

## Essay #2 - Next generation cloud technologies

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Cloud technologies around the world are starting to become hot topics as society continues to innovate. The topic for this essay about next generation technology is that of multi-cloud and hybrid cloud computing. Multi-cloud computing is best defined as using multiple cloud providers, such as AWS, Azure, Google Cloud, and IBM to meet specific business needs. The reason that a business might consider a multi-cloud approach is to avoid vendor lock-in, optimize costs, use specialized services, and enhance redundancy. Hybrid cloud computing, on the other hand, combines a company's private resources with public cloud services, allowing organizations to maintain sensitive data and critical workloads on-premises while using the scalability and flexibility of the public cloud for less sensitive tasks or jobs. Hybrid cloud architecture has a good balance because it allows for firms to have complete local control over what they want, while allowing the rest to be on the public cloud.

Multi-cloud computing involves using services from multiple cloud providers to address specific business requirements, ranging from application hosting by one provider to data storage by another. Key players in this space include major cloud providers like AWS, Google Cloud, IBM, and Azure. Businesses of all sizes, from startups to large enterprises, adopt a multi-cloud strategy to avoid vendor lock-in, achieve cost savings, and capitalize on the unique technologies offered by different providers. The usage of multi-cloud is usually driven by the need to optimize operations through data deployment across various platforms, allowing organizations to achieve

a balance in workload based on performance, geographical location, and government compliance needs. By using the multi-cloud approach, businesses can significantly upgrade efficiency and cost-effectiveness, customizing their use of cloud resources to fit their specific business operational demands.

On the other hand, Hybrid cloud computing combines private cloud resources, mostly hosted on-premises, with public cloud services, allowing organizations to combine the scalability and flexibility of the public cloud while maintaining control over sensitive and critical workloads in their private infrastructure. The primary producers for this type of application are AWS, Azure, GCP, IBM Cloud, and VMware. Hybrid cloud solutions cater to enterprises across various industries, including finance, healthcare, and government, that have diverse IT needs and face regulatory or security constraints. This approach allows for the deployment of workloads—using the public cloud for its cost-effectiveness and scalability, while sensitive data or mission-critical applications are kept on-premises or within a private cloud, ensuring seamless integration and workload portability between different environments.

When discussing the problems being solved by these cloud computing strategies, we also have to consider the capabilities that are brought to the table. Multi-cloud computing gives the power to organizations to strategically deploy their digital assets across several cloud environments, solving critical issues like vendor lock-in and providing enhanced disaster recovery options. By having more than one cloud service providers, companies are not only able to negotiate better pricing but also leverage specific technological strengths and regional presences that may be unique to each provider, such as analytics, artificial intelligence capabilities, or data visualization tools. This approach naturally creates a new capability for businesses to optimize their operations for performance, and cost-efficiency, enabling a more

agile and tailored IT strategy. I firmly like the idea of using a multi-cloud strategy because it allows for data and other key information to be spread between companies. This would be critically important in the event of an outage; you would still retain some level of service. Multi-cloud computing introduces flexibility and a wider range of choices that was previously unattainable, allowing organizations to craft a convoluted infrastructure landscape that precisely matches their requirements.

Hybrid cloud computing also creates a seamlessly integrated environment that combines the scalability and flexibility of public cloud services with the control and security of private cloud infrastructure. This innovative approach enables organizations to dynamically allocate resources where they are most needed, optimizing performance and cost-efficiency. By facilitating the movement of data and applications between private and public clouds, hybrid cloud computing introduces a new level of operational agility, allowing businesses to rapidly respond to market demands, scale resources up or down as required, and ensure that sensitive data remains under tight lock and key.

Multi-cloud computing revolutionizes the way organizations deploy and manage their cloud resources by allowing them to utilize services from multiple cloud providers simultaneously. This approach offers crazy flexibility, scalability, and resilience, empowering businesses to select the best-in-class solutions for each aspect of their operations. Businesses competing in this space include major cloud providers such as AWS, Microsoft Azure, Google Cloud, and IBM Cloud. These providers offer a wide range of products and services, including compute instances, storage solutions, database services, AI/ML tools, and networking capabilities, enabling organizations to build complex, distributed architectures tailored to their specific needs.

Hybrid cloud computing on the other hand seamlessly integrates private and public cloud resources, enabling organizations to leverage the benefits of both environments while addressing unique business requirements and compliance concerns. Competitors in this space include cloud providers like AWS, Azure, GCP, IBM Cloud, and VMware, as well as companies specializing in hybrid cloud management and integration solutions such as Dell Technologies, Hewlett Packard Enterprise, Cisco Systems, and Nutanix. These companies offer a variety of products and services, including hybrid cloud platforms, management tools, networking solutions, and professional services aimed at facilitating the seamless integration and management of hybrid cloud environments.

Early adopters of both multi-cloud computing and hybrid cloud computing span a diverse range of industries and sectors, reflecting the appeal and desire for these cloud strategies. Technology giants like Netflix, Spotify, and Airbnb have embraced multi-cloud architectures, leveraging the strengths of different providers to enhance reliability, scalability, and performance. These companies distribute workloads across multiple clouds to optimize costs and mitigate risks associated with downtime or service outages. Similarly, financial institutions like Capital One and JP Morgan Chase, as well as healthcare providers like Pfizer and Johns Hopkins Medicine, are early adopters of hybrid cloud computing. They utilize a combination of private and public cloud resources to balance regulatory compliance, data security, and operational efficiency. By integrating on-premises infrastructure with public cloud services, these organizations achieve greater flexibility and agility in deploying applications, managing data, and scaling resources according to fluctuating demand. Overall, early adopters of multi-cloud and hybrid cloud computing are pioneering new fields in IT infrastructure, driving innovation, and reshaping the digital landscape with how we use our cloud technologies.

In conclusion, multi-cloud and hybrid cloud technologies stand at the forefront of a shift in the cloud industry, ready to redefine the way organizations leverage cloud resources and manage their IT infrastructure. With multi-cloud computing, businesses gain unprecedented flexibility, scalability, and resilience by harnessing services from multiple cloud providers, driving competition, innovation, and cost optimization in the market. Meanwhile, hybrid cloud computing seamlessly integrates private and public cloud environments, enabling organizations to achieve a delicate balance between regulatory compliance, data security, and operational efficiency. Together, these technologies empower businesses to tailor their cloud strategies to meet their unique needs, driving greater agility, innovation, and competitiveness in the digital era. As adoption continues to accelerate and technology evolves, multi-cloud and hybrid cloud computing will undoubtedly continue to shape the cloud industry, driving forward progress and unlocking new opportunities for businesses across all sectors.

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