a consistent operational model across all these resources."

In fact, many companies appear to be addressing the need for a coordinated approach to managing their clouds across the enterprise: 56% of survey respondents report that they have one, compared to 30% who do not and 15% who are unaware of one.

Nevertheless, there is a large gap between respondents who say their organizations are coordinating management of their cloud and those who, as noted above, see coordination as essential. This finding suggests many respondents are interested in achieving greater coordination than they currently see in their organizations. Posey concurs that "we're in a very early stage" for enterprises having centralized policies to govern their clouds and a comprehensive view of their spending and usage.

Survey respondents report a variety of difficulties with cloud management, not least of which is acquiring the skills and talent they need. Asked to choose from a list of common challenges that organizations face in managing their clouds, 51% report having difficulty keeping up with the technology skills/talent required, the most-cited answer. **FIGURE 2**

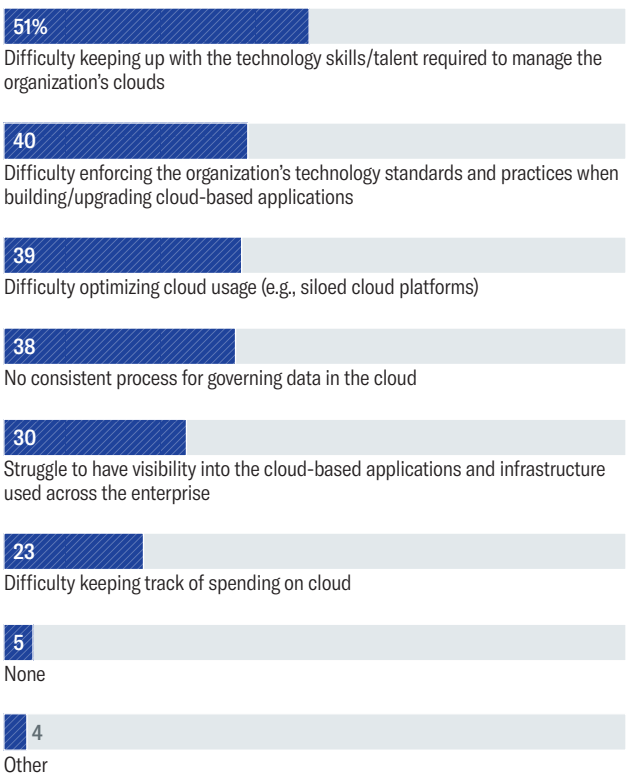
Next, they say they face three challenges almost equally. Forty percent cite difficulty enforcing their organization's technology standards and practices when building/upgrading cloud-based applications, 39% cite difficulty optimizing cloud

FIGURE 2

Struggle to Keeping Cloud Skills Current

Companies also face difficulty enforcing standards and optimizing usage.

Which of the following challenges does your organization face in managing its clouds? [SELECT ALL THAT APPLY]



Source: Harvard Business Review Analytic Services survey, October 2021

usage (due, for example, to siloed cloud platforms), and 38% say they lack a consistent process for governing data.

The survey also asked respondents what they have done, or are currently doing, to address their cloud management challenges, and the results suggest they are taking a range of approaches. Fifty-nine percent cite establishing policies for managing data in the cloud—the most often-selected answer. **FIGURE 3** But addressing the talent gap is also high on respondents' agendas: hiring or training IT staff to help with managing the organization's clouds ranked second, chosen by 52%.

These results also indicate, however, that most organizations have not yet implemented many key strategies that would support greater coordination and, ultimately, improve both cost control and resiliency. For example, only 30% implemented have or are planning to implement reporting on cloud spend and usage by business units and functions. Fewer say they have engaged or are engaging their vendors more to help manage their clouds (28%) or creating a cloud center of excellence (27%).

Respondents may feel some urgency to address data governance even though most do not consider it a management challenge. For example, they cite security most often (71%) among the most important factors they consider when deciding whether a public or private cloud would be best for a given workload or application, and data governance policies are a tool in the data protection arsenal. Posey observes that data security not only is a top challenge for companies using public clouds—due to concerns about cyberthreats—but also is linked to difficulties obtaining skills and expertise. The skills for managing information security onpremises "are not necessarily transferrable to public cloud environments," she says.

Organizations have good reason to focus on talent broadly. The financial services executive notes, "As you're shifting into any new technology, you definitely have to adjust skills." The firm has hired externally to fill skills gaps, but the executive says investing in learning and development for current employees has been critical. "If we're not developing those skill sets internally, then we can have some real challenges around getting people fast enough," the executive says.

Having a clear cloud implementation strategy helps the financial services company ensure that IT and business leaders choose the best environment when they provision new applications and services. Whether the application sits in a private or public cloud depends on which platform has the necessary technology capabilities, as well as the right level of security and regulatory compliance. Additionally, automated "guardrails" built into the cloud development environment ensure developers build applications that conform to these policies without having to be versed in all of them. "Where we can have tens of thousands of developers, we don't want to rely on individuals to understand that entire control structure," the financial services executive says. The strategies and policies, supported by automation, facilitate the end result—a bank that is more responsive to its customers.

FIGURE 3

Data and Talent Come First

Respondents are pursuing a range of solutions to manage their clouds.

Which of the following steps has your organization taken, or is taking soon, to address its cloud management challenges? [SELECT ALL THAT APPLY]

Source: Harvard Business Review Analytic Services survey, October 2021

Putting Cloud Management at the Top of the Agenda

Without a comprehensive approach to managing multiple clouds, companies may find it difficult to maximize and extend the benefits they seek from their cloud investments, including improved security. "There's always going to be tension" between goals, says Turner. Companies want to

“What these organizations are seeing is that they need to look through a management lens as well as a cloud infrastructure resources lens.”

Melanie Posey, research director, cloud and managed services transformation, 451 Research

protect the business, control costs, and speed up digital innovation. She sees business and IT leaders becoming more open to "centralized, policy-driven, automated ways to do some optimization without slowing down the business."

Survey respondents anticipate a range of business outcomes from their cloud investments. Asked to name the five business outcomes their organization most aims to achieve, 62% cite more efficient business and/or IT operations—the most selected answer. **FIGURE 4** Reduced operating expenses and acceleration of digital transformation ranked second, tied at 47% each, followed closely by increased business productivity (45%). Better security, chosen by 39%, rounded out the top five.

To achieve their business goals, managing clouds needs to be higher on the agenda for both technology and business leaders. "What these organizations are seeing is that they need to look through a management lens as well as a cloud infrastructure resources lens," says Posey. Doing so would help them optimize costs and usage and make better decisions about where to host their applications and workloads and manage them day to day.

In other words, although they may feel pressure to address data governance and have urgent needs for talent, business and IT leaders will likely need to turn their attention to additional solutions. "The most successful organizations are creating centers of excellence, or some kind of collaborative leadership that balances the imperatives of the whole organization—many of which have to do with security and cost and performance—but also recognizes how the business itself is being transformed and becoming more and more digital," says Turner.

The survey points to opportunities for business and technology leaders not only to pay more attention to cloud management, but also to collaborate more closely with each other and their cloud vendors or managed service providers when making decisions about their clouds.

For instance, IT is often the main decision maker when it comes to cloud spending. Forty-five percent indicate that the technology function is the group primarily making decisions about where to spend their cloud budgets, while 31% indicate some degree of joint decision making with business leaders (a combination of those who cite C-suite leaders (18%) and who cite a committee comprised of business and technology leaders (13%)). Another 13% say some type of business function is the primary decision-making group—either the CFO and finance, regional leaders, or business unit/functional leaders—while an additional 10% say the primary decider depends on the type of cloud service being purchased.

"There are certainly times where, from a business perspective, it doesn't matter" that IT makes the decisions, says the financial services executive. For instance, if the capabilities an application needs are available on every platform, it isn't likely to matter which one is used. "It makes sense for that to be largely a technology decision." However, the executive continues, many decisions about where to spend on cloud—whether to migrate an application and where to host it—have to take into account the benefits to customers, regulatory compliance, and the ability of the organization to deliver that app securely and effectively. "If you're making these decisions based entirely on technology, then you're not making the best business decision. If you're making them based on business, you're not making good technology decisions."

FIGURE 4

A Focus on Efficiency

Companies seek operational improvements from their cloud investments.

Which of the following business outcomes does your organization most aim to achieve from its cloud investments? [SELECT UP TO FIVE]

Source: Harvard Business Review Analytic Services survey, October 2021

“The most successful organizations are creating centers of excellence, or some kind of collaborative leadership that balances the imperatives of the whole organization [...] but also recognizes how the business itself is being transformed and becoming more and more digital.”

Mary Johnston Turner, research vice president, Future of Digital Infrastructure, IDC

"Articulating the connection between the infrastructure imperatives and the business imperatives, and then engaging the senior teams so they become part of the conversation around how the business succeeds, is what's really going to be the hallmark of the winners in the next couple of years," says Mary Johnston Turner of IDC.

Whether or not IT is making the decisions, establishing enterprise policies for provisioning cloud applications and services can help ensure that cloud management considerations are baked into any hosting decisions. Such policies encourage choices that assure optimal performance, data security, and resiliency—all of which are essential for delivering services to customers. "We have a very strong central enterprise governance structure, and we use that to set really, really good standards, and to build centralized capabilities that allow the different business teams and technology teams ... to be enabled" today and in the future, says the financial services executive. "We're building tomorrow's legacy. You have to recognize that and make sure you're building it in a way that allows people to have less of the pain of transformation than you've had to get to where you are."

Automating development, deployment, and operations using a cloud management platform not only offers a way to enforce cloud policies, says Turner, but also can supply information needed to control costs and monitor performance. "You have to create this higher level, abstracted, unified control environment or you're going to continue to operate in silos that are going to be difficult to integrate and coordinate," she adds. "The way you architect and control your infrastructure" will determine whether your company can achieve the business outcomes it anticipates, she says.

Effective partnerships with cloud vendors and service providers can be important, as well. Turner points out that for many companies, the cloud has offered a way to access technologies such as data analytics that they may not have the talent to support. Now, services are emerging that enable firms to automate and offload application-level management of their private clouds, leaving internal IT teams free to focus on controlling the enterprise environment. The financial services executive credits cloud vendors with helping the firm's teams understand the value various platforms provide, as well as providing insight from their experiences with other companies.

Conclusion

To obtain the next level of benefits from cloud investments and further their digital business goals, companies need a strategic view of how these fit together and a consistent way to manage them. Previous cloud investment decisions that prioritized speed and flexibility for business initiatives over enterprise governance and operations have helped propel companies' digital transformation. As they move forward, greater emphasis on cloud governance and management can enable companies to run their complex multi-cloud environments more efficiently and securely.

Companies will also need to hire and train more staff in the software-based skills necessary to manage multiple clouds. However, greater collaboration among business and IT leaders, as well as between companies and their vendors or managed service providers, will be essential to achieving greater coordination. "Different people will see a different aspect of the problem," says Posey. Some decision makers might be focused on security, others on governance, costs, or operational efficiency. "All of those concerns are coming together and may be bubbling up to the C-suite."

Enterprise policies that govern most aspects of how clouds are used can help ensure applications and workloads run more efficiently, that they are resilient, and that data is protected. So can tools that automate enforcement of these policies and facilitate cost-effective day-to-day management of cloud operations. Finally, having a process for sharing information and solutions, such as with a cloud center of excellence, can enable leaders to converge on the best approaches for their organization to integrate sound management of their clouds with their business needs. Turner concludes, "articulating the connection between the infrastructure imperatives and the business imperatives, and then engaging the senior teams so they become part of the conversation around how the business succeeds, is what's really going to be the hallmark of the winners in the next couple of years."

METHODOLOGY AND PARTICIPANT PROFILE

A total of 283 respondents drawn from the HBR audience of readers (magazine/ enewsletter readers, customers, HBR.org users) completed the survey.

Size of Organization

12%
Fewer than 100 employees

13%
100 to 499 employees

7%
500 to 999 employees

22%
1,000 to 4,999 employees

9%
5,000 to 9,999 employees

37%
10,000 or more employees

Seniority

24%
Executive management/ board members

44%
Senior management

20%
Middle management

11%
Other grades

Key Industry Sectors

23%
Technology

10%
Education

9%
Financial services

All other sectors less than 8% each.

Job Function

19%
General/executive management

12%
IT

9%
HR/training

8%
Consulting

All other functions less than 8% each.

Region

35%
North America

25%
Europe

25%
Asia Pacific

6%
Latin America

8%
Middle East/Africa

1%
Other

Figures may not add up to 100% due to rounding.

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