Public vs Private vs Hybrid Cloud Differences

Cloud computing spans a range of classifications, types and architecture models. The transformative networked computing model can be categorized into three major types:

- Public cloud
- Private cloud
- Hybrid cloud

The technology service can be accessed in various models and deployment strategies, including the most popular Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). The underlying infrastructure architecture can take various forms and features, including virtualized, software-defined and hyper-converged models, among others.

This article explores the key differences between the classifications of public, private, and hybrid cloud
The public cloud

The public cloud refers to the cloud computing model with which the IT services are delivered across the Internet. The service may be free, freemium, or subscription-based, charged based on the computing resources consumed. The computing functionality may range from common services such as email, apps and storage to the enterprise-grade OS platform or infrastructure environments used for software development and testing.

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The cloud vendor is responsible for developing, managing and maintaining the pool of computing resources shared between multiple tenants from across the network. The defining features of a public cloud solution include high elasticity and scalability for IT-enabled services delivered at a low cost subscription-based pricing tier. As the most popular model of cloud computing services, the public cloud offers vast choices in terms of solutions and computing resources to address the growing needs of organizations of all sizes and verticals.

When to use the public cloud

The public cloud is most suitable for situations with these needs:

- Predictable computing needs, such as communication services for a specific number of users
- Apps and services necessary to perform IT and business operations
- Additional resource requirements to address varying peak demands
- Software development and test environments

Advantages of public cloud

- No investments required to deploy and maintain the IT infrastructure
- High scalability and flexibility to meet unpredictable workload demands
- Reduced complexity and requirements on IT expertise as the cloud vendor is responsible to manage the infrastructure
- Flexible pricing options based on different SLA offerings
- The cost agility allows organizations to follow lean growth strategies and focus their investments on innovation projects

**Limitations of public cloud**

- The total cost of ownership (TCO) can rise exponentially for large-scale usage, specifically for midsize to large enterprises
- Not the most viable solution for security and availability sensitive mission-critical IT workloads
- Low visibility and control into the infrastructure, which may not suffice to meet regulatory compliance

**The private cloud**

The private cloud refers to the cloud solution dedicated for use by a single organization. The data center resources may be located on-premise or operated by a third-party vendor off-site. The computing resources are isolated and delivered via a secure private network, and not shared with other customers.

Private cloud is customizable to meet the unique business and security needs of the organization. With greater visibility and control into the infrastructure, organizations can operate compliance-sensitive IT workloads without compromising on the security and performance previously only achieved with dedicated on-premise data centers.

**When to use the private cloud**

The private cloud is often suitable for:
- Highly-regulated industries and government agencies
- Technology companies that require strong control and security over their IT workloads and the underlying infrastructure
- Large enterprises that require advanced data center technologies to operate efficiently and cost-effectively
- Organizations that can afford to invest in high performance and availability technologies

Advantages of private cloud

- Dedicated and secure environments that cannot be accessed by other organizations
- Compliance to stringent regulations as organizations can run protocols, configurations and measures to customize security based on unique workload requirements
- High scalability and efficiency to meet unpredictable demands without compromising on security and performance
- High SLA performance and efficiency
- Flexibility to transform the infrastructure based on ever-changing business and IT needs of the organization

Limitations of private cloud

- Expensive solution with a relatively high total cost of ownership as compared to public cloud alternatives for short-term use cases
- Mobile users may have limited access to the private cloud considering the high security measures in place
- The infrastructure may not offer high scalability to meet unpredictable demands if the cloud data center is limited to on-premise computing resources

The hybrid cloud

The hybrid cloud refers to the cloud infrastructure environment that is a mix of public and private cloud
solutions. The resources are typically orchestrated as an integrated infrastructure environment. Apps and data workloads can share the resources between public and private cloud deployment based on organizational business and technical policies around security, performance, scalability, cost and efficiency, among other aspects.

For instance, organizations can use private cloud environments for their IT workloads and complement the infrastructure with public cloud resources to accommodate occasional spikes in network traffic. As a result, access to additional computing capacity does not require the high CapEx of a private cloud environment but is delivered as a short-term IT service via a public cloud solution. The environment itself is seamlessly integrated to ensure optimum performance and scalability to changing business needs.

**When to use the hybrid cloud**

Here’s who the hybrid cloud might suit best:

- Organizations serving multiple verticals facing different IT security, regulatory and performance requirements
- Optimizing cloud investments without compromising on the value proposition of either public or private cloud technologies
- Improving security on existing cloud solutions such as SaaS offerings that must be delivered via secure private networks
- Strategically approaching cloud investments to continuously switch and tradeoff between the best cloud service delivery model available in the market

**Advantages of hybrid cloud**

- Flexible policy-driven deployment to distribute workloads across public and private infrastructure
environments based on security, performance and cost requirements

- Scalability of public cloud environments is achieved without exposing sensitive IT workloads to the inherent security risks
- High reliability as the services are distributed across multiple data centers across public and private data centers
- Improved security posture as sensitive IT workloads run on dedicated resources in private clouds while regular workloads are spread across inexpensive public cloud infrastructure to tradeoff for cost investments

**Limitations of hybrid cloud**

- It can get expensive
- Strong compatibility and integration is required between cloud infrastructure spanning different locations and categories. This is a limitation with public cloud deployments, for which organizations lack direct control over the infrastructure
- Additional infrastructure complexity is introduced as organizations operate and manage an evolving mix of private and public cloud architecture

**Which cloud to choose?**

The choice between public, private and hybrid cloud solutions depends on a variety of factors, use cases and limitations. In the real-world, it’s not an either/or situation, especially since organizations tend to leverage all three types of cloud solutions considering the inherent value propositions and tradeoffs.