



The Next-generation Hybrid Cloud Model

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Introduction

With the rapid evolution of cloud computing, it is becoming increasingly important for enterprises to embark on next-generation, cloud-enabled, business transformation initiatives. It has also become vital for businesses to carefully consider their cloud platform management strategies to reduce regulatory risks, create a business continuity plan to prevent revenue losses, and derive high-quality insights to drive decision-making. Poor cloud platform management, talent scarcity, and the resultant increase in attack surfaces can all add significant complexities to cloud adoption.

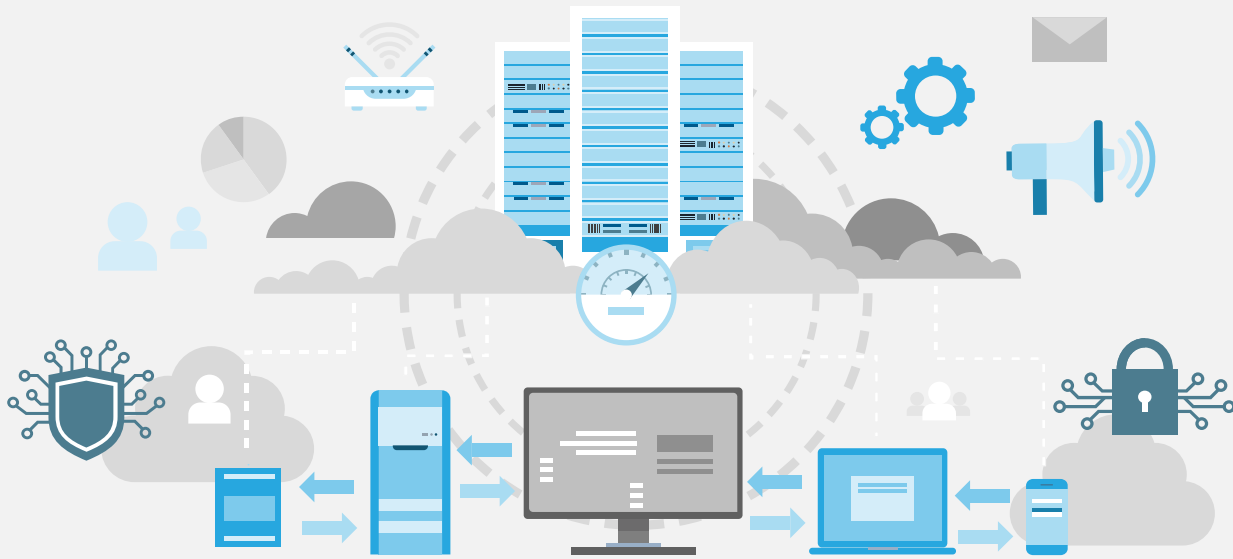
These challenges highlight the need for a next-generation cloud computing platform that:

- Includes plug-in modules to ensure infrastructure scalability, data security, and protection against ransomware attacks
- Can effectively perform data backup and recovery
- Derives insights enabling the early detection of vulnerabilities or threats
- Eases development and testing without interfering with enterprise operations

Enterprises can realize benefits beyond cost optimization, including operational resilience and improved customer experience, by adopting such a next-generation cloud computing platform and extended services.

In this report, we explore how enterprises can leverage a next-generation hybrid cloud computing model to tackle existing limitations and drive value from cloud transformation. In particular, we answer the following questions:

- Why are most enterprises unable to realize expected value from their cloud investments?
- What is driving the need for a next-generation hybrid cloud model?
- How can enterprises adopt a next-generation hybrid cloud model?
- What are the key benefits and use cases of a next-generation hybrid cloud model?
- How should enterprises plan for the future?



Finding value from cloud investments

As cloud adoption becomes mainstream, the objective of cloud transformation is shifting from efficiency gains to overall business benefits, including higher innovation, improved customer experience, and greater business resilience. Enterprises realize that a cookie-cutter approach to the cloud will diminish returns on their cloud investments, and most organizations believe that scaled cloud adoption will help them achieve their intended business benefits.

Close to 55% of enterprises believe that the COVID-19 pandemic has resulted in hurried cloud adoptions.

However, our research suggests that enterprises, though keen to adopt the cloud, are not able to realize value from their cloud investments.

Realizing value from cloud investments remains a task as:

- Every enterprise's cloud transformation maturity is unique and requires a differentiated approach to scale
- Rapid cloud adoption is making enterprises miss the vital steps needed to maximize value from their cloud transformations
- Enterprises have high expectations from their cloud transformations at an early stage and fail to look at cloud infrastructure as a long-term strategic bet

Almost 84% of enterprises believe they are not able to realize the expected value from their cloud investments.

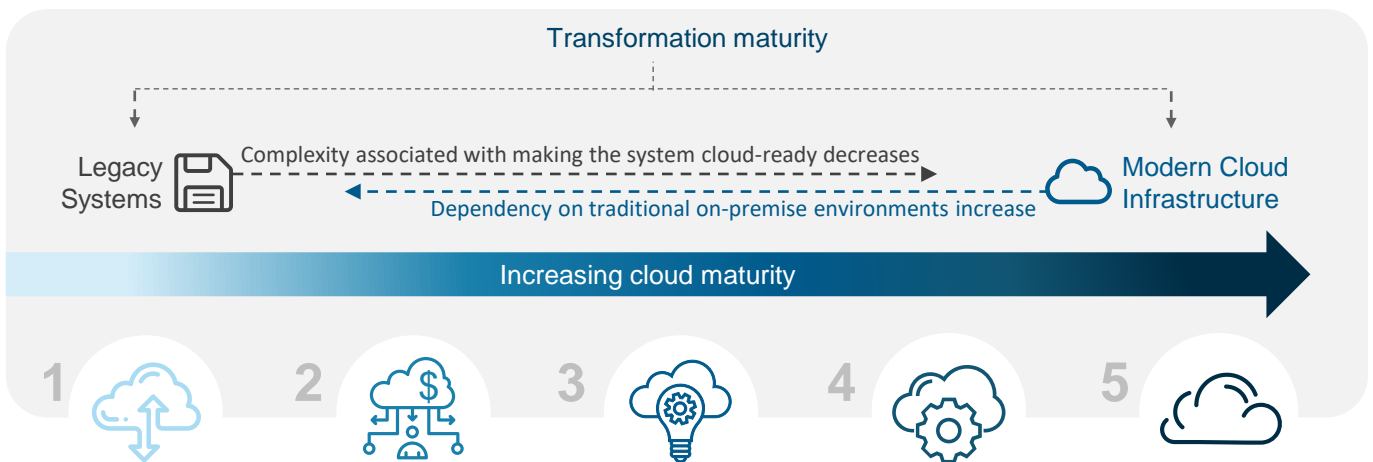
The cloud transformation maturity model

Enterprises are at different stages of maturity in their cloud transformation journeys. Most of them are struggling to realize the desired value from their investments because they consider cloud adoption as a lift-and-shift operation. The exhibit below depicts the different levels of cloud maturity among enterprises.

EXHIBIT 1

The cloud transformation maturity model

Source: Everest Group (2022)



	Beginner's cloud	Scaled cloud	Strategic cloud	Optimized cloud	Referenceable cloud
Key characteristics	<ul style="list-style-type: none"> Pilot stage / small cloud footprint Experimentation with cloud 	<ul style="list-style-type: none"> Meaningful cloud adoption Maturing security and compliance mechanisms Significant automation leverage 	<ul style="list-style-type: none"> Cloud as a lever of growth and business innovation Movement of complex workloads to the cloud 	<ul style="list-style-type: none"> Well-architected and optimized cloud that incorporates feedback from all previous stages Shift from move to the cloud to optimization in the cloud 	<ul style="list-style-type: none"> Highest stage of cloud maturity; role model cloud for industry peers Significant leverage of cloud-native technologies, such as containers and serverless
Challenges	Lack of cloud readiness	Dependence on legacy and non-virtualized systems	Lack of efficiency and ease in operations	Dependence on multiple cloud providers for vendor-specific cloud capabilities	

As enterprises move to a modern cloud infrastructure, their need for a right-fit cloud model that meets their business objectives is even more acute. Some key enterprise expectations from cloud models are:

- **Visibility** into the health of all existing and future infrastructure, applications, data, and cloud-enabled services

- **A common governance and policy standard** across on-premise and cloud environments
- **Talent interoperability** between different application development teams, with a wide range of skills across technology platforms, both on-premise and on the cloud
- **Standardized security controls and monitoring** across public cloud, private cloud, and legacy infrastructure

To meet these evolving expectations, most enterprises are experimenting with different forms of cloud models – public, on-premise, private, multi, and hybrid. The hybrid cloud model has gained immense popularity in recent times due to its flexibility in adapting to changing enterprise needs.

Almost 90% of enterprises claim to have adopted some form of a hybrid cloud model.

Types of hybrid cloud models

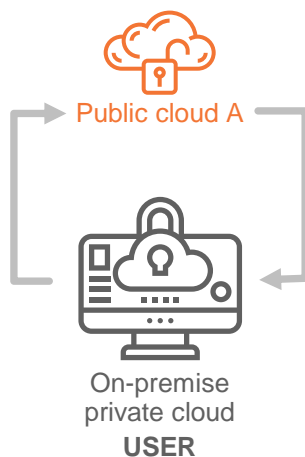
To serve different enterprise needs, the hybrid cloud model has evolved drastically and, today, enterprises can choose from different hybrid model architectures, as illustrated below.

EXHIBIT 2

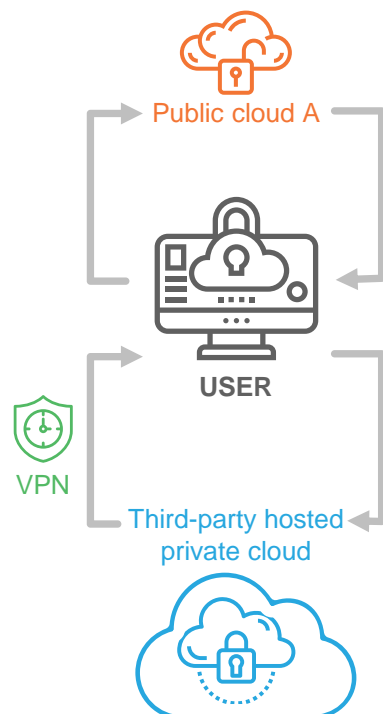
Various types of hybrid cloud models

Source: Everest Group (2022)

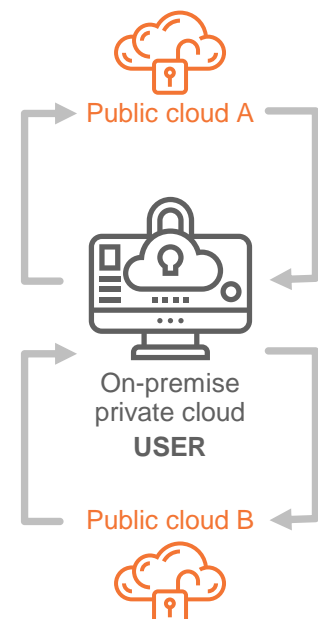
Mix of on-premise private cloud and public cloud model



Mix of virtual private cloud and public cloud model



Private cloud and multi-cloud model



Below we take a closer look at these models.

- **Mix of on-premise private cloud and public cloud:** In this hybrid cloud variant, a part of the application is hosted on the cloud, and the other part is hosted on an organization's premises. This distribution could be a horizontal split, in which the database and its contents are on-premise and the business application logic is on the cloud, or a vertical split, in which distinct modules are hosted in either place. This design helps an enterprise control business-critical data or functionalities
- **Mix of virtual private cloud and public cloud:** Like the above model, a part of the application is hosted on the cloud, while the other part is hosted on the public cloud (virtual private cloud). A secure connection is used to provide access. The benefits of using a virtual private cloud are that it requires lower maintenance than the private cloud and offers better security and performance than the public cloud
- **Mix of private cloud and multiple public clouds (multi-cloud):** To avoid complications such as vendor lock-in, an enterprise can choose to have an on-premise private cloud for user-sensitive data and duplicate the remaining data/applications across multiple public clouds to benefit from various cloud services that different vendors offer

Adoption drivers and key limitations of a hybrid cloud model

Below we examine the benefits / adoption drivers and disadvantages of maintaining a hybrid cloud environment.

Adoption drivers

As enterprises start to shift their legacy systems and local IT infrastructure to the cloud, they are increasingly deploying the hybrid cloud model over other deployment models due to the following advantages that it offers:

- **Minimizes or avoids single cloud-provider lock-in:** Enterprises prefer to adopt the most relevant cloud platforms for their business objectives and want the flexibility to move across cloud stacks as and when needed. Hybrid cloud offers them this flexibility
- **Meets data governance requirements:** Hybrid cloud allows organizations to fine-tune the physical location of any dataset (on-premise or public cloud), thereby meeting data localization and geolocation requirements
- **Improves business continuity:** Hybrid cloud connects multiple clouds and on-premise environments for a unified data recovery strategy that ensures business continuity while adhering to compliance requirements, regardless of geography or vertical
- **Maximizes performance:** Enterprises look to keep sensitive or high-transaction workloads on their legacy platforms or internal cloud and leverage public or hosted cloud for other benefits. A hybrid cloud strategy that places workloads on platforms that best meet enterprises' technical and business requirements is essential to access best-of-breed capabilities and align business objectives

- **Necessitated by M&As:** The merger or acquisition of a cloud-heavy enterprise with an over-engineered legacy IT environment, or vice versa, calls for involuntary hybrid cloud adoption to create a new business model that works well with both legacy and cloud environments



Harnessing the power of scalability of cloud-based ML is helping us accelerate our path to becoming an AI-driven expert platform, and we've only just begun.

– Chief Technology Officer, a fin-tech SaaS provider

Key limitations

The hybrid cloud model has its own constraints, such as:

- **Lock-ins are still possible:** With some of the most advanced services and applications native to a public cloud provider, movement across different cloud vendors is difficult, leading to vendor lock-ins
- **Overhead costs:** Spending heavily on additional cloud-native resources, such as containers or Kubernetes, to achieve interoperability between clouds increases operational costs
- **Significant effort in redesigning processes and policies:** Implementing an additional uniform control plane to support an enterprise's infrastructure dispersed across multiple clouds leads to a complete overhaul of existing process flows and policies
- **Increased security risks:** If data is transferred to and from multiple public clouds that host resource-intensive applications, the attack surface area increases, in turn increasing the risk of a security breach
- **Scale and change complications, integration, and network designing complexities:** Enterprises face such challenges due to the lack of interoperability between cloud platforms that host their information

These limitations have driven the industry to come up with a more evolved hybrid cloud computing model – the next-generation hybrid cloud computing model.

The next-generation hybrid cloud computing model

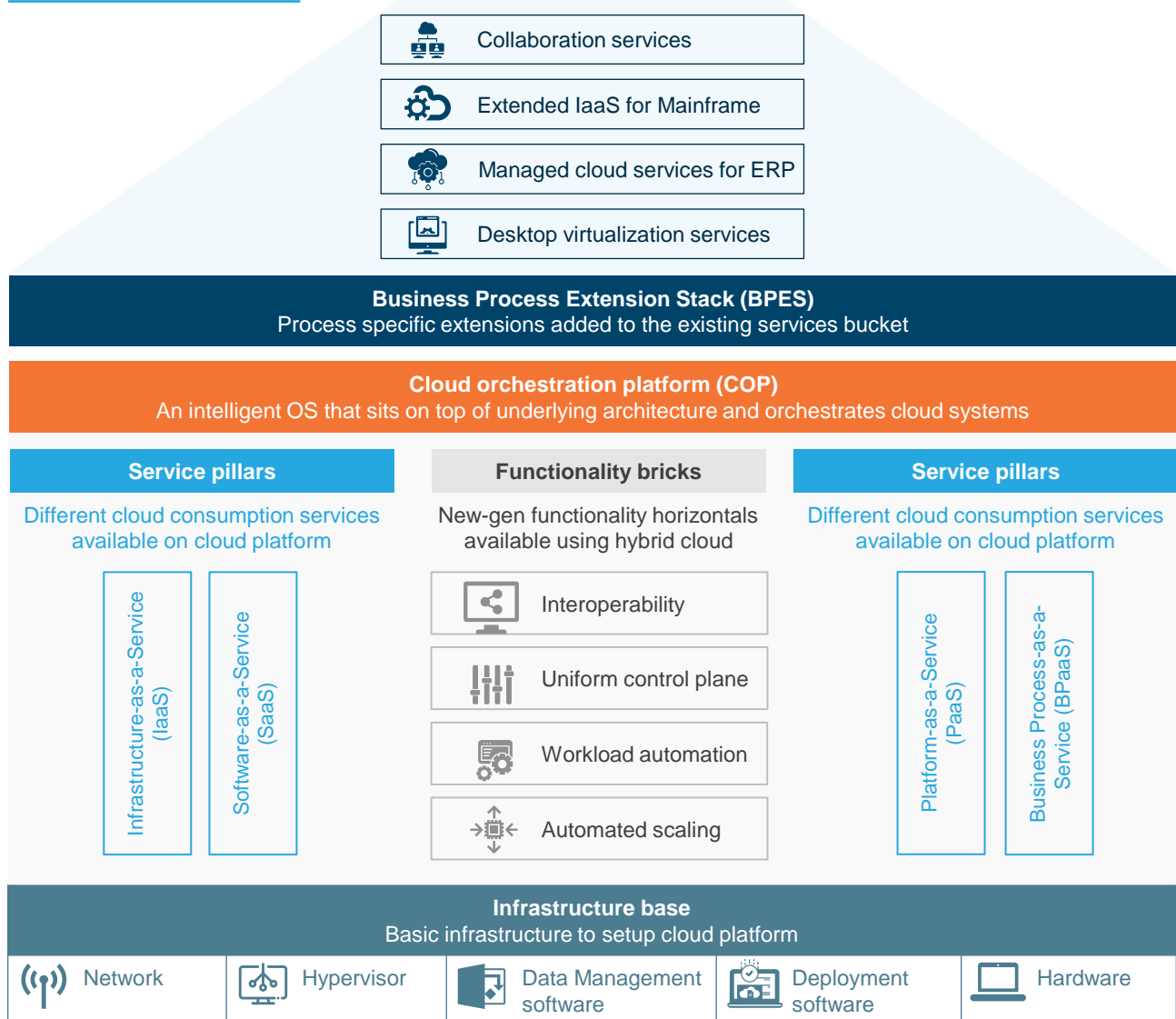
Current hybrid cloud models do not allow enterprises to achieve optimized cloud maturity. Thus, enterprises are looking for a next-generation hybrid cloud model that can effectively integrate ad hoc capabilities into the core architecture, while posing minimal scalability and security challenges.

The next-generation hybrid cloud model will be able to automate the integration of the business process extension stack, or plug-in APIs. Furthermore, it will have a standardized and intelligent (AI-driven) operations control plane, which will minimize the challenges of operations management across legacy and cloud systems, as illustrated below.

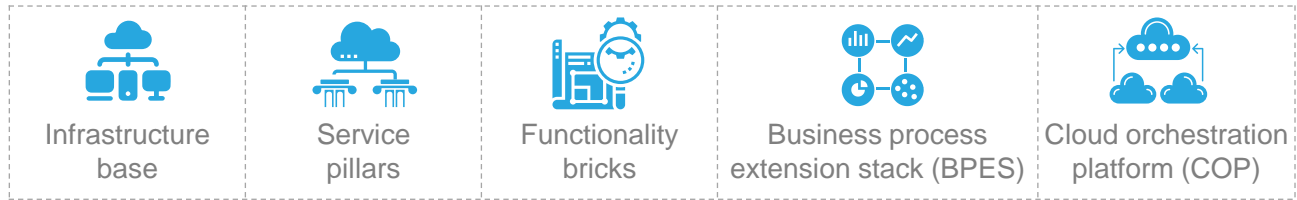
EXHIBIT 4

The next-generation hybrid cloud model

Source: Everest Group (2022)



The key building blocks of the next generation of efficient hybrid cloud computing will consist of:



Infrastructure base

Cloud infrastructure, like the foundation of a high-rise building, is critical to the cloud computing model. This infrastructure layer comprises a mix of hardware and software components, as described below.

- **Hardware:** A cloud hardware component comprises various physical devices such as firewalls, load balancers, storage arrays, backup devices, and servers, which are placed in data centers across the globe
- **Hypervisor software:** A hypervisor/virtualization software acts as a host, operates on top of real hardware, and divides resources such as memory, computing power, and storage into virtual computers or guests. The next-generation hypervisor software should be able to utilize and blend diverse cloud infrastructures, treating them as extended virtual machines/guests from a different cloud vendor
- **Network:** Multiple virtual subnetworks, each with different levels of visibility, along with physical components such as switches and routers, make for a typical cloud network architecture. Users can access cloud resources via the network (internet/intranet) allowing anywhere, anytime access to data, cloud services, and apps on-demand
- **Deployment software:** The open-source deployment software should be capable of deploying a variety of in-house or third-party cloud infrastructure into a virtual machine or guest. The deployment software will, in turn, assist the hypervisor host machine in extending this virtual machine to its array of guest machines
- **Data management software:** Data management software should act as an integration layer, providing data maintenance and management services. It should provide configurational flexibility for instances of data residing on separate virtual machines, irrespective of how those virtual machines were created, either by the hypervisor host machine or by the deployment software

This next-generation cloud infrastructure base will automatically integrate multiple clouds and in-house data stores, eliminating any system integration issues. It will also be able to meet data governance and regulatory requirements through the data integration layer and address any scalability issues faced with previous cloud computing models.

Service pillars

The service pillars that reside on top of the cloud infrastructure base are a cloud vendor's core services. Different cloud suppliers offer distinct sets of fundamental services to serve different enterprises. Key services offered are:

- **Infrastructure-as-a-Service (IaaS)** allows cloud providers to make computational resources, such as storage, networking, and servers, available to end users. Service integrators and providers offer

these services in dedicated private cloud and extended cloud models for various platforms, beyond the public cloud. This service also provides the flexibility to scale infrastructure up or down based on processing and storage requirements

- **Platform-as-a-Service (PaaS)** provides enterprises access to a cloud environment and a set of prebuilt tools for developing, customizing, and testing their own apps by facilitating remote team collaboration, thereby allowing team members to focus on development rather than the underlying infrastructure
- **Software-as-a-Service (SaaS)** allows enterprises to access cloud-based software from a cloud service provider. The software is offered on a subscription basis, with the cloud service provider handling software management, installation, and upgrades
- **Business-Process-as-a-Service (BPaaS)** is a bundled cloud computing service that includes business logic, data, and processes, and it may be coupled with several core cloud services, such as SaaS, PaaS, and IaaS. An enterprise should implement a business process service that aligns with its business policies, helps to reduce the IT function's time and allows for faster time to market and scalable business operations

These service pillars are the key components of the existing cloud computing paradigm. They will not only ensure all the pre-existing benefits of the standard hybrid cloud model, but also serve as the skeletal structure of the next-generation hybrid cloud solution. Enterprises can pick and choose the services they want, reducing their financial load and benefiting from the model's business process extension feature.

Functionality bricks

This modern hybrid cloud setup will simplify critical business challenges that are becoming increasingly difficult to address with traditional IT services, thereby offering cost-effective, agile, and efficient computing. It will offer enterprises the flexibility to scale the on-premise private cloud hardware or public cloud infrastructure and provide complete control over systems, security, and policies, making resources accessible from anywhere and at any time.

The major functionalities embedded in the next-generation hybrid cloud model are illustrated below.

EXHIBIT 4

Key functionalities of the next-generation hybrid cloud model

Source: Everest Group (2022)



Interoperability

Multiple public cloud environments can effortlessly interact with one another to ensure a continuous flow of data and information across all systems and environments



Hybrid authentication

It will provide hybrid identity management solution allowing a common user identity for provisioning, authorization and authentication of all resources, regardless of its location



Monitoring

Enterprises can discover, observe, control, services across clouds, define traffic management rules, and facilitate canary deployments in an efficient and consistent manner across various environments



Optimization

Enterprise visibility across cloud consumption, resource utilization and pricing models; Further allowing cloud estate rationalization



Accurate cloud load forecasting lays the foundation for effective deployment of cloud computing resources and maximization of economic benefits.

– Research Square, a research firm

Cloud orchestration platform

The cloud orchestration platform will sit on top of the cloud infrastructure and facilitate the operations of all the service pillars and added business process extensions. The exhibit below depicts the key characteristics of an orchestration platform that manages cloud infrastructure and services.

EXHIBIT 5

Characteristics of a cloud orchestration platform

Source: Everest Group (2022)



Tool Agnosticism

Capable of deploying apps, workloads, and services using the same tools regardless of location

Interoperability:

Compatible with an expanding variety of environments and should promote interoperability and cross-portfolio interaction with third-party products and cloud architectures

Embedded security:

Provide a built-in cloud defense mechanism that constantly monitors and eliminates any unanticipated data privacy attacks and security threats

Open-source innovation:

Allow open-source innovation while also lowering cloud deployment costs and shortening the time to market for important business workloads

Reliable

Improved disaster recovery and business continuity to avoid service outages and unplanned downtime

When all five platform requirements of the next-generation cloud computing model are met, enterprises can develop a safe, low-cost, scalable, next-generation hybrid cloud model.

Business process extension stack

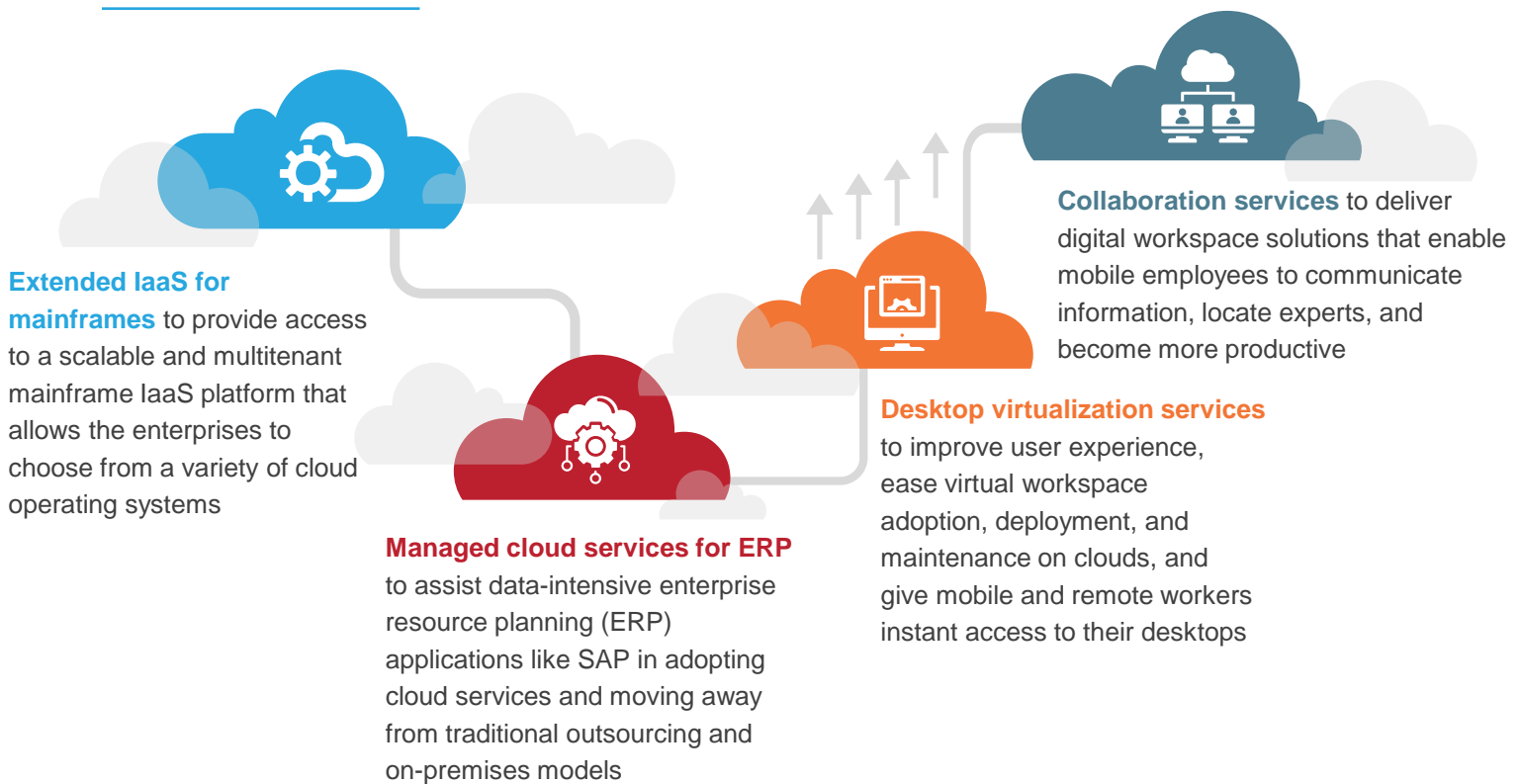
When assembled, a plug-in extension stack will work as a dynamic wall for the next-generation hybrid cloud computing model. Cloud providers or third-party cloud application developers can add and remove these services from the dynamic wall on demand, on a pay-as-you-go basis. These business process stacks will act as extensions to the core service pillars and offer services to meet evolving enterprise requirements and business objectives. Enterprises' in-house IP can also be upgraded for use as API plug-ins.

Some of the business process extensions that can be provided as add-ons are listed below.

EXHIBIT 6

Major business process extensions

Source: Everest Group (2022)



These plug-in APIs highlight the need for an app store-style market platform to host open-source services and applications that can be vetted and co-developed with other partners and that feature a cloud orchestration layer. This layer should be able to bind and manage the entire cloud infrastructure, including core and value-added services, and support third-party open-source application extensions on the platform.

Advantages of the next-generation hybrid cloud model

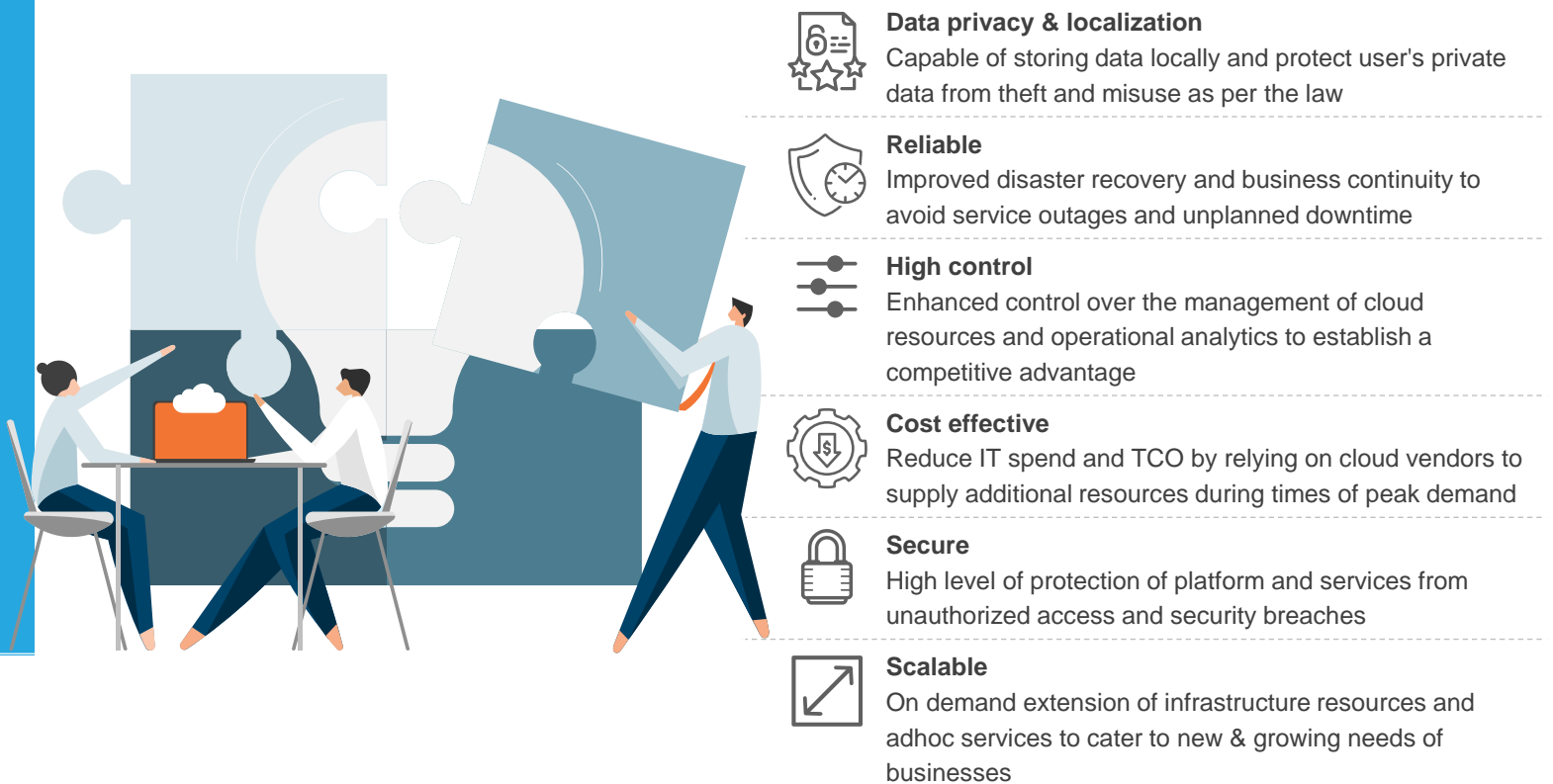
The next-generation hybrid cloud model will offer numerous benefits beyond those typical of a platform-for-platform switch strategy, in which legacy workloads are shifted to another monolithic public cloud model rather than being integrated to use the best platform for each workload. This makes a true hybrid cloud approach ideal for enterprises that need to manage huge data volumes and multiple business operations.

Some of the notable advantages of the next-generation hybrid cloud are depicted below.

EXHIBIT 7

Key benefits of the next-generation hybrid cloud model

Source: Everest Group (2022)



To derive all the benefits from the next-generation hybrid cloud model, enterprises should partner with vendors and service providers that align with their business objectives. The service providers and vendors selected should have a broad portfolio of offerings and expertise, spanning legacy and public cloud environments. Potential partners should also be part of a broad existing ecosystem that can enable cloud journeys to accelerate results

“ If somebody wants to store more data, [the capacity is] there. I don't have to think [about] how much more I have left on premise, and I don't have to go and ask for storage expansion on premise... It's right there, it's consumable, and we just expand and contract as needed.

– Principal systems engineer, a global office supplies chain

Two approaches to adopting the next-generation hybrid cloud model

Enterprises can follow two approaches to adopt the next-generation hybrid cloud model.

- **Develop in-house hybrid cloud capability**

Before moving ahead with this approach, enterprises should involve various stakeholders and consultants to help them identify enhancements in functionality and processes that can be unlocked through the cloud. This exercise will enable them to analyze the strategic benefits of a cloud-native environment versus in-house solutions. Enterprises should also conduct rigorous due diligence when selecting individual vendors for cloud infrastructure skeletal services, functional bricks, operating systems, and cloud use-case assessments before laying the foundation of a hybrid cloud capability. This diligence will ensure that enterprises have access to appropriate solutions, support, and pricing models.

- **Partner with a service provider that shares an aligned vision for hybrid cloud**

Alternatively, enterprises can select service providers aligned with their goals and those that have the necessary resources for next-generation hybrid cloud deployment and understanding of the legacy platform being transformed. The ideal SI would already have relationships with numerous cloud providers, technology vendors, and managed service providers that can set up hybrid cloud environments and provide security, managed application, and container development services. It will also be a full-scope service provider that can augment its service portfolio to support enterprises' technical and business requirements. This spread will help reduce enterprise effort on technology upgrades and enable the enterprise to focus on running the business.

We wanted more hotels on the ground, not more server infrastructure and data center real estate. Our cloud partnership allows us to focus more on innovation opportunities and less on managing infrastructure.

– Global CTO, a leading hospitality chain

Industry-specific use cases for next-generation hybrid cloud computing

Enterprises can adopt the hybrid cloud model in the following industry-specific use cases to benefit from the combination of private and public cloud environments:



Technology

With enterprise operations becoming increasingly complex today, enterprises are concerned about the cost of expanding their IT teams, including the addition of specialists such as network administrators, hardware experts, and software programmers. Enterprises can hire cloud-managed services providers to manage their IT operations in a hybrid cloud environment.



BFSI

The financial services industry is more concerned about data privacy and compliance issues, and organizations in the space are turning to private cloud. This rapid adoption of private clouds serves as the foundation for a next-generation hybrid cloud model, which is expected to become the industry standard in the coming years.



Hospitality

Hybrid cloud computing can transform the hospitality industry through the use-build-migrate model. It can reduce capex spend by saving costs related to energy consumption, business operations, and smart-connect hardware. Hybrid cloud services can enhance guest experience, expedite services, provide seamless access, and improve flexibility.



Manufacturing & logistics

Logistics service providers are considering strategic cloud partners to keep their operations running smoothly. Cloud-based SaaS logistics management solutions find higher adoption among enterprises, are marked by low initial costs, upgrade capabilities that eliminate the need for additional software, and can scale the business based on customer demand.



Energy & utilities

Emerging blockchain technology, IoT, and increasing digitalization are pushing energy & utilities enterprises to adopt cloud solutions. These solutions help manage costs, improve collaboration, enhance customer experience, increase IT and asset efficiencies, and ensure grid reliability.



Travel Industry

Travel and tourism online service aggregators are re-tooling to operate in two modes – traditional delivery and agile delivery to meet increasing business pressure and site traffic demands. By consuming (IaaS), (SaaS), and (PaaS) cloud capabilities, these enterprises can operate in a hybrid environment, which helps them to adapt to fast changing business demands and provide agility in operations.

Pre-requisites for a successful hybrid cloud transformation journey

While the benefits of adopting a hybrid cloud model are many, enterprises need to carefully consider the following factors before embarking on a transformation journey.

- **Cloud infrastructure capabilities:** Enterprises should ask themselves whether they have the necessary infrastructure and whether the cloud transformation plan aligns with their existing infrastructure and software assets. They should examine qualitative factors, such as the extent of customization needed and integration complexities, as well as quantitative elements, such as maintenance costs, replacement costs, and predicted useful life of on-premise infrastructure
- **Talent pool to manage on-premise architecture and public cloud operations:** Cloud project managers, cloud architects, user experience specialists, data architects, and specialized developers should be equipped with skill sets that meet the requirements of existing applications and infrastructure as well as next-generation cloud apps and architecture to facilitate cloud transformation. To address this need, enterprises will have to cross-train employees working on scaled-down legacy systems to gain the skills needed for cloud transformation and management or contract service providers to plug gaps, through either short- or long-term infrastructure management agreements
- **Security governance policies:** The IT governance architecture will need to change to guarantee that the apps, data, security, and controls in the cloud are appropriately accountable and owned. Enterprises should take steps to minimize the risk of shadow IT and guarantee suitable controls, such as license management and capacity monitoring
- **Use cases for cloud transformation:** Enterprise decision-makers should have a vision for how the cloud will be used in the future and make sure that this vision aligns with the larger strategic goals. Although the first forays into cloud computing may be small (for example, switching from proprietary solutions to SaaS offerings), a long-term vision will assist in driving decision-making within the enterprise



Enterprises can use the following seven statements as they evaluate the benefits of a hybrid cloud model for themselves.

If you agree with at least three of the following statements, you should consider deploying a next-generation hybrid cloud model.



We are not getting the expected benefits from our existing cloud models



We are not happy with our hyperscaler investments and are evaluating alternative options



There are many workloads in our environment that are not suitable for the public cloud



Our current cloud model has created many process silos



We need to follow strong data-related regulatory compliances



We do not intend to retire our legacy systems in the short term



We believe our current models do not provide a secure environment



As the business landscape becomes increasingly cloud-native, enterprises should consider building their cloud strategies around the next generation of a multi-platform, integrated, hybrid cloud computing model. They should use the statements above as a starting point for their transformation journeys that combine their legacy systems' benefits with the innovation built in the cloud.

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