ManageEngine

HYBRID CLOUD MONITORING:

FUNDAMENTAL DRIVER OF EFFICIENCY IN HYBRID CLOUDS.

www.manageengine.com/apm

Table of contents

Introduction

Hybrid cloud implementations are on the rise, driven by benefits such as enhanced flexibility, cost optimization opportunities, and support for the agile DevOps culture.

Public clouds compromise on performance and security, while scaling private cloud deployments will put a dent in your wallet and can be hard to maintain. To overcome these drawbacks, organizations are investing in a more secure structure that can potentially scale and lower costs.

What is hybrid cloud?

A hybrid cloud is an integrated infrastructure comprised of private and public clouds and is designed to leverage the best of both worlds. This could be as simple as hosting your data on the public cloud, and hosting operational and sensitive data internally via private clouds to ensure they are not accessible.

Private clouds give organizations control over their resources, providing multiple levels of security and access. On the other hand, the public cloud gives enterprises the ability to scale resources up and down quickly. **Combining both—according to organizational needs—promises to be a more efficient means of achieving the intended outcome.**

Origin and growth of hybrid cloud

The concept of cloud computing is credited to **Joseph Carl Robnett Licklider**, whose work, *Intergalactic Computer Network*, dates back to the 1960s. J.C.R. Licklider claimed he wanted to "*Connect all their individual computers and time-sharing systems into a single computer network spanning the continent*". His dream was realized with the invention of TCP/IP networks in 1983, which would evolve into the internet that we know today.

Salesforce.com pioneered the internet-based application delivery movement in 1999 when it offered its enterprise application through a simple website instead of on-premises software. In the 2000s, tech giants such as Amazon Web Services (AWS), Microsoft, and Google began launching their public clouds and cloud applications. Companies like Microsoft, Rackspace, and other vendors capitalized on the enterprise-level IT department fears of data security with private clouds. Cloud technology, by then, had gained enough momentum to have its own following among the tech community.

Public clouds and private clouds came with their own drawbacks and organizations began experimenting by implementing different cloud

models from different vendors. But it wasn't until early 2008 that NASA's **Nebula**, an open source cloud computing platform, became the first open source software to deploy hybrid clouds.

Adoption of hybrid cloud in organizations

With a large volume of data to be processed daily, the only option for many organizations is to embrace the cloud since traditional data centers are no longer adequate. With the pandemic driving remote work, more enterprises have been compelled to incorporate the hybrid cloud in their IT infrastructures.

Organizations have a myriad of options open to them when it comes to hybrid clouds. It's vital that they understand their needs and determine what their options are. One of the popular uses is to utilize the on-premises infrastructure for processes involving sensitive data, while using the public cloud for the rest. Evaluating different approaches to find which strategy is best suited is, of course, ever-dynamic.

Motives behind the adoption of hybrid cloud

Organizations often transition to a hybrid cloud to take advantage of existing IT resources, quickly scale new resources, control workloads, gain visibility into critical processes, and ensure a seamless end-user experience. Additionally, it's an easier and more systematic approach when it comes to handling workloads. Not all workloads are well suited to either just a private or a public cloud. For example, workloads or processes that tend to be heavily dependent on certain resources are best run on a public cloud, whereas a private cloud is favored for processes that are subject to high security, like payment processes.

Hybrid cloud stats that you never knew you needed

Hybrid cloud started gaining clout in the later part of 2011, and Gartner predicted that **70% of all Fortune 2000 companies** would have at least one cloud-based application by 2014. NTT's 2021 Hybrid Cloud Report revealed that, from a survey conducted of 950 IT and business leaders in 13 countries across the United States, Europe, Africa, APAC, and Australia regions, 61% had already been using hybrid cloud and an additional 33% were planning to implement it in the next couple of years.

According to statistica.com, in 2020, the hybrid cloud market was worth *$56 billion* and is expected to reach *$145 billion* in 2026.

94%

of enterprises already use a **cloud service.**

Out of the active cloud users,

83%

of the enterprises adopted a hybrid cloud model.

By 2022,

>90%

of enterprises will rely on a **hybrid cloud** environment to meet their infrastructure needs.

AWS leads the cloud market with a

32%

share.

Why are businesses investing in hybrid cloud models?

The biggest advantage of the hybrid cloud model is that it allows workloads and data to move freely between private and public clouds when and as demands change. A few other aspects that add value to the hybrid cloud model include:

Reduced IT costs: Implementation of a hybrid cloud solution imposes additional costs beyond establishing a purely private or public environment. However, in the long run, the money spent is significantly lower when compared to its counterparts.

Storage space: Traditional data centers put constraints on storage space since physical storage space increases with the data size. With the hybrid cloud, organizations can extend their storage by simply mapping a bigger bucket for cloud storage.

Security: The hybrid cloud model enables companies to leverage the security of a private cloud with the versatility of a public cloud. With data backed up in the cloud, organizations needn't worry about data erasure when employees' devices are affected, whether they need to recover lost data or wipe it from compromised gadgets.

Cost-effective scalability and flexibility: As business needs evolve and grow, the demand for IT services fluctuates. A hybrid cloud enables organizations to scale resources accordingly, thus furthering its agile nature.

Faster service delivery: Procuring physical servers is time-consuming. Provisioning new infrastructure from the cloud can be accomplished in a few minutes.

The challenges involved in managing a hybrid cloud implementation

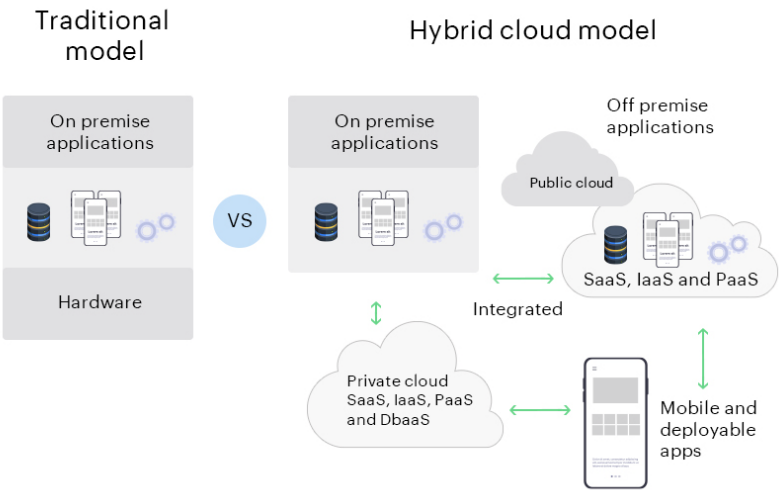
Although moving to a hybrid cloud model can help organizations achieve significant benefits, they must be aware of the potential management challenges associated with the transition. From a technical perspective, the challenges associated with a hybrid cloud model are:

Complex dependencies:

Applications built on a hybrid cloud can be dependent on multiple clouds, on on-premises technologies, or on both. They might be dependent on hundreds of elements, make calls to multiple databases, and even integrate with several third-party products. Issues with any one of the cloud services might impact the hybrid cloud-based applications.

Many organizations today have environments, spread across various technologies, which are constantly added to, modified, and replaced with applications, services, and infrastructure. As a result, the environment cannot reflect the current view of its application architecture. A tool that maps and monitors application dependencies will help prevent mishaps caused by secondary elements.

Complex architecture:



Synchronous networking of multiple clouds and on-premises technologies leads to increased complexity in architecture. Since both public and private clouds are involved, the complexities in workloads are more prevalent in hybrid clouds than in a single cloud architecture.

Processes and workloads on the technological side in enterprises are complicated by configuration with virtual hosts, like Hyper-V servers, or VMware servers. This is especially true for larger organizations, which often have virtual machine (VM) instances that are installed across multiple cloud servers.

Limited visibility:

The visibility in these architectures is often minimum. With significant blind spots and gaps, it's laborious to demystify the complex and colossal hybrid architecture.

A 2018 survey conducted by Dimensional Research cites **visibility into cloud data and application traffic as the No. 1 concern for 65% of IT professionals.** The innate complexity of hybrid clouds and ephemeral nature of cloud applications, which induce constant change in the system, is prone to obscure visibility into the structure.

Lack of control:

The lower the visibility, the less control you have over the output. A lack of insight into the infrastructure and operations leads organizations to overlook inherent issues and opportunities. Due to the deprivation of control over hybrid cloud workloads, businesses face difficulties implementing a self-service system, lack of collaboration between workloads and workers, and agile development problems. Visibility and control are interrelated; the lack of visibility puts the company at risk of losing control over its data, assets, access, and functionality.

Huge quantities of data:

In the wake of ever-growing data, cloud-based microservices that tend to be light and fast are gaining traction. Serverless functions, also known as *Functions as a Service (FaaS)*, and containers are examples of popular microservices. These abstract data in different ways. FaaS abstracts the infrastructure layer from the application layer, whereas containers are packages of software abstracted away from the host. Furthermore, containerized applications generate enormous ***east-west traffic***, and because of this, it's vital to monitor the lateral flows. While challenging, it's crucial to gain visibility into the packet and application-level data.

Multiple monitoring silos:

Public cloud providers offer their own dashboards to track the health of their respective services and infrastructure. AWS offers ***CloudWatch***, Microsoft's Azure has multiple tools such as ***Azure Logs, Azure Diagnostics***, ***and Azure Alerts***, a part of Azure Monitor, while Google Cloud Platform offers ***Google Cloud operations suite*** (formerly Stackdriver). However, monitoring your hybrid cloud environments with these tools can be challenging and includes several shortcomings.

The tools offered by cloud providers can be Infrastructure as a Service (IaaS) focused and siloed, thus limiting their scope. They provide minimal code-level insights, and even those users may need to utilizemultiple monitoring services to understand application performance. Users may also require additional tools to obtain visibility into on-premises infrastructure.

Without a centralized monitoring system in place, you may end up with multiple monitoring silos and multiple consoles to look at.

Go beyond limitations with hybrid cloud monitoring

The most effective solution to combat the hybrid cloud model challenge is increasing the visibility into application performance and the underlying processes and resources associated with the architecture. Observability is critical for an in-depth understanding of complex and highly distributed systems so that enterprises can track performance and application status across multiple platforms. The correct hybrid-cloud management strategy provides granular data necessary to gain insights that pinpoint obvious answers to hybrid cloud performance puzzles.

Approaches that can mitigate hybrid cloud visibility challenges:

- Monitor cloud and on-premises environments equally, without visibility gaps.
- Monitor application performance before and after cloud migration.
- Keep track of application dependencies and connections.
- Monitor third-party services and SLAs.
- Monitor multiple clouds.
- Implement risk analysis, fault management, and advanced data analytics using AI and ML.

Monitor cloud and on-premises environments equally, without visibility gaps

The visibility gap in hybrid clouds make it difficult to see what's going on inside the network because typical cloud monitoring tools are not equipped to monitor all types of clouds. This leads to a poor customer experience, unpredictable risks during cloud migration, blind spots in security, and increased costs and complexity.

However, with a sophisticated monitoring tool, third-party data—from AWS, Azure, Google Cloud, and others—can be obtained from the cloud and standardized with metrics that businesses utilize. Interactions between every application, service, and database have to be monitored with end-to-end visibility to ensure that no transaction is performing poorly.

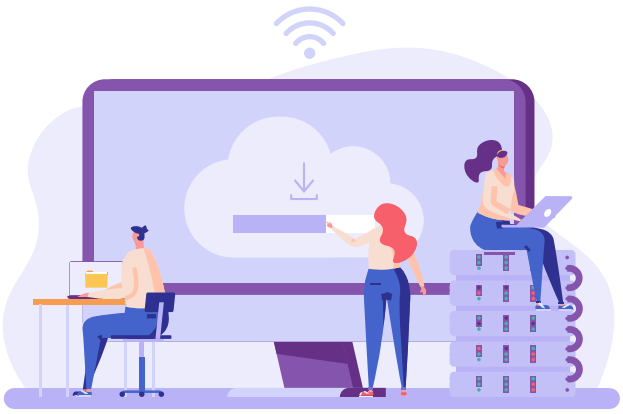
Monitor application performance before and after cloud migration

Most organizations want to migrate some of their applications from the data center to a public cloud. Some businesses adopt a "*lift and shift*" approach, i.e., they move entire applications to the cloud, while others prefer to re-architect the application for the cloud to make better use of cloud features.

Whatever approach is adopted, the organization will need to understand how its applications work before and after a cloud migration. Differences in performance could indicate the migration did not work as expected, or the application requires further tuning.

To monitor application performance before and after a migration, businesses need a monitoring solution that works in the cloud and on-premises. The monitoring solution should support the entire business infrastructure during the migration so there are no visibility gaps.

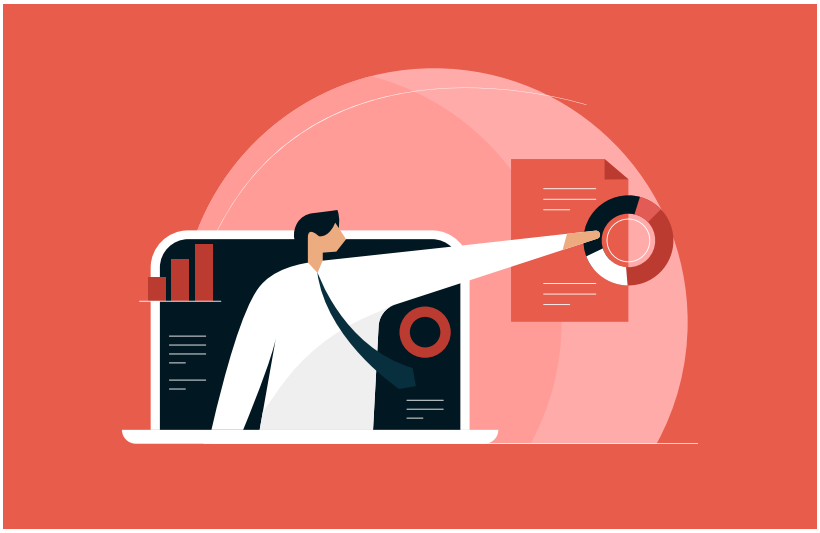
Keep track of application dependencies and connections



Hybrid cloud environments can involve complex dependencies and multiple moving parts, especially if dynamic architectures such as microservices are involved. It is important to keep track of these dependencies and interconnections.

Ideally, the hybrid cloud monitoring solution should provide a visual representation of the application architecture, its connections, and external services. This makes it easier for IT teams to understand how applications and services connect and talk to each other, as well as quickly determine the current health status of their hybrid cloud environment.

Monitor third-party services and SLAs



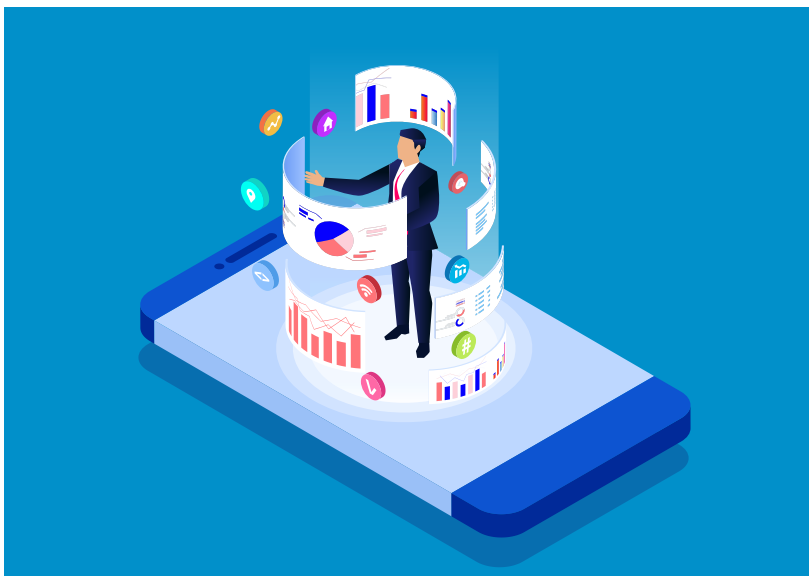
Accountability is hard to achieve in a hybrid cloud environment since multiple third-party services are involved in application delivery. In many cases, performance issues can lead to finger-pointing between the cloud provider and the application team, delaying problem remediation and affecting overall customer experiences.

Your monitoring solution should provide the ability to define and track service level agreements (SLAs) and service level objectives. This enables better accountability into the performance of third-party services. You can document when third-party services are not meeting SLAs and hold them accountable.

Monitor multi-cloud platforms

Cloud vendors provide exclusive services for monitoring and managing cloud services and the proprietary applications they provide. However effective that might be, it's not ideal for hybrid clouds. Interoperability with native cloud monitoring services is vital for a comprehensive hybrid cloud monitoring model. Hybrid cloud monitoring tools offer to monitor cloud services from different vendors as well as on-premises environments to ensure that the performance of an application dependent on multiple services is steady and ideal.

Advanced data analytics for fault management and forecasting



One of the key challenges in cloud visibility is managing the huge volume of event logs and performance metrics generated without meaningful insight. It's necessary to implement cloud monitoring solutions that aggregate these diverse data sources and apply data analytics methods like AI and ML to enhance cloud visibility. The AI and ML technologies continuously analyze events to learn about errors, patterns, and problems. These methods can be used during runtime to detect and alert out-of-range, anomalous performance or activities, depending on the baselines recommended.

ML is also used for graphical event modeling and forecasting performance. Based on historical performance data and with the help of ML, future performance, resource growth, and usage can be predicted.

About ManageEngine Applications Manager

ManageEngine Applications Manager is a platform-agnostic, application and infrastructure monitoring solution that monitors the whole suite of IT elements, including a wide array of public cloud services from AWS, Microsoft Azure, Google Cloud Platform, and Oracle Cloud, as well as private clouds and on-premises environments.

Applications Manager enables users to monitor their applications and the resources it's dependent on from a single console. It also monitors other IT infrastructure elements, such as databases, servers, VMs, and middleware components.

Applications Manager provides important features for efficiently monitoring hybrid clouds, such as deep visibility into application performance, end-to-end transaction tracing, application dependency mapping to define complex architectures that span multiple environments, multi-cloud monitoring, and integrations with ManageEngine ServiceDesk Plus, as well as third-party tools like ServiceNow and Slack. Applications Manager helps businesses monitor application performance before, during, and after migration to the cloud.

Summary

Hybrid cloud is a custom-made infrastructure that combines the public cloud and the private cloud. It's an extremely convenient, cost-effective, and secure approach, for enterprises with large data usage, high-security needs, and rapid growth rate. Ephemeral instances and microservices are scaled dynamically, often across multiple cloud providers and hybrid environments, which shrouds visibility.

No system is complete without a monitoring system in place to ensure a controlled output. Hybrid cloud architecture is no exception. Hybrid cloud monitoring, with a robust, platform-agnostic, application performance monitoring solution like **ManageEngine Applications Manager,** can help organizations achieve better results in a transparent, controlled environment. Monitoring also helps manage security and performance issues before it matures into a bigger risk that causes harm and loss of business and reputation.

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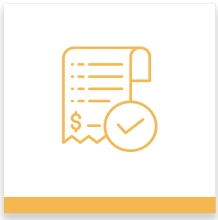

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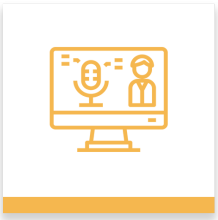

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