

# The Impact Of **Cloud Computing** In 2021

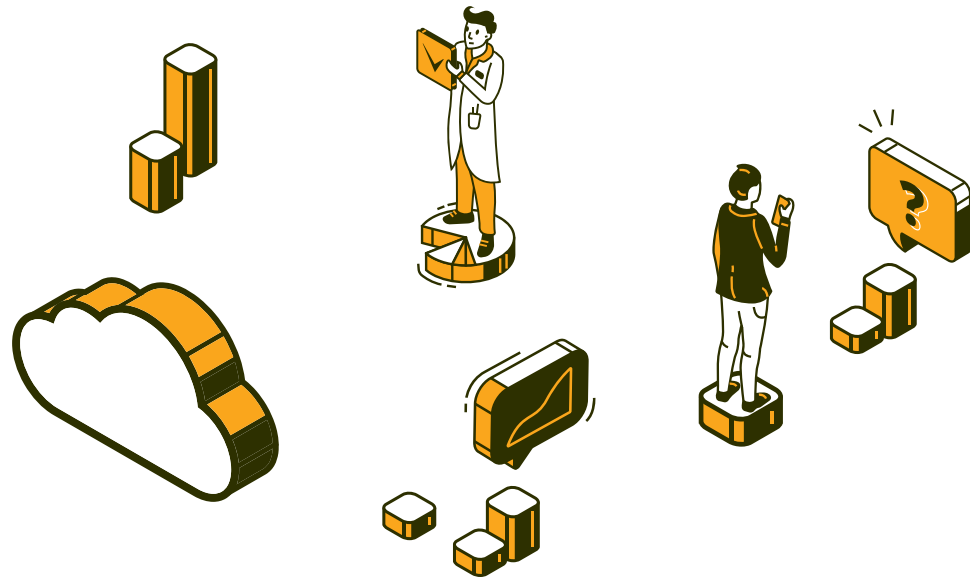
The Ultimate Industry Outlook  
For Cloud Professionals



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To deliver applications and services that drive business growth and meet customers' evolving needs in the digital age, enterprises need to transition to a cloud-first strategy in 2021. As we continue to see, the key to success in a cloud-native strategy is not about “just getting it to work” but “getting it to be a business differentiator.”

Cloud-native has gained momentum at the application layer and in “serverless” computing, where the costs and overhead of stateful operation are radically reduced. But what about the business itself? What is changing with cloud-native?

- ✓ First, consider the shift in thinking from end-to-end to how things get done in a software-defined world. This way of thinking now permeates every phase of software development and production. It's no longer all about moving to the cloud but finding value and iterating with a fully integrated DevOps process. It's moving from creating a product to creating an experience. With that in mind, IT should be putting the customer first, not always thinking only about operations.
- ✓ Second, consider the rapid pace of innovation and new market models. In a digital business, every visitor is a potential customer, and every business needs to move with the times. It's no longer just about “customer experience” but about the total experience, from design to production. One area that's growing with cloud-native is the rapidly expanding range of service-oriented offerings. Whether you are selling SaaS to an enterprise or powering the services that power a consumer app, you deliver services, and cloud-native drives this change.

- ✔ Third, consider the increasing business maturity of cloud-native. As the new management platforms come online and customers see how they benefit from these tools, they embrace them at scale and accelerate their cloud-native move. It's not just new platforms. In the IoT world, it's microservices that accelerate the adoption of new capabilities like the edge and cloud connectivity. It's containers that deliver a more agile development model. It's orchestration tools that provide a container orchestration framework.
- ✔ Fourth, consider the role of edge computing. There is no doubt that there will be an explosion of edge-related services, and cloud-native is driving this adoption as well. Whether it's a data center in a remote location or a distributed cloud of resources near the edge, what does it take to get there? What new features do you need in your deployment?
- ✔ Fifth and finally, consider the role of DevOps and how it enables cloud-native adoption. Now, you have to implement the technology. You have to implement the culture to make it work. The challenge is creating the right internal enablement program that focuses on the right outcomes and gets everyone aligned. For example, the role of metrics, gaining recognition for success, and identifying improvements.

# Transition to cloud-native in 2021

In the age of rapidly evolving technologies and continually growing IT needs, the pressure is on to keep up. Cloud-native can be a “cost-effective and manageable” way to address increasing technology and operational needs.

The advantages of cloud-native computing include:



Simplicity



Organizational agility



Automation



Software-defined and scalable



Shared services capabilities



Increased security

Cloud-native architectures allow for a single source for hardware, software, and security. Through standardized data storage and an increase in connectivity options, cloud-native computing creates new revenue streams for cloud providers. Because of the flexibility that cloud-native architecture provides, enterprises can adopt cloud-native applications at any point in the product lifecycle. The best part? This is a differentiator for cloud providers, not an inhibitor. Many of these providers have open APIs, so you can integrate with partners that are using similar cloud-native architectures.

Technology leaders who leverage cloud-native technology will deliver highly available applications built to scale with fast-changing environments. As cloud-native software expands to include the compute layer, a move to the public cloud will accelerate the speed at which organizations can adopt it.

# How to transition to a cloud-first strategy in short

Start with your data and data consistency. Why are you having trouble with data consistency? Do you know what your data looks like? Do you know how to query your data? You need to answer these questions before moving to the cloud.

Keep going with your data. You can't move to the cloud and just stop at the data; if you want to go to the cloud, you're going to have to do much more than just shift. You have to redesign your business processes and understand what the data should be used for. The cloud provides data services, but you have to also rely on the service to be available.

Take the time to go through your Data Dictionary. A Data Dictionary is not a simple document: it is a reference guide to your company's data. You need to write down what is different between your on-premise data and the cloud. If you're still using MySQL, you need to know that. If you're still using SQL Server, you need to know the differences between relational and analytical databases. You need to learn that, write it down, and make sure to keep it updated.

You should also have a process for importing data from the cloud into your on-premise database. If you don't know which version of your data is the most recent, you can't maintain your data dictionary. It's not as simple as merely importing data into a new location. You should be working with the data you have and identifying a way to bring that data into the cloud. You don't want your data to get lost.

When you're ready, you can move to the cloud. Once you're there, you have to start writing the software to access the cloud services, which means you also need to write software to access the legacy data. A hybrid cloud has two separate sets of requirements. A well designed hybrid cloud can meet both criteria. If your data is consistent, and your data consistency needs are well-defined, then you're off to a great start.

# Why you will want to leverage microservices architecture

With the explosive growth of the digital economy, traditional centralized architectures are not the best solution. Just because applications have traditionally been built on top of single application architecture doesn't mean that's the only option anymore.

Many organizations have realized the benefits of microservices, or small, modular applications that leverage technologies such as Docker, Kubernetes, and Kubernetes container orchestration. These applications use a shared programming model, are horizontally scalable, and can work together across a large number of systems. As a result, organizations can more easily enable a holistic, end-to-end application development cycle. The rapid development cycles that cloud architectures offer can bring together a broad range of teams to build and operate applications that are more reliable and easier to maintain.

The advantages of microservices architecture include:

- ✓ Increased speed
- ✓ Leverage modern technologies, such as containers
- ✓ Work with developers from anywhere
- ✓ Scalable

Cloud-native technologies and architectures are becoming increasingly popular with global organizations. So, why should you look to them for your company's technology infrastructure? These technologies offer the right combination of speed and cost, scalability and flexibility, and collaboration across teams.

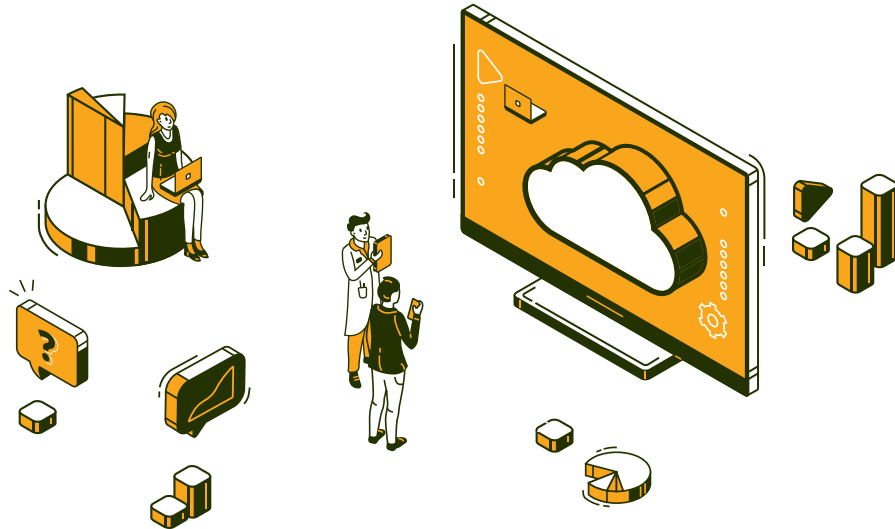
Companies that leverage these technologies will have the ability to create and implement a centralized application development and delivery process that maximizes cloud technology use and incorporates microservices architecture. This architecture and process will help you scale and keep up with the rapidly evolving demands of a changing business environment. As the digital economy continues to grow, companies will need:

- ✔ A flexible, robust, and scalable cloud infrastructure to support their applications;
- ✔ A cloud platform to address ongoing business demands, and;
- ✔ A cloud platform that will be an easy adoption and enable the development of apps that provide new levels of innovation and provide more customer value.

One such organization is Microsoft, which has embraced cloud-native and microservices technology to support its enterprise and public cloud businesses. For example, Microsoft built and launched its Azure Container Service (ACS), a service that provides enterprise-grade Kubernetes container orchestration and container support for Microsoft-as-a-service-based applications. Microsoft uses a new, more flexible, microservices-based application development and delivery model to allow customers to utilize Microsoft technologies while supporting a more significant number of environments and data stores. Through its efforts, Microsoft has created a repeatable, repeatable, and scalable delivery model based on a microservices architecture.

The microservices-based application development and delivery model will significantly impact the organization's overall agility. As a result, the company will be able to rapidly design, build and iterate on new applications and integrate them with existing applications, increasing innovation in new and current business lines and delivering unique, differentiated products and services. Microservices architecture will help you meet these business goals by fully engaging all IT groups while focusing on end-to-end development processes, improving the quality of existing applications, and, ultimately, increasing customer engagement.





## How microservices architecture can improve your business in 2021

Creating microservices architecture can allow your business to focus on its different products and services. And while this is great, it does come with specific challenges. The cost of managing the application can be too much, and ultimately the infrastructure may be at risk of being unpatched.

But on the flip side, having a single record and identity system can significantly improve service quality and reliability. Plus, organizations will be able to re-purpose components and identify where inefficiencies exist with much less effort because of the shared functions.

### Pairing the Right Applications with Microservices

So how can you best implement microservices within your existing applications? While the implementation can be more complicated, the strategy is still relatively simple. With the right approach, you will be able to quickly test, build, and deploy your microservices.

Consider your application and consider the components that it relies on. Think about how services (or microservices) would interconnect together. If you take an overall architecture view of your application, you'll likely see how each of the application components interact with each other. Consider what services would provide the business value to the overall application. And decide how they are going to interact to create the services or components you need.

Now that you have the above in mind, build the application from the bottom up with the service interface in mind. You should consider how the different components could benefit each other, and in turn, you'll be able to establish the interaction between them.

Understanding component interaction is also important to ensure that the services work together to create a cohesive application. This cohesion is essential to ensure that the application has a one-to-one relationship with the user.

## **Consider Microservices as More than Development**

Whether you're implementing microservices for development or operational purposes, remember that the aim is to help your company deliver better products and services to its users. A microservices-based architecture will help make your organization more effective and deliver greater value levels to customers.

In addition to the business benefits, microservices architecture can increase your efficiency and improve your efficiency. Take the approach of pairing the right applications. You will be able to more easily identify where inefficiencies exist within your application and apply them through the development lifecycle.

Microservices will not automatically save your company. But if done correctly, microservices can help improve your company's ability to perform operations and provide better service to its users. Microservices can make sure that your business is operating at peak levels and at a fraction of the cost of running without microservices.

# Choosing between AWS, Microsoft Azure, and Google Cloud in 2021

Choosing between AWS, Azure, and Google Cloud is no small task, but if you've been around this industry for some time, you'll recognize these prominent three vendors. I've spent some time with AWS, and I'll have a look at Google Cloud next week.

The first thing to note is that your data center's size is much more important than you might think.

One of the key trends we've seen over the past few years is data centers' explosion. It would have been inconceivable five years ago. But a few years ago, most big organizations were concerned about data security. The public cloud seemed a stupid idea, mainly as you can find yourself locked into a vendor for five years.

Today, the cloud has come of age, and there are several reasons to use the cloud.

First, the value proposition is obvious and appealing. If you need to scale and not do it organically, an integrated cloud solution can provide elasticity, load balancing, and management. And if you're looking to move the processing closer to the customer, it gives the advantage of being available 24/7/365.

Second, the economics are compelling. Nowhere in the world is the cost of power or cooling more critical than in a data center. So the experience in big data centers has become almost a battleground, which is a problem as users have no idea whether their data centers are built to consistent standards. The operators can't (and won't) help.

Third, vendors are responding to user concerns and have stepped up their game in this area. For example, most Elastic Block Storage (EBS) products now feature sophisticated features, such as scaling across multiple regions. And EBS deduplication is now available.

Just remember, though, there are two types of customers in the data center world: an incumbent and a challenger. The incumbent demands a cost-effective solution and works hard to make sure it is, regardless of any other factors, and that's how providers will survive. If you're a challenger, you're less likely to be constrained by these demands.

## The era of serverless

The majority of serverless solutions come from AWS. The reason is simple. The economics and security, plus the way the developers work with the cloud, are very similar, which means it's relatively easy to port code.

One area of debate is economics because, to no small extent, AWS is ripping off the current user. The following are some of the critical points in this debate:

First, think of the old paradigm. When you start, you want to build up features on your web application until you reach an early point where you will begin to sell it.

In the old paradigm, you would do this with a C/C++ developer, and you would need a system of documentation to cover the whole application. And it would take an average of four months to go through the documentation and get up and running. That involved the cost of one person for four months and is why you had to have a bunch of engineers on the road.

This concern is still valid in theory, but the public cloud makes this obsolete. You can start a serverless project by opening an API, and you will sell the whole thing in a day.

That means that, by using the AWS Lambda service, you can operate a serverless project without the need for a CTO to be involved. In turn, that means that the traditional systems can be turned on or off at will, removing all the pain of re-architecting if you want to add something else.

Vendors have responded. Some have made perfect moves in this area, including Terraform, which I have covered previously.

The second point is how developers work with the cloud. In traditional projects, you would start with a developer and an environment. Then you'd hand the developer a build/deployment environment, which usually consisted of a Linux box, a database server, and a language server. And the process would take two weeks.

In the old paradigm, you would start the project and monitor it as it went, reporting users' progress.

In the cloud, there is no monitoring. You start with a console, and you don't need to monitor anything. Developers just plug into the console, and then they get their experience and do their job.

Your developer can play and experiment with different projects without knowing if your instance is already starting to sell or not. It can also do things that would be impossible in the old paradigm.

The serverless paradigm frees developers to work in a fashion that we call a serverless mindset. Now they can create applications without depending on the classic development lifecycle, with no delays or bottlenecks and no need to account for legacy applications.

To this end, the advantage of serverless architecture is that developers can deliver instant solutions, without a need for those classic system engineers to navigate an ever-expanding development process or for all the coding practices and infrastructure that goes with it.

The cloud makes life easier for the developers through how the developers work with the cloud and how Development works with the organization. It makes it possible to do with a single line of code what would otherwise take a team of engineers months. That is the holy grail for software developers, and while AWS is a potent tool, it will always have its limits. Consequently, the client will still have to decide on the infrastructure they will use, with a view to the cloud or in a more traditional way.

Scaling becomes more difficult. Instead of having a dedicated team of engineers, you now need to hire people who will work in the cloud, and you'll need to train them on the security and performance of your code.

With a traditional approach, the software developer's skills are continuously upgraded, with the need to purchase expensive hardware and licenses of the software that the developers are working on.

If you are using AWS, you can go either way. You can use the code to develop your application in the cloud and then replicate it into your AWS infrastructure. You'll take advantage of the automatic scaling and the scalability.

If you do that, you will effectively turn your applications from virtual servers into containers. That transformation will help to improve the performance of the apps and to simplify the management of them.

If, on the other hand, you are looking to migrate to the cloud, you can still use the infrastructure of AWS, but you will start with a containerized application. This containerized application will be portable to any other cloud, allowing you to continue to scale quickly and cost-effectively.

That is based on the serverless framework, which can run on an AWS infrastructure in a containerized form. That allows the automatic scaling to keep an eye on the traffic load.

Most importantly, you won't have to worry about spending a considerable amount of time and money upgrading your apps every time you want to scale.

On the flip side, the framework allows you to experiment with a serverless solution quickly. This ability is a powerful thing for an IT manager, who would otherwise find it hard to experiment with new technologies and concepts.

Developers can run new versions and experiments, and the organization can reap the benefits of their results.

This is what the provider provides for clients, allowing them to immediately see what the new application will look like, how it will perform, and how it will scale. It means you get instant insight into the architecture, the business logic, and how it can be rapidly and cost-effectively adapted to meet future needs.



## How are organizations approaching the challenge of cloud management and operations?

Organizations are increasingly seeking to blend their on-premises IT solutions and the cloud. The popular term “hybrid” reflects the desire to maintain technology control while moving to a hybrid environment. “Full” on-premises-based applications and infrastructure allow organizations to retain their existing infrastructure and IT services, as well as leverage public cloud applications in ways that many choose. A hybrid IT infrastructure will enable businesses to take advantage of both public and private cloud infrastructure at scale. A fully on-premises-based cloud is ideal for organizations that use various technologies – such as distributed computing, storage, and big data – to support their business, and have additional physical and virtual data centers for specific workloads.

These approaches have the potential to make a significant impact on business outcomes and build a foundation for accurate cloud management and operations. However, many organizations struggle to attain the full benefits of the hybrid cloud. Here are several of the challenges organizations are facing:

The on-premises IT infrastructures that many organizations built 20-30 years ago are being put under pressure by cloud management and operations solutions that have become very advanced and are designed to support more-efficient on-premises environments. On-premises IT still holds many essential benefits, such as control of the data center environment, centralized IT management, custom tooling, and support for local hardware and software. However, new management and operations solutions often focus on “automating the dynamic physical world” without considering the on-premises IT environment’s unique and dynamic requirements. That often leads to a “worst-of-both-worlds” situation: systems that are too complex and require far more effort to manage than a fully on-premises-based system. The operational tools needed to support these new, more-efficient on-premises IT environments are not always compatible with the complex on-premises IT tools organizations have come to rely on.

Another issue facing organizations today is the variation and lack of standardization of cloud services. Organizations need to integrate a wide range of on-premises IT systems and infrastructure. Different cloud services may not have the same security or configuration level, and some cloud services require distinct management and operations toolsets. If an organization is integrating its on-premises solutions and cloud services, it will need to find a solution to manage all the cloud services.



**Changing business processes as cloud changes business:** Today, organizations are actively working to create and integrate solutions that integrate both cloud and on-premises systems and infrastructure. However, these systems are complex and integrate many components that have not traditionally been connected. To enable successful integration, both cloud and on-premises tools will have to be brought together and standardized to address standard cloud management and operations challenges.



**New requirements for storage:** Companies are moving more workloads to the cloud but at different levels. Organizations need to balance their data workloads and applications such as file and print services that reside on-premises. These will need to be managed to meet cloud management and operations on both a consumption and protection level.





**Interoperability of cloud services:** There are many cloud services, such as Oracle applications, that require specific tools to be used. Organizations will have to adapt and embrace both on-premises and cloud tools to manage their complex systems. Also, as more cloud services become available, they will have to determine which cloud services are most useful to them and combine these tools into a single platform.



**The need for contextual support:** Cloud systems are, by nature, highly distributed. Organizational processes are not uniform and can differ between the different business units that exist in an organization. There is often a need to standardize to make on-premises and cloud environments more efficient and meet the cloud's requirements.



**What to look for:** Many solutions out there address many of these issues, and there is no silver bullet. Consider these features when evaluating cloud management and operations solutions:



**Focus on an on-premises-based IT management solution:** Being “all in” or “none in” in the cloud can result in a proliferation of vendors, technology integrations, and internal data silos. It can also be complex to manage cloud workloads. A vital goal of any solution should be to control and manage the on-premises IT environment.



**Organizational support of cloud workloads:** Some organizations will have control over specific cloud functions, such as networking or security services. Others will need a “cookie-cutter” solution that can fit the organization's needs and support many cloud services. In some organizations, a cloud management and operations system can support various IT functions, not just the infrastructure in the cloud. The needs of an organization will determine the needs of the cloud management and operations system.



**A broad-based platform that provides many tools and capabilities:** An organization looking to manage the entire IT environment can put many tools together. They can be purchased a la carte and integrated with different parts of the organization's IT environments.



**Integration with on-premises tools:** Some on-premises systems require special management tools and access to various cloud services. This requirement is often driven by the need to provide users with a single set of tools to control their workloads and have them use those tools to manage on-premises systems.



**Integration with on-premises systems:** On-premises systems require cloud management and operations systems to connect with them. An essential requirement for cloud management and operations systems is to integrate with on-premises systems, especially when using them for file and print services and other types of on-premises services.



**Centralized management capabilities:** Some of the fundamental cloud management and operations tools require some form of centralized control. These include tools that provide the ability to control or access cloud services, provide security, perform policy enforcement, and automate processes. A vital goal of any cloud management and operations system will be to give this centralized control to support the organization's needs.



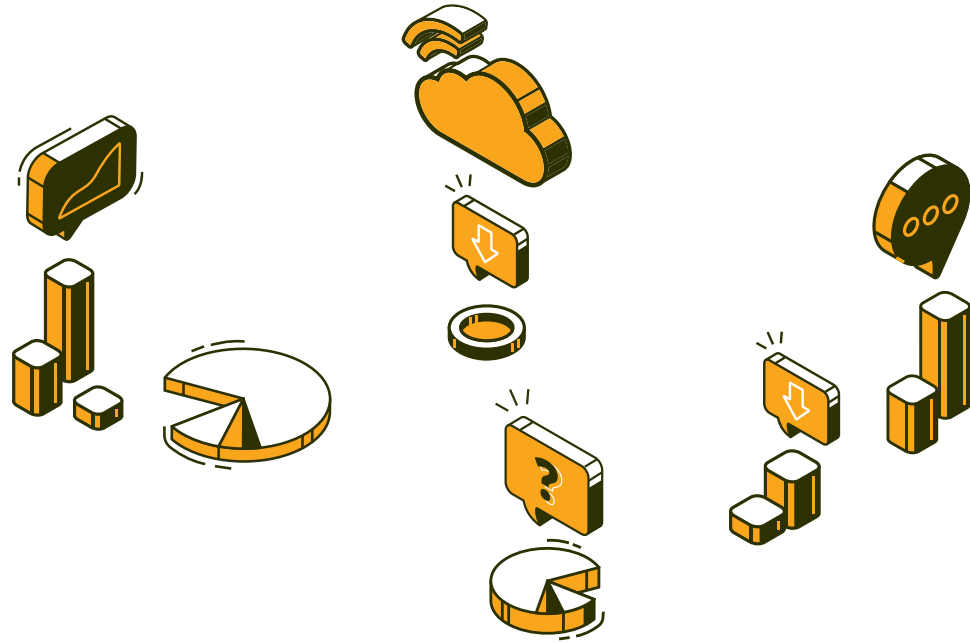
**A range of cloud-specific management tools:** Organizations will need a wide variety of tools to manage and analyze data, including devices that support SaaS-based apps and tools that collect and analyze data stored in Amazon S3. While the organization can use tools such as VMware, Citrix, and OpenStack, a vital goal of any cloud management and operations system should be to support a variety of different cloud technologies.



**Hybrid computing environments that support on-premises and cloud:** IT environments that support on-premises, as well as cloud, will be necessary to support a variety of scenarios. Cloud platforms that offer the ability to add shadows as needed will be required.



**Highly integrated platform:** Having a single management and analytics tool across the IT environment will be essential to provide a holistic view of the IT environment. This overview will allow for real-time monitoring and control of cloud resources and provide unified access to on-premises resources and infrastructure.



## Cloud is already part of your business; now is the time to capture the cloud's full value

In many ways, the cloud has been too long overlooked. Many organizations are still facing challenges in developing and implementing suitable business models for the cloud. Businesses that have deployed a hybrid or fully on-premises-based cloud environment face different issues with business value maximization. The core issue is that many organizations are making choices between integrating cloud to core operations - and fully integrating their cloud capabilities to their core businesses. When choosing one, they are often not fully achieving either.

Why can't the same experience be enjoyed in both approaches? Because the business cloud services are built on the infrastructure and managed by someone who is not necessarily as familiar with the business as the people who are using it. Unless your business is built around the cloud, you may find it a difficult adjustment to figure out how your key people will use cloud services.

Cloud does not exist in a vacuum. It requires an integrated approach that goes much deeper than many business people or IT operations people are comfortable with. Many organizations face difficult issues, such as the transition of the development, testing, and release processes to the cloud or finding the cloud to be a big jump from their old model. You must change the full cloud management and operations model. Unless you can engage with the business on a much more meaningful level, the cloud is more likely to create more problems than it solves.

Many organizations can get to some cloud maturity level without changing the enterprise cloud management and operations model. Many companies may have begun a cloud journey with a single dedicated managed cloud provider. Over time, other providers come into their lives, integrating them into their overall cloud strategy. Then it gets even trickier because some clouds are dedicated, and many are cloud services in their own right. Many organizations are now looking at combining their cloud services to provide a broader solution for their business, using a hybrid cloud model that works best for them.

The question that should be on many people's minds is not whether the cloud is the right solution as you move into 2021, but what is the best approach to cloud adoption in your organization? Achieving business outcomes requires new ways of thinking. A single solution that delivers a combination of services is unlikely to provide a complete transformation. In a "hybrid" model, you still need to integrate the cloud services into your business processes, or you risk losing the benefits of that broader solution. In a "fully on-premises-based" environment, you still need to integrate cloud services to your on-premises business and need to manage them differently than cloud services you might build from scratch.



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