

the
GORILLA
GUIDE[®] to...



Navigating Cloud and Multi-Cloud Environments

How the Cloud Has Enabled the
Work-from-Home Explosion

CARY KOSTKA

Navigating Cloud and Multi-Cloud Environments

By Cary Kostka

TABLE OF CONTENTS

Introduction.....	4
Hybrid, Multi-Cloud Scenarios Continue to Evolve.....	5
Poly Cloud Adds an Exciting Page to the Multi-Cloud Chapter...	6
Hybrid and Multi-Cloud Scenarios Remain Largely Unchanged.....	8
Cloud Computing Will Continue to Grow.....	9
The Cloud Experience Will Continue to Change How Business Uses IT.....	14
Edge Computing Movement Gains Traction.....	17
Cloud Is the Future.....	19

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Introduction



Welcome to The Gorilla Guide To...[®] Navigating Cloud and Multi-Cloud Environments, Foundation Edition! If you're wondering which cloud and multi-cloud trends could contribute to your organization's success, this book is a great starting point.

IT executives and staff are frequently being asked by their customers to incorporate more cloud-based business tools. Although many already had some form of cloud presence by 2019, there are still many organizations waiting for the right moment to make a switch.

Little did they know that the global pandemic would force a variety of decisions to address the sudden transition from supporting in-house workers to supporting remote workers. These decisions have necessitated an expansion of how the cloud will be used to keep workers productive today and into the future.

Now is the time for the maturation of cloud and multi-cloud environments. Cloud usage will continue to increase, as companies seek to capitalize on the benefits offered by multi-cloud strategies. Changes will be seen, though, in how businesses implement the cloud, fueled by well-defined procedures and the emergence of innovative cloud technologies. Although the unrelenting demands for more power and more access will still come down from the C-suite, the tools available to IT departments will make meeting these demands easier and more intuitive

The combination of these demands and the expected maturation of cloud-based processes will keep IT managers and CIOs out of their comfort zones to deliver cloud-based technology that builds on the recent productivity and performance gains. This will continue to fuel a digital transformation that remains limited only by the creativity of engineers in using the cloud as a fundamental basis for business IT needs. Multi-cloud environments will continue to evolve from trend to requirement, and the influx of tools and methods will give IT leadership an edge in staying ahead of the curve.

Hybrid, Multi-Cloud Scenarios Continue to Evolve



The defined categories of public, private, and hybrid cloud structures will blur as multi-cloud gains momentum. This is similar to the trends seen recently, where businesses sought ways to add business continuity in the face of an explosion of remote work.

This doesn't mean that the end of on-premises server rooms is looming, as any network environment—from large enterprises to smaller networks—will sooner or later face a requirement to host an application or network functions on a physical, on-premises server. The primary concern for IT departments regarding the cloud remains unchanged. They must still achieve the perfect balance of meeting and managing on-premises requirements while shifting primary operations into the cloud.

The demonstrated agility by major cloud players to support the shift toward corporate hybrid cloud environments addresses two key scenarios. Those already invested in a multi-cloud strategy can continue to evolve their systems to match emerging cloud technologies. Meanwhile, IT infrastructures that are just starting to dip their toes into the multi-cloud waters can do so with proven strategies and tools at their disposal. And, rather than being limited by the use of one siloed cloud vendor, they'll have the ability to branch out and use the most appropriate vendor in the most logical place.

Poly Cloud Adds an Exciting Page to the Multi-Cloud Chapter



As multi-cloud environments continue to evolve, an exciting new twist has appeared on the horizon for cloud computing. Poly Cloud is a trending way for businesses to support single applications or data volumes using multiple cloud providers.

Although sometimes used interchangeably with the term multi-cloud, this is inaccurate. Poly Cloud differs from multi-cloud in that you may run specific business functions using the best cloud provider for that function. For example, a cloud-hosted SQL application can utilize the open source features of AWS while enjoying a completely compatible data path of Azure-based data sets, all while providing a single point of access for a user (see **Figure 1**).

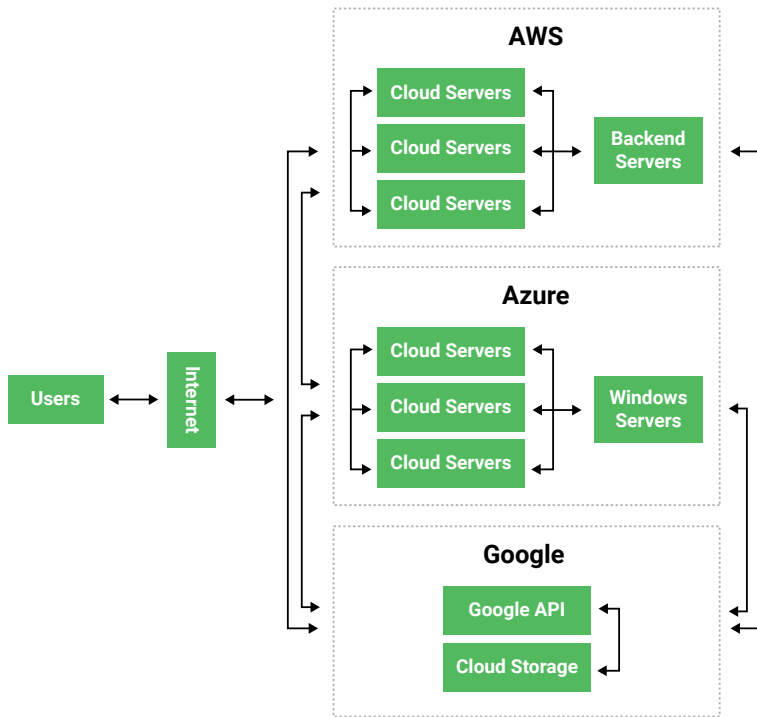


Figure 1: How Poly Cloud works

A number of cloud providers, such as AWS, Azure, and MongoDB, now offer native support for Poly Cloud strategies. Users looking toward Poly Cloud as a foundational strategy can also expect a wider range of tools to come available in 2022, as occurrences of Poly Cloud continue to increase.

Poly Cloud makes it easier to avoid vendor lock-in and encourages collaboration with partners due to its ability to interconnect multiple data sets regardless of the cloud-based source.



The continued evolution of cloud configurations will become more complex on the surface, especially when Poly Cloud is considered. IT teams will need to keep this in mind as they build or expand their cloud-based infrastructures.

So instead of choosing between cloud providers and an on-premises data center in a multi-cloud approach, you can align only the best-suited elements of all your options to create a more optimized multi-cloud environment. This better positions the multi-cloud environment as the network infrastructure model of choice.

Hybrid and Multi-Cloud Scenarios Remain Largely Unchanged

Despite the appearance of Poly Cloud, the overall structure of hybrid and multi-cloud scenarios will remain largely the same. That said, each will continue to provide its own unique functionalities that need to be noted before choosing your strategy:

- Hybrid clouds are a mixture of public and private clouds aligned to work together in an IT infrastructure. Applications, data, and business processes are seamlessly intertwined in a hybrid cloud scenario, essentially

providing a centralized network infrastructure that simplifies monitoring, security, and resource management tasks.

- Multi-cloud configurations can also be a blend of public and private clouds, but they're not expected to work together as a cohesive infrastructure. These cloud scenarios don't contain any dedicated links between systems, and are often used to incorporate physical and virtual network components, as well.

Cloud Computing Will Continue to Grow



It comes as little surprise that cloud computing, which surged in 2020, will continue to do the same this year. According to [Gartner Inc.](#), spending on cloud services is expected to grow by almost 17% in 2022. But unlike the growth of 2021, which was fueled by the pandemic, current growth will be stimulated by the standardization of containerization, edge computing, and an increased appetite for virtualization (see **Figure 2**). With many IT infrastructures and budgets already optimized, now is the time to utilize proven cloud technologies to maintain high standards of productivity and customer service even as employees begin their return to the office.

**Worldwide Public Cloud Services End-User
Spending Forecast (Millions of U.S. Dollars)**

	2020	2021	2022
Cloud Business Process Services	46,131	50,165	53,121
Cloud Application Infrastructure Services	46,335	59,451	71,525
Cloud Application Services	102,798	122,633	145,377
Cloud Management and Security Services	14,323	16,029	18,006
Cloud System Infrastructure Services	59,225	82,023	106,800
Desktop as a Service	1,220	2,046	2,66
Total Market	270,033	332,349	397,496

Source: Gartner (April 2021)

Figure 2: Illustration of key cloud-based service growth

The addition of maturing services, and proven ways to implement them, into the hybrid cloud approach will continue contributing to its explosive growth. Leading the charge will be Infrastructure as a Service (IaaS) and Software as a Service (SaaS). According to Gartner, IaaS is expected to double in revenue in 2022, with SaaS accounting for one-third of cloud services revenue. As the popularity of these services increases, so, too, will the number of organizations using hybrid cloud platforms as their network infrastructure foundation.

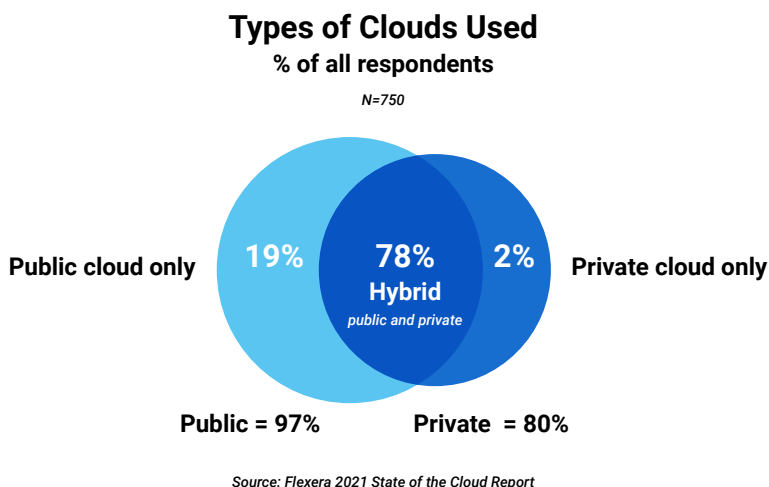


Figure 3: Companies are increasingly moving to a multi-cloud model, according to Flexera (Source: Flexera 2021 State of the Cloud Report)

The hybrid cloud model will continue to dominate cloud-usage strategies in 2022 (see Figure 3). This model provides a centralized foundation for supporting the recent advances in cloud-based technology. Functions, such as containerization, are better managed and secured in a hybrid cloud scenario. In turn, businesses become more agile in responding to changing markets or internal business requirements.

MULTI-CLOUD PRESENTS ORGANIZATIONS WITH BUSINESS-FLEXIBLE FEATURES

The ability to provision features that promote stability and performance will take on a decisive role in attracting IT decision makers toward using multi-cloud architecture. IT teams can still lean on provider support channels through their cloud services provider.

This will continue to contribute to reduced IT costs from a staffing and support perspective while presenting businesses with faster a wider range of cloud-based services that can be quickly configured and brought into production.

With multi-cloud devices and networks already housed in separated, self-contained spaces, security and access will remain easier to manage in some ways. This is important as we continue to see improved security controls and an emphasis on governance. Multi-tiered identity and access management (IAM) tools will take a leading role in hardening access to cloud-based systems. The expanded use of third-party tools to supplement those offered by cloud providers will work toward improving the monitoring of cloud system health and performance.

However, it is worth noting that as powerful and intuitive as some third-party tools have become for the management and performance monitoring of multi-cloud environments, those offered by the “Big Three”—AWS, Microsoft Azure, and Google Cloud—will still offer the most comprehensive tools for cloud management.

CONTAINERIZATION ADDS MODERNIZATION AND AGILITY TO HYBRID AND MULTI-CLOUD NETWORKS

Hybrid cloud networks allow businesses to seamlessly weave in private cloud infrastructure as well as on-premises network segments. Multi-cloud solutions offer IT organizations ways to isolate portions of their networks.

Containerization works with both types of cloud networks to manage microservice-based applications through a centralized platform.

According to a Gartner report, spending on containerization is expected to nearly double between 2020 and 2024. And according to Forrester, cloud container adoption will reach the 50% mark in 2022. This is a trend being driven by application developers who are hopeful that this movement will allow for applications to be modernized, taking full advantage of cloud-based infrastructure.


The ability to implement and manage containerization alleviates the mounting pressures on cloud providers to end their walled approaches. These new initiatives will enable improved and more secure exchanges of data while adding new layers of diversity to applications and standards. These will also serve to promote agility in application development and deployment, with the ability to perform concise lifecycle management not too far behind.

Cloud containerization will offer a diverse portfolio of additional benefits, including:

- OS-independent application deployment
- Applications that are lightweight and consume fewer resources
- Containers that can work in multiple environments, including on-premises and hybrid scenarios
- The ability to be highly scalable

With many organizations now developing cloud-native applications, it makes sense to base these on containers that come with a naturally lean and modern approach. This cuts down on bandwidth requirements, both in terms of network traffic and CPU power, while giving businesses more flexibility to adjust to their markets and customers.

The Cloud Experience Will Continue to Change How Business Uses IT



IT departments are now years removed from when many were heralded as business heroes. The cloud has since moved from being the wave of the future to becoming the need for today, and it has brought with it greater demands for improvements.

The improved cooperation between cloud providers and their business customers makes it easier to develop business-friendly innovations. This provides more confidence in cloud-based systems by IT leaders and business stakeholders, especially among those who have gone all in on cloud-based infrastructure to keep their business users productive.

The shift we saw a few years ago, where IT went from singularly determining the best technology toward an equal partnership with business leaders, will continue. This equal partnership of business and IT staff in determining their

organization's technology path has proven itself as leading to more effective, agile technology solutions.

Business and IT leadership will continue to find themselves working collaboratively to address the costs and efforts of implementing and supporting additional cloud infrastructure. As business leaders start to see their supporting technology as an investment, IT departments and business stakeholders will take more time to work together to drive new initiatives forward. We can continue to expect to see the business take the lead in determining the preferred applications of data that take cloud priority.

VIRTUAL CLOUD DESKTOPS WILL REMAIN A CORE COMPONENT

It may have been assumed by many that as the COVID-19 pandemic ebbed, so would the demand for virtual cloud desktops. But instead of virtual desktop usage reaching a crescendo, it has in fact continued to play a vital role in the enterprise.

Powerful enhancements have further entrenched virtual cloud desktops into the technology requirements of many businesses. Virtual desktops allow businesses to consolidate endpoint management tasks. The ability to quickly spin up or retire a virtual cloud desktop has served to keep them in the forefront of IT thinking.

The proven success when using virtual cloud desktops has changed the way people work. Businesses are now quicker and more willing to eschew the traditional models of

working in exchange for the adaptable and always-ready practices gained by using cloud-hosted virtual desktop (VDI) solutions in their business.

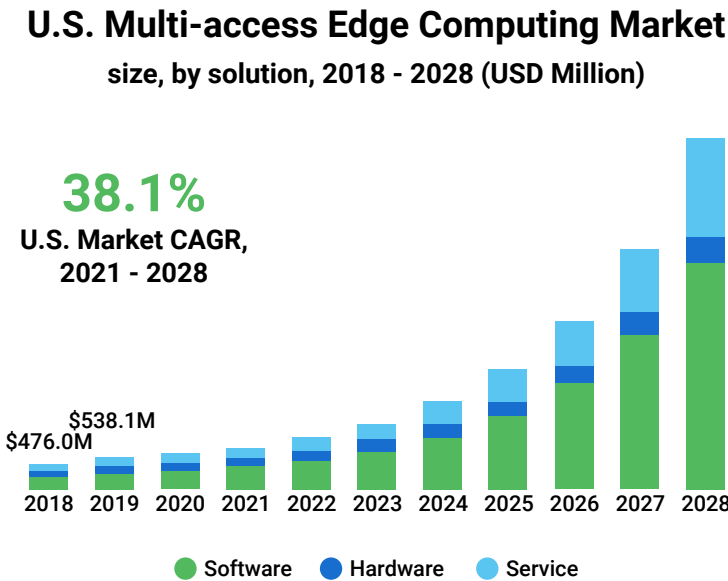
The cloud-based virtual desktop will continue to provide remote access to corporate resources. Businesses can now save on hardware costs as well by encouraging a BYOD approach to computing devices for homebound workers. This has prompted many business and IT leaders to push for deeper levels of desktop virtualization, as they're more willing to rely on the cloud as the backbone of network accessibility.

The Desktop-as-a-Service (DaaS) approach will continue its momentum due to the continuing interest in cloud-based virtual devices. Major vendor products, such as Microsoft Intune and Microsoft 365, will continue to simplify both the management and provisioning of cloud-based virtual devices and provide the vital tools necessary to implement a DaaS strategy. These ultimately contribute to reduced demands on IT staff and the lowering of end-user support costs.

As this technology continues to advance, the capability to implement and enforce security on virtual desktops in the cloud may actually exceed the capability on physical devices.

Edge Computing Movement Gains Traction

The use of edge computing, or the practice of processing data locally and not through a distant data center, is a process that still feels counterintuitive when discussing cloud-based environments. However, the growth of edge computing continues unabated (see **Figure 4**) and must still be on the radar of any IT organization.



Source: www.grandviewresearch.com

Figure 4: Edge computing is being forecasted for explosive growth over the next five years (Source: Grand View Research)

The massive amount of data being produced and stored in the cloud is where edge computing makes a name for itself. Edge computing makes it possible to process all of this information to produce meaningful analyses.

Cloud providers and IT stakeholders have discovered that improved business agility is achievable when edge data is integrated with cloud-hosted applications, and AI is added to glean meaningful insights from that data.

This integration will continue to be aided by partnerships between public cloud providers, Poly Cloud instances, and wireless carriers, bringing elements of the Internet of Things (IoT) to the corporate data management structure.

The recent direction will continue. Businesses will use edge computing strategies that colocate data processing assets closer to business customers. This direction will continue to provide business users with the ability to use real-time analytics while still having access to Big Data computing in the cloud. These improved business tools promote proactive data mining and analysis to take place among business users, regardless of their relative location or connectivity.

These innovative edge and cloud-based technology strategies will continue to allow businesses to achieve improved productivity with higher levels of security. We will see innovative, mixed edge, and cloud strategies to expand the use of containers and Kubernetes as a DevOps standard, contributing to minimal data access delays while giving network and security teams an expanded view into user access controls and data monitoring.

HYBRID AND MULTI-CLOUD ENVIRONMENTS WILL CONTINUE PROVIDING INNOVATIVE SOLUTIONS

Both hybrid and multi-cloud models are continuing to grow, boosted by the influx of new technologies and a deeper understanding around how the cloud can have a positive impact on business operations. The expansion of support options, and the need to support a diverse physical and virtual workforce, will only add to the list of business cases for cloud computing.

Containerization will add more customization and fluidity to how business applications are developed and used. Edge computing will continue to grow and utilize distributed computing for robust data processing and the support of remote business workers. And, Poly Cloud will allow IT organizations to fluidly transition between clouds, encouraging collaboration and offering an agile response to changing business requirements.

Cloud Is the Future



As you've seen throughout this Gorilla Guide, the cloud, which changed the game years ago, is now poised to disrupt the IT industry at an even more accelerated pace and with more powerful functionality.

Wherever you are in your cloud journey—still almost completely on-premises, or whether you've moved to hybrid

cloud, public cloud, or multi-cloud infrastructures—one thing is clear: the cloud is the future. Ignore it at your peril.

Forward-thinking organizations will be proactive, examining the latest innovations in cloud technology and taking a deeper look into how cloud integration can enhance their technology stack. Improved efficiency, happier internal users and external customers, and greater bottom-line results are common traits of businesses that have moved into the cloud. Isn't that what everyone wants?

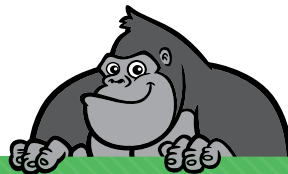
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