

A person with long dark hair, seen from behind, wearing a black top and a tan backpack, walking through a city at night. The background is filled with blurred lights from buildings and streetlights, creating a bokeh effect. The scene is dark, with the primary light sources being the out-of-focus city lights.

Research Insights

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The hybrid cloud platform advantage

A guiding star to enterprise
transformation

Japan point-of-view

IBM Institute for
Business Value

IBM

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Key takeaways

Generating value

The value derived from a full hybrid, multicloud platform technology and operating model at scale is *2.5 times the value* derived from a single platform, single cloud vendor approach. In fact, the platform approach accelerates value with scale.

More clouds, more vendors

By 2023, organizations globally expect to be using *at least 10 clouds*, from a growing number of vendors. However, *only a quarter* of businesses have a holistic multicloud management strategy.

Cloud and transformation go together

64% of advanced cloud companies globally recognize the need for enterprise transformation and application modernization to go hand-in-hand, *31% more than* Japan respondents.

Control towers

Cloud Management Platforms can serve as IT infrastructure control towers. 35% of global IT executives—and 43% of Japan IT executives—say they are seeking this type of improved visibility and control of their cloud costs.

Cloud platforms and business transformation

Welcome to the era of unparalleled business transformation. Today, companies use cloud platforms and digital technologies to discover new ways to leverage data for improved business performance. Cloud platforms are clouds that provide an integrated experience. Ideally, a platform scales and supports both small development teams and organizations, and large enterprise businesses. It can be deployed across data centers around the world.

Typically, cloud platforms are clouds—or multiclouds—in a single environment: public or private. A hybrid cloud platform takes that a step further, operating across two or more of these environments.

Advanced companies are aligning their business transformation with the orchestration of their cloud platforms to achieve a next-generation business model. This next-generation model enables an agile organization fueled by data, guided by artificial intelligence (AI) insights and built for change on a hybrid cloud—we call it the Cognitive Enterprise™ (see “Insight: the Cognitive Enterprise”).¹ This transformation trend is likely to become even more important as organizations reset to do business post-pandemic.

The adoption of cloud has been a central feature in developing new, digitally-driven business models. However, some organizations are struggling with harnessing the full capabilities of their cloud environments. This stunts their ability to attain their target operating models.²

Though 90% of companies globally were “on the cloud” by 2019, only about 20% of their workloads have moved to a cloud environment.³ These workloads have usually been microservices that are native—that is, born on the cloud.



18%

Projected annual growth of the global cloud market through 2023.



68%

of advanced cloud businesses are building an open-source cloud platform, compared to 52% of Japan respondents.



66%

of advanced cloud businesses say a “single pane of glass” management approach is needed to ensure visibility and control costs across all their clouds, vendors, clusters, and data, versus 43% of Japan respondents.

The next 80% of the cloud opportunity focuses on shifting core business applications and workloads to the cloud and optimizing everything from supply chains to sales. This is the next chapter of the cloud; it requires business executives to invest in hybrid multicloud platform strategies and capabilities.

To develop IT environments that enable business transformation, whether supporting specific workflows or a wider operating model, CIOs need to be able to offer capabilities that seamlessly integrate tasks across different types of clouds and entire IT infrastructures.

Enterprises need an application development platform that can run on any cloud, workloads that can execute seamlessly across multiple clouds, and a comprehensive orchestration capability that spans across clouds. A platform approach can play a unifying role and act as the technological glue that allows an organization to harness the full range of capabilities available to it for improved business and operational performance.

The value case for hybrid multicloud

Hybrid multicloud is the fundamental enabler of enterprise target operating models. Whereas, for many organizations, getting on the cloud was “what” they wanted to do, these new business models, applications, and infrastructure are “why” they want to do it. While these new technologies can be compelling, the successes or failures of cloud deployments are not technology stories; they are business transformation stories.

It has been demonstrated that the value derived from a full hybrid, multicloud platform technology and operating model at scale is 2.5 times the value derived from a single platform, single cloud vendor approach.⁴ This has been validated across 30 global companies in multiple industries. Indeed, a platform approach accelerates value with scale.

Insight: The Cognitive Enterprise

“A new era of business reinvention is dawning. Organizations are facing an unprecedented convergence of technological, social, and regulatory forces. As AI, blockchain, automation, Internet of Things (IoT), 5G, and edge computing become pervasive, their combined impact will reshape standard business architectures. The ‘outside-in’ digital transformation of the past decade is giving way to the ‘inside-out’ potential of data exploited with these exponential technologies. We call this next-generation business model the Cognitive Enterprise.”⁵

Insight: Who are the Cloud Aviators?



We identified 13% of our global survey respondents as Cloud Aviators. They are defined by three characteristics:

- Have strong functionality across multiple clouds
- Recognize the strategic importance of a cloud management system that delivers visibility, governance, and automation across the entire IT environment
- Are actively using a multicloud management platform.

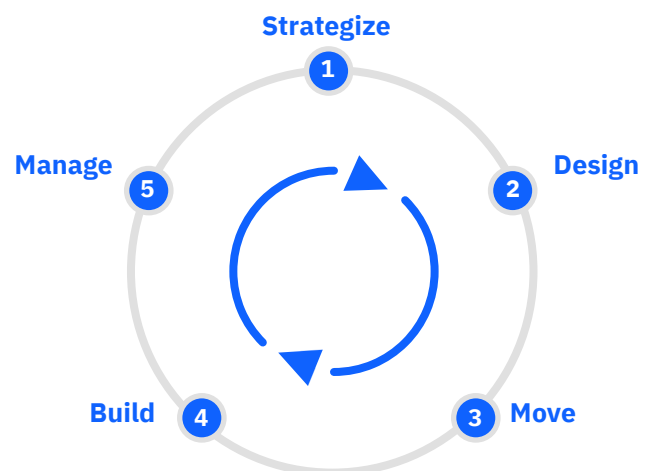
To better understand the business value of mature multicloud functionality and the use of multicloud management tools, we conducted a survey. Analyzing the findings, we identified and characterized a group of leading businesses that have successfully achieved demonstrable competitive advantage from adopting a robust hybrid cloud management and governance platform. Naming this group “Cloud Aviators,” we highlight major differences in strategic approach, decisions, actions, and behaviors that separate Aviators from their peers (see “Insight: Who are the Cloud Aviators?”).

Through regression analysis and other statistical techniques, we estimate business benefits and return on investment (ROI) that organizations may achieve. We also define five key stages to implement a cloud management platform that helps deliver the benefits of a hybrid multicloud environment. To this end, we characterize how Cloud Aviators strategize, design, move, build, and manage a hybrid multicloud platform in their organizations to achieve competitive advantage (see Figure 1).

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Figure 1

Five steps to achieving the hybrid cloud platform advantage



The next chapter of the cloud requires business executives to invest in hybrid multicloud platform strategies and capabilities.

Step 1—Strategize Link operating models with business transformation

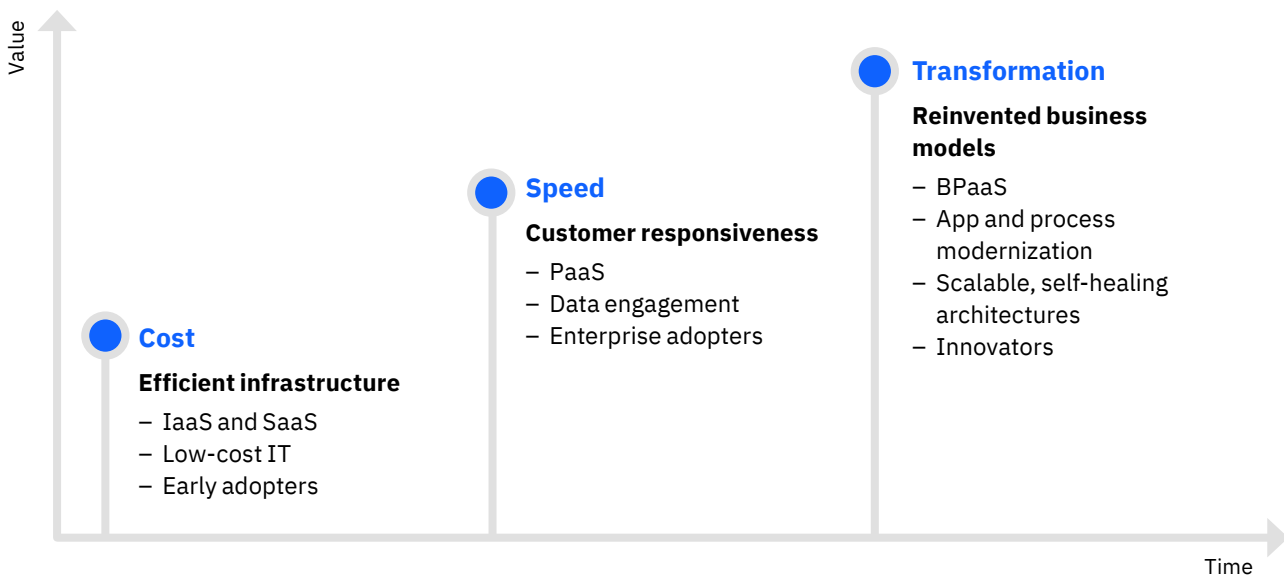
In the last decade, attention on cloud computing and the corresponding growth in cloud applications have gained serious momentum, rapidly expanding use of the technology. Just three years ago, for example, the global public cloud computing market was only one-half the size it is today.⁶ However, moving to cloud should not be the strategy or the goal. It is a means to achieve goals, such as aligning end-to-end business transformation with new operating models.

But that doesn't mean the development of cloud capabilities lacks strategic business importance. Organizations making their "journey to cloud" started with leveraging cloud's efficiencies to lower the costs of their IT infrastructures ("Cost" phase, see Figure 2).

In the next phase ("Speed") of cloud adoption, enterprises developed apps that helped leverage cloud's operational benefits, sparing developers from the complexity of their IT environments. Ease of application deployment, improved resource allocation, and dynamic data management were just a few of cloud's myriad advantages. Because these initial cloud environments were all about gaining operational efficiencies and reducing costs, practically every organization implemented at least one.

Today, with cloud adoption nearly ubiquitous ("Transformation" phase), businesses can use cloud to bridge the long-standing divide between business and IT. Some organizations are using cloud for digital transformation, redesigning their business processes to optimize innovation and enhance competitive positioning. Indeed, the cloud journey now can be closely aligned with a wider transformation of an organization's capabilities and its ways of working. As such, enhanced cloud functionality is a central, strategic pillar, enabling an entirely new approach to business.

Figure 2
Cloud is the technology for transformation.



A cloud platform strategy cannot be designed in isolation. Ideally, it happens in the context of the business objectives one desires to achieve and in concert with a data governance strategy, an application modernization strategy, and a mobile strategy, among others—because all of these now interrelate. If they are not viewed holistically, there will be gaps. Looking at these various strategies together simplifies the work of transforming business and IT at the same time.

Unfortunately, only 29% of businesses in Japan say that their organization has a holistic multicloud management strategy in place today. This is true even though our analysis shows that organizations globally break even on their investment in cloud management in approximately two years and go on to earn 2.9 times their investment in year 10, while Cloud Aviators earn 4.5 times their money back.

Cloud Aviators recognize the strategic importance of a comprehensive cloud management system. They closely align their journey to cloud with the transformation of their operating models and redesign of business processes. When asked if “both business process benefits and IT benefits are critical to application-modernization business cases,” 41% more of Cloud Aviators agreed than Japan respondents. And 64% of Cloud Aviators recognize that business process redesign and application modernization need to go hand-in-hand, which is 31% more than Japan respondents.

A strategic approach to cloud requires an enterprise-wide view toward business transformation so that workflows and the supporting technology meet the needs of rapidly changing business requirements. It has become apparent that the “one cloud fits all” environment doesn’t create significant enterprise value.

That simplistic view doesn’t adequately accelerate key business benefits, such as enabling faster time-to-market, harnessing data for increased personalization, improved decision making, process automation, and cost efficiency. Nor does it scale sufficiently to drive meaningful capability improvements or usability advantages.

In response, we are witnessing an accelerating proliferation of public, private, and hybrid clouds in practically all organizations globally, fueling 18% annual growth of the cloud market through 2023.⁷

A Japanese advertisement agency⁸

The advertisement industry is shifting from a traditional media-centric model to a more modern, digital media-centric approach. Traditional systems were designed and built to seek commonization and stability. However, these legacy systems often fetter the industry—they’re out of step with business execution. Mission-critical systems that will support next-generation advertising need to be robust, flexible, and scalable.

A Japanese advertising agency decided to invest in a hybrid cloud solution that integrates multiple clouds. To figure out what its future mission-critical systems should be and how to formulate an innovation plan, the agency engaged an advisory company. The advisory company provided a wealth of use cases, experience, assets, and methods.

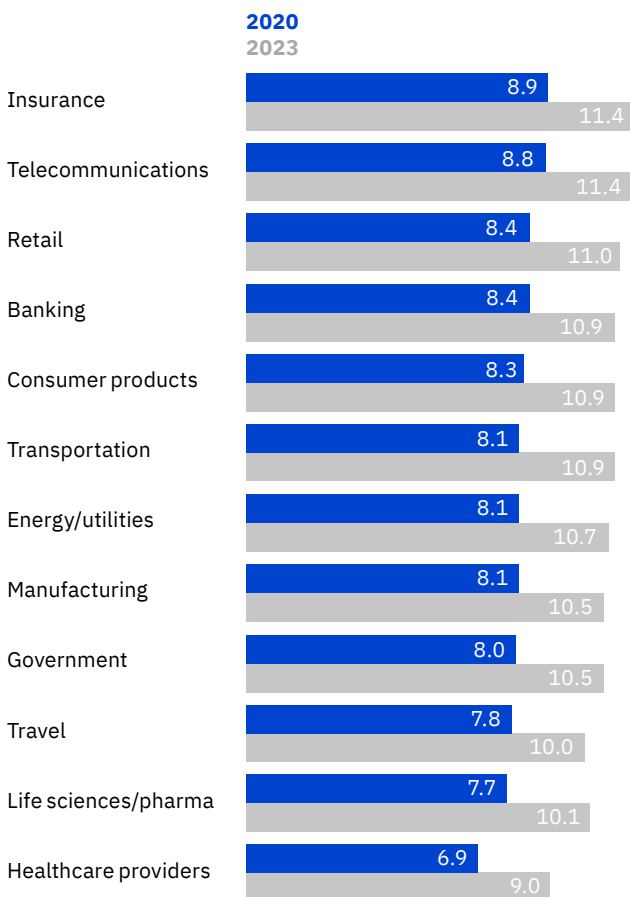
The advisor helped deliver a service-oriented, componentized enterprise architecture and roadmap. The phase transition roadmap aimed to control risks by shaking up the status quo in monolith-first stages. The advisor also helped develop a corporate vision and perform a business reinvention, including better governance of the new architecture.

The agency now has an agile structure that can better handle a flexible business environment, with its legacy business processes broken down into reusable components using APIs.

According to our most recent survey of over 6,000 businesses worldwide, the typical enterprise is aware of using nearly eight clouds from multiple vendors. The actual number is unquestionably higher because many functions—including customer service, logistics, sales, marketing, and human resources—regularly add *ad hoc* cloud applications to keep up with market demands. It’s no wonder that organizations globally expect to be using at least 10 clouds within three years, from even more vendors than before (see Figure 3).

Figure 3

Average number of clouds by industry globally



Source: 2020 IBM Institute for Business Value hybrid multicloud survey (n=5,262). Q3. How many clouds does your organization use? Today, In three years.

Action guide

Strategize

Development of cloud capabilities is of strategic business importance and is closely aligned with end-to-end business transformation. As a result, you should take your business objectives as a point of departure for the development of your hybrid multicloud management capabilities. 41% of Japan respondents stress the importance of both business benefits and IT benefits in their approach to developing hybrid multicloud platform capabilities.

Next, ascertain how the development of enhanced cloud capabilities aligns with your transformation of processes and the wider operating model. Indeed, Cloud Aviators are keenly aware of the close links between changes in their cloud capabilities and business processes.

While these new technologies can be compelling, the successes or failures of cloud deployments are not technology stories—they're business transformation stories.

Step 2—Design Create your transformation journey with multicloud management

As companies seek to transform toward intelligent workflows that can tap into capabilities across the organization, it is critical that the underlying IT environment supports these efforts. In this context, the lack of coordination or integration of different clouds can become a barrier to improved operational performance.

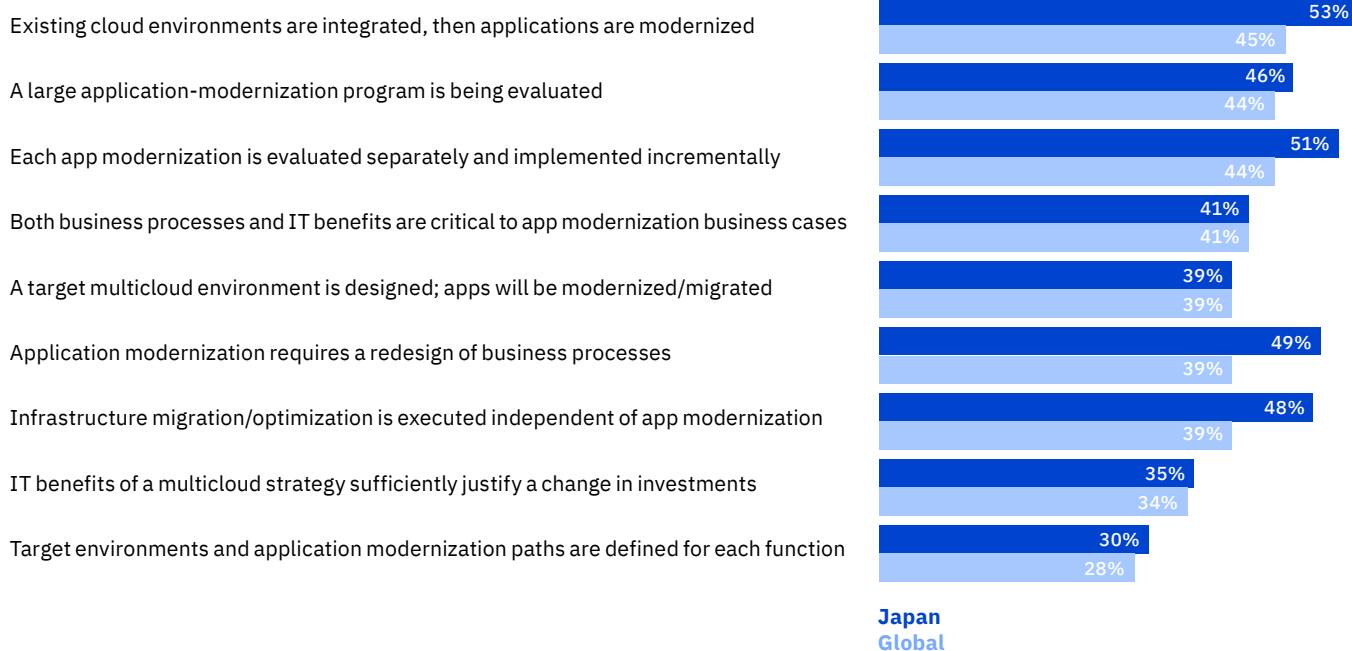
41% of global organizations agree that both business process and IT benefits are critical to application modernization business cases (see Figure 4). Accordingly, multicloud orchestration is not merely a technological imperative for your IT environment, but a critical enabler of the transformation of your operating model and ways of working.

With so many companies undertaking business transformation journeys, organizations are employing a variety of clouds to meet external customer demands and internal strategic, operational, and infrastructure requirements. Many businesses are operating in complex, three-tiered environments: public cloud, for customer-facing engagement and collaboration apps; private cloud, for mission-critical, security-conscious workloads; and traditional IT environments, where workloads reside behind firewalls, siloing business processes and constraining the free flow of data.

Each cloud is aligned with its own unique tool sets, intensifying an IT environment's complexity, accelerating costs, scattering workloads, aggravating security gaps, and constraining application development. These factors can nullify the advantages companies realized when they first moved to the cloud.

Figure 4

Design elements in the journey to a multicloud environment



Source: 2020 IBM Institute for Business Value hybrid multicloud survey, Japan (n=300), global (n=5,262).
Q20: Extent of agreement about your organization's journey toward a multicloud environment, (1-5), ([4,5] Agree)

Insight: What are containers?

Containers are packaged software environments with all the required code and other dependencies, allowing software to move smoothly from development to test to production without the need to be rewritten. This helps ensure flexibility and portability in a hybrid multicloud environment.

Here a cloud, there a cloud, everywhere hybrid cloud

But there is good news. In their best implementation, applications on public clouds, private clouds, and on-premises IT become interoperable and portable when deployed in hybrid cloud environments. As a result, most organizations are discovering that their hybrid cloud adoption is also proliferating. In the next three years alone, hybrid cloud adoption is expected to grow by 38% and the average organization in Japan will be using nearly six hybrid clouds.

Indeed, more than twice as many global CIOs expect to invest “significantly” in hybrid cloud in the next two to three years than the number who have made that decision to date. Interest in cloud—and hybrid cloud in particular—is clearly not waning; its role as a source of strategic competitiveness is accelerating.

To optimize the benefits of complex, hybrid multicloud environments, and align these to a transformation of workflows and the wider operating model, businesses need to be able to orchestrate tasks across different types of clouds and entire IT infrastructures. Enterprises need an application development platform that can run on any cloud, workloads that can execute seamlessly across multiple clouds, and a comprehensive orchestration capability that spans across all clouds.

According to our findings, building an open-source cloud platform has significant advantages. Over 68% of Cloud Aviators do, compared to 52% of Japan respondents. The innovation efforts of Cloud Aviators are enhanced by using an ecosystem of innovation partners and accessing open-source developers.

Only 52% of Japanese organizations have cloud infrastructure based on open-source technologies. Only 39% have a cloud infrastructure that enables multivendor portability without lock-in.

Accordingly, Cloud Aviators are actively using their superior cloud-enabled technology environment to drive innovation efforts by leveraging both internal and external capabilities. Through open-source technologies, Cloud Aviators are also better able to avoid vendor lock-in with a cloud infrastructure and management capability that promotes multivendor portability. However, only 52% of Japanese organizations surveyed have cloud infrastructure based on open-source technologies. Fewer still, only 39%, have a cloud infrastructure that enables multivendor portability without lock-in.

As hybrid cloud adoption gains traction, it is helping businesses develop their next-generation operating models. Hybrid cloud platforms can play a unifying role in orchestrating business and IT transformation and act as the technological glue that allows an organization to harness the full range of capabilities available to it for improved business and operational performance.

To this end, how can we characterize the benefits and essential characteristics of an open-source, hybrid cloud management and governance platform? How does a next-generation, vendor-agnostic, cloud management and governance platform operate in practice? What new sources of value can it unlock? And how can it be used to mitigate and reduce operational and technical risk?

Action guide

Design

Based on the specific business processes your organization requires to be competitive, modernize your IT infrastructure, development methods, and governance needs with a cloud-based platform infrastructure in mind. Your cloud platform needs to be open, hybrid, multicloud, secure, and managed.

To drive improved ROI, cut costs, and reduce risks in your hybrid multicloud environment by optimizing infrastructure, for example, automate repetitive and/or manual tasks such as service provisioning to increase productivity. Adopt open-source technology to optimize containers (see “Insight: What are containers?”).

58% of Cloud Aviators report that their workloads already span multiple clouds, compared to 37% of Japan respondents.

Step 3—Move Make the move to a hybrid cloud platform

Cloud platforms enable the capability to design or innovate once, and then deploy the output across the enterprise. Moreover, the versatility of managing both on-premises and off-premises implementations enables a client to modernize more workloads more quickly by reducing or eliminating data, security, or latency constraints. Once that is done, the workloads are more uniformly portable and manageable.

Through the use of containers and, particularly, a unified, open platform, organizations can decouple the rate and pace of business transformation from specific deployment model choices or constraints.

For example, the complex logic associated with mainframe environments can be modernized within a container environment local to the mainframe. Once completed, the environment, or at least key parts of it, become portable.

58% of Cloud Aviators report that their workloads already span multiple clouds, compared to 37% of Japan respondents. 54% of Cloud Aviators already deploy Kubernetes-based applications across multiple clouds, versus 33% of Japanese organizations surveyed (see “Insight: What is Kubernetes?”). And due to their lower-friction cloud infrastructures, 56% of Cloud Aviators report that the time it takes to release applications is reduced to days, compared to only 36% of Japan respondents.

While all survey respondents saw improvements in their ability to leverage data from investments in cloud, Cloud Aviators are better at translating data into relevant and actionable insights. This enhanced ability to generate value from data is supported by improvements in data virtualization. Accordingly, the journey to cloud and improved management of the multicloud environment are closely linked to both becoming data-driven organizations, and the ability to infuse data and analytics into day-to-day operations.

A Japanese financial services firm⁹

From its start, a Japanese financial services firm has practiced its philosophy of creating new value by deploying cutting-edge technologies to develop innovative services ahead of competitors. But while successfully driving growth, the company wanted to digitally transform itself to improve its customer experience. It also wanted to mitigate the impact of a shrinking domestic market and intensified competition from outside its industry.

To boost customer service and card-less (or cashless) services, the company decided to renovate its channels by deploying the latest cloud technology. The transformation achieved multiple benefits:

- Established a robust, scalable infrastructure using hybrid multicloud, helping to realize partnerships and provide new services
- Modernized its legacy systems by taking advantage of containers technology
- Improved its development productivity through cloud applications
- Mitigated risks by separating authentication and approval from applications and by leveraging standard technologies.

Insight: What is Kubernetes?

Kubernetes is an open-source platform that is used to manage workloads and services in containers. It’s highly portable and enables consistent, automated deployment of applications. There is a wide range of tools and support available for Kubernetes, which is maintained by the Cloud Native Computing Foundation.¹⁰

Cloud Aviators are over four times as likely to outperform their peers on revenue growth and more than three times as likely to outperform their peers on profitability.

Action guide

Move

Prioritize for your organization what needs to be moved to which cloud, in terms of risks, skills availability, value, cost implications, and vendor options. Determine which cloud makes the most sense based on which business processes “speak to” external parties (such as customers), along with which processes are strictly internal, the size of storage and number of servers required, and how many hours the workload needs to run per day.

Accelerate your migration to an open, hybrid multicloud environment using the latest technologies, such as Kubernetes, containers, DevOps tools and techniques. Optimize workloads in the cloud. Combine and eliminate redundant servers, identify unused storage and applications that run without being used anymore (but you are being charged for), and reduce the amount of time when certain applications run (such as development and test apps).

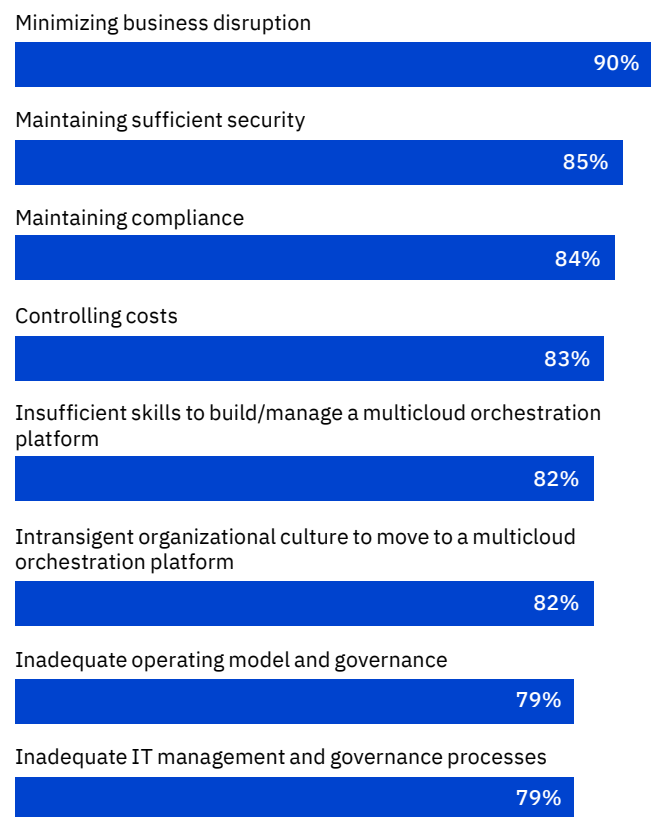
Step 4—Build

Translate cloud management into superior performance

Adopting a hybrid multicloud platform has its challenges. Ranking highest among these are minimizing business disruption, security and compliance concerns, and the need to control costs to build and manage a multicloud orchestration platform (see Figure 5).

Figure 5

Challenges of adopting a multicloud orchestration platform



Source: 2020 IBM Institute for Business Value hybrid multicloud survey (Japan cut, n=300), (1-5) 3/4/5 responses reported.

Applications and data may be two separate things; however, when building multicloud solutions, it's important to think of them together. Wherever you choose to run your apps, they need access to the required data. That data is governed across multiple clouds.

A key benefit of hybrid cloud is the ability to write applications just one time and deploy them anywhere in the enterprise or ecosystem—across public or private clouds. But the “build once, deploy anywhere” advantage is tightly linked to the use of common tools and application environments such as containers.

Cloud Aviators generate better revenue and profitability growth than their peers. They translate their advanced cloud capabilities into superior top- and bottom-line performance. In fact, Cloud Aviators are over four times as likely to outperform their peers on revenue growth and more than three times as likely to outperform their peers on profitability. This clearly demonstrates an ability to leverage their mature multicloud capabilities for tangible business outcomes and better financial performance.

The strong revenue and profitability performance of Cloud Aviators is, at least in part, driven by a number of improved enablers of business success. Key among these is a greater ability to spur innovation. While 70% of Cloud Aviators are in the process of developing new cloud-enabled business offerings, that is true for 53% of Japan respondents.

A Japanese credit card company¹¹

A major Japanese credit card company has been pursuing a strategy of delivering innovative digital financial services. But the credit card business and payment services in Japan have seen drastic changes, such as a prevailing cashless economy and cost-reduction pressure. And customers have been seeking new services.

The company adopted a solution that leverages open technologies to improve performance and time to market, achieve near real-time data availability, and implement a platform that increases reusability. The solution involves efficient methods for designing and developing applications, automatic generation of source codes, CI/CD (continuous integration and continuous delivery), APIs and microservices in containers, and security practices.

By leveraging APIs and services for back-end functionality and frequently renovating application features, the company has seen improved data availability and accessibility. It has used DevSecOps to automate processes such as build, security inspection, and deployment. It has improved the future scalability and the quality and efficiency of development. An OpenShift container platform provides high-quality performance to seamlessly respond to an unexpected increase in throughput. And the company has realized high availability and recovery performance during system failures.

Action guide

Build

Use hybrid multicloud to create next-generation digital capabilities. Execute these capabilities to help modernize your application portfolio and transform your business using exponential technologies such as AI, IoT, and 5G. Deploy and extend enterprise applications with multicloud technologies to unlock and transform core business capabilities.

Increase business agility with higher IT velocity. For faster time-to-market and to accelerate innovation at lower costs, develop and deploy cloud-native applications using the latest cloud technologies from any vendor. Speed innovation with the power and collaboration of thousands of open-source developers and an expansive ecosystem of partners and solutions. Exploit the power of data, analytics, AI, and emerging technologies to extract insights for competitive advantage. Cloud Aviators do just this.

Identify and build the management platform you need that includes common services for logging, monitoring, security, and identify access management. Use containers that enable images to run on any cloud, anywhere. An open-source approach is essential to work across various cloud vendors and for extensibility to future cloud-related technologies.

Step 5—Manage Drive business transformation

Cloud platforms allow for IT organizations to operate a consistent cloud management, security, and regulatory model. Currently, the proliferation of public and private clouds, combined with large sections of traditional on-premises IT, has created complex and often unwieldy business and IT environments for many organizations.

With each cloud aligned with its own tool sets and governance, the underlying promise of cloud is often undermined. This, in turn, limits an organization's ability to transform its ways of working and enhance business processes. Costs can be higher than anticipated. Workloads are sometimes scattered in sub-optimal, fragmented ways that aggravate security gaps, constrain application development, and hinder business responsiveness and agility. Critical business transformation efforts can stall thanks to the high degree of IT complexity.

It is not surprising, therefore, that for many buyers of cloud services, economic benefits promised by cloud vendors remain substantially unfulfilled in terms of cost savings, improved capability, innovation, and revenue realization.

Unwieldy governance across complex cloud and on-premises systems necessitates the need for an organizing environment able to seamlessly and securely facilitate management and technical interoperability. Hybrid multicloud orchestration—or Cloud Management Platforms—provide such a mechanism by enabling four key competencies: end-to-end coverage and capability, open architecture, seamless interoperability, and security resiliency.

Japanese organizations surveyed saw 46% greater reductions in IT operating expenses from their cloud investments compared to global respondents.

With so much data stored across various clouds and traditional IT systems, enterprises can struggle to attain their target operating models. Hybrid cloud's innate interoperability across IT systems virtually eliminates the need for extended transition periods as core data and applications are "cloudified." By integrating management of complex multicloud systems into a single IT control environment, Cloud Management Platforms enable users to comprehensively consume, orchestrate, and govern IT services across multiple cloud environments.

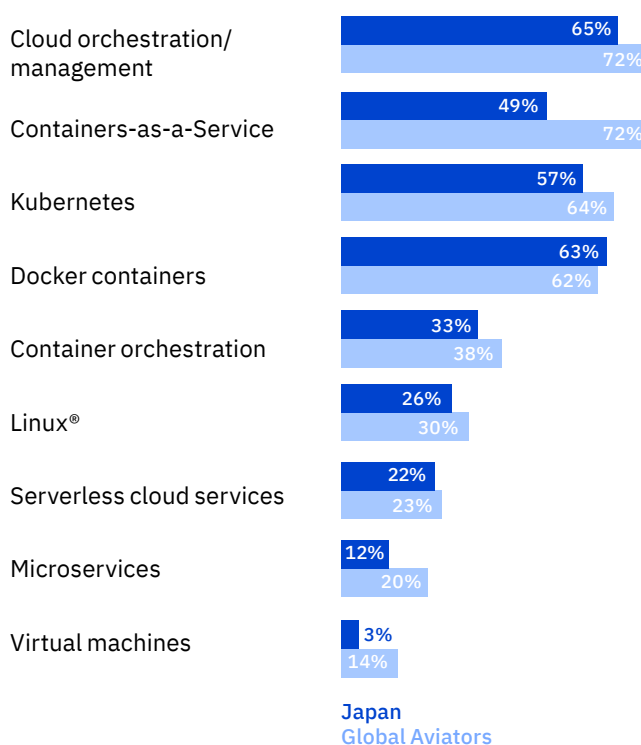
Also known as a "single pane of glass" solution, Cloud Management Platforms can serve as a control tower. This helps to overcome constraints and limitations generated by the myriad activities mismatched across disparate infrastructures. What's more, it directly addresses concerns of the 43% of IT executives in Japan who seek improved visibility and control of their cloud costs.

Multicloud management can be supported by multiple reinforcing tools and technologies (see Figure 6). While the multicloud orchestration platform constitutes a foundation, it can be further enhanced with containers, Kubernetes, and microservices. These tools act as building blocks for organizations' overall ability to manage their multicloud environment effectively. And well-managed multicloud environments play a key role in enabling business transformation.

To ascertain the impact of specific multicloud management tools on business performance, we have conducted a more detailed econometric analysis. The statistical of our global sample shows that the adoption of several cloud management tools is strongly associated with being a business outperformer. In fact, this combination of tools is correlated with outperformance on revenue growth compared to peers by more than 15%.

Figure 6

Key supporting multicloud management tools



Source: 2020 IBM Institute for Business Value hybrid multicloud survey, Japan (n=300), global (n=5,262). Q8_1: Multicloud environment used by your organization today.

Meanwhile, several individual tools, notably the orchestration platform, Kubernetes, containers-as-a-service, and docker containers, make significant contributions of between 1.5 and 2.8% each. This suggests that adoption of mutually reinforcing multicloud management tools leads to improved business impact. Accordingly, the successful journey to cloud needs to be accompanied by cloud management capabilities that are underpinned by several relevant multicloud management tools.

As important as using consistent tools is the need for consistent developer experiences. Using different tools is a significant drag on developer productivity. Tools exist that provide a common developer experience.

Cloud Aviators translate their superior cloud performance into greater operational efficiency and reduced costs. Through better management of their cloud environments, Japanese organizations surveyed saw 46% greater reductions in IT operating expenses from their cloud investments, and 67% greater reductions in maintenance costs, compared to global respondents.

The greater operational performance of Cloud Aviators is closely linked to an enhanced ability to implement new agile ways of working, and more efficient approaches to developing new solutions.

To assure visibility and control costs across all their clouds, vendors, clusters, and data, 66% of Cloud Aviators say a single pane of glass management approach is needed, versus 43% of Japanese organizations.

Most organizations still have a long way to go to be able to manage their IT infrastructure on a single pane of glass. One reason: only 39% of organizations in Japan say their developers write and modernize applications using consistent tools.

Action guide

Manage

The goal of cloud platform management is a reliable and intuitively responsive cloud environment that increases end-user satisfaction and tightly integrates business demand and operations with IT services and operations at reduced costs and risks. But achieving this isn't static.

Cloud services needed and used by your business will constantly evolve. Keep up with business processes that business functions have moved to the cloud, potentially without your knowledge.

1. *Optimize continuously.* Perpetually improve server use, and identify unused storage, resizing and/or shutting down virtual machines. Continuously manage costs.

2. *Govern holistically.* Implement a governance dashboard that manages across the entire cloud environment today and is extendable to future anticipated technologies that will be governed in the cloud environment. Flexibility in selecting management tools is essential because operational activities are distributed throughout the organization. To enhance adoption, develop open source-based governance policies so that individual business functions can easily modify them as needed.

3. *Enable self-service.* Ask IT to respond in real time to market demands. Streamline typical activities, such as setting up a new cloud service or deleting it, access control and other security functions, and billing management.

4. *Take measurements.* Establish qualitative and quantitative measurements to help ensure the resiliency of your overall hybrid IT environment and its impact on your critical business processes.

IBM Institute for Business Value

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Methodology

From February to April 2020, the IBM Institute for Business Value, in collaboration with Oxford Economics, surveyed over 6,000 executives globally, including 300 executives from Japan, across industries, job titles and geographies to gain an in-depth understanding of their organizations' current use of hybrid cloud, multicloud and their approach to multicloud management. In addition, the survey collected data on business performance and the benefits that organizations realize from multicloud.

Analysis of data from the survey let us ascertain current levels and nature of adoption of multicloud as well as expectations for the future. We also were able to specify the strategic drivers and enablers for the successful multicloud journey.

Our study estimates the business benefits of hybrid cloud adoption and the use of multicloud management tools. We did this by defining a group of Cloud Aviators that are notable for their maturity in multicloud functionality, strategic approach and active use of tools for multicloud management and contrasting their business performance and benefits from multicloud relative to other respondents.

Moreover, we conducted econometric analysis of the data to get a more detailed understanding of the business impact of adopting different multicloud management tools.

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