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Chapter 6

Hybrid cloud use cases across industries

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Abstract

Hybrid cloud solutions are increasingly being adopted across industries to address diverse business needs, offering a blend of public and private cloud capabilities. In healthcare, hybrid clouds enable secure data sharing and compliance with regulatory standards. In finance, they provide flexibility for scaling operations while maintaining sensitive data in private environments. Retailers use hybrid clouds for improved customer experiences, leveraging the scalability of public clouds during peak times. This abstract explores various use cases across sectors, highlighting how hybrid cloud models enhance agility, optimize costs, and ensure security, driving digital transformation and innovation across industries.

Keywords

Hybrid Cloud, Cloud Use Cases, Healthcare, Finance, Retail, Cloud Scalability, Data Security, Digital Transformation, Cost Optimization, Agility, Cloud Flexibility, Regulatory Compliance, Customer Experience, Cloud Integration, Cloud Solutions, Industry Applications, Innovation, Cloud Adoption.

6.1. Introduction

Cloud computing has become the norm for dynamic business infrastructures, replacing in-house architectures. Various services offered online allow companies to be more financially flexible and enable automatic updates and access to the latest technology. Many cloud providers collaborate to create a large number of fully equipped data centers,

delivering data and applications through the internet. Furthermore, its adoption by industry has been increasing at a consistent pace. With improving technology in current infrastructure as well as the know-how on cloud computing, a lot of well-established corporations have been experimenting and migrating parts of their businesses. Nonetheless, some of the more sensitive data or processes are still kept internal (Syed, 2021). To support such strategic moves, the concept of hybrid cloud computing was proposed. It is a fusion of joint public and private cloud environments that remain unique entities yet are bound together by standardized or in-house technology, enabling data and application portability. Simply put, the public cloud is used for resources that are based on shared models, while the private cloud is referred to as resources and services that are managed internally. Together, they create a collaborative setup, enhancing internal flexibility and scalability, increasing the overall network performance for the company. As the business landscape undergoes rapid changes, the use of cloud technology is embraced as a method to adapt various business models. With this setup, companies are able to control critical processes internally, while sharing conventional solutions with the external providers, thus forecasting the use and manipulation of larger datasets with increased scalability. Such transitions are especially crucial in the Healthcare industry, where new regulations are mandating an extensive amount of data acquisition.

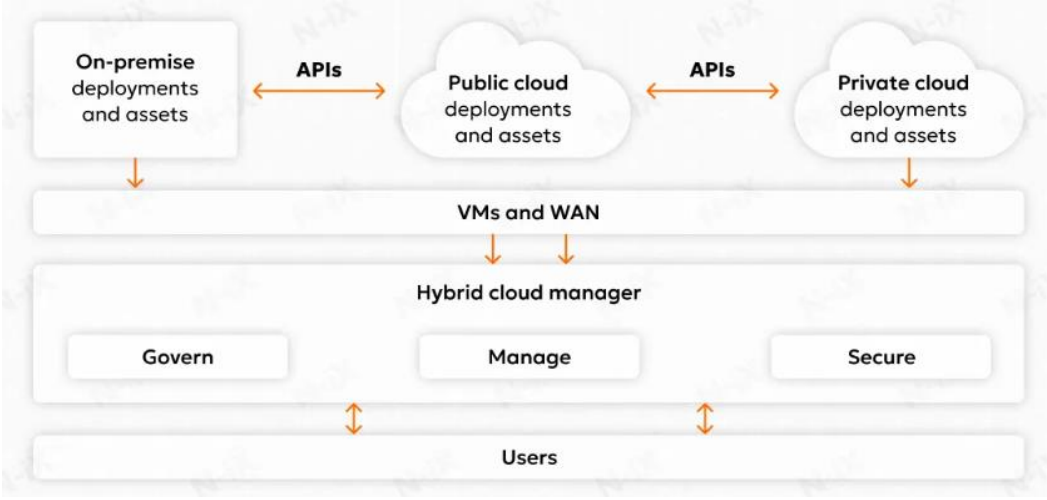

Fig 6.1: Hybrid cloud use cases

6.1.1. Background of Hybrid Cloud Computing

Hybrid cloud computing offers enterprises a flexible environment that combines the safety and reliability of private cloud with the scalability of public cloud. There are many

definitions but, in general, hybrid cloud computing can be defined as a combination of at least one private and one public cloud that maintains at least one connection between them. Hybrid clouds can be designed in such a way such that the connection can be established via public networks, or more directly, via provider-to-provider connection.

There have been considerable technological improvements that can facilitate the creation and management of hybrid clouds (Syed et al., 2021). The growing popularity and maturity of virtual machines or, more modern, containers, has led many production systems to operate on this paradigm. It has enabled better resource management, more flexible environment creation, and faster replica deployment. As more and more companies operate in the cloud, there is always a need for continuous and rapid development of solutions, either increasing the competitiveness of their own products or cutting production costs. Moreover, as the modern market is very volatile and the needs can change rapidly, achieving flexibility and scalability of the environment is often crucial for businesses to rapidly react to sudden changes. Businesses need an environment that can be dynamically extended to adapt to fluctuating workloads.

6.1.2. Significance of Studying Hybrid Cloud Use Cases Across Industries

Outlined that cloud computing represents a novel paradigm in the way IT service provision relations exist, and various organisations are seeking ways to implement this technology. The question of how to store and process data is central to contemporary information processing. Cloud computing offers various services that provide protection and the ability to build applications on a large scale, store and process data. Handling computational jobs quickly and packaging those tasks for later use is a challenging task for many engineers (Danda, 2023). Rapid Storage Search For efficiency reasons, large table files used in a variety of computer tasks. At the center of the public cloud is IaaS. Generally, the public cloud is dominated by service from data center providers. From the perspective of research in cloud computing, much of what the industry is seeking focuses on the practices and patterns involved with end users of cloud services. Thus, the institution-based resource choices of mandates and laws will predict how, what, and from where a company will choose services, though this aspect is marginalized in available cloud research literature.

6.2. Hybrid Cloud Use Cases in Healthcare Industry

As the information technology sector continues to grow and evolve, cloud computing is progressively thriving due to its elasticity, scalability, high availability, and opportunity for cost reduction. Hybrid Cloud Computing is considered a disruptive innovation which has changed the mindset of enterprises and how they utilize cloud computing models. Consequently, a growing body of organizations employ a mix of public and private clouds creating a hybrid cloud model. It has been adopted by various business domains including finance, government, e-commerce, telecommunications, and education to cope with Big Data. In the context of the information and technology industry, it improves business processes through automation, simplifies resource management, increases utilization of data storage, and makes data accessible from anywhere. Furthermore, cloud technology plays a significant role in the operational processes of applications and in preserving historical records essential to conducting audits. Similarly, public cloud likewise allows enterprises to execute applications efficiently through off-site resources stored in data centers. It is able to significantly expand the existing capabilities of a traditional data infrastructure, developing new competencies and services, and supplying a modular architecture permitting the integration of technologies. It is obvious that cloud technologies are perceived by the healthcare industry as a promising platform to store, access, and process Big Data, preserving health records, images and other sensitive information in a mode that permits quick access by authorized personnel or through personal devices (Syed, 2019). Many hospitals, medical universities, and shared diagnostic centers have executed cloud-based services. The enforcement of cloud computing by these healthcare institutions has resulted in the substantial employment in medical record storage and management, deployment of medical imaging processing services, telemedicine services and enhanced operational processes that facilitate diagnostics. As of today, the sharing of electronic health records (EHR) has been modernized with various cloud-enabled applications which can be entirely integrated across a common network and server infrastructure. Major hospitals and health institutions offer a variety of telemedicine services that can be tied, through cloud service providers, to personal healthcare devices.

Equation 1: Healthcare: Data Storage and Compliance

$$C_{hc} = C_{public} + C_{private} + C_{compliance}$$

Where:

- C_{hc} = Total cost of hybrid cloud infrastructure for healthcare
- C_{public} = Cost of storing non-sensitive data in public cloud
- $C_{private}$ = Cost of storing sensitive data in private cloud
- $C_{compliance}$ = Cost of compliance with healthcare regulations (e.g., HIPAA)

6.2.1. Electronic Health Records (EHR) Management

Electronic Health Records (EHR) Management The storage and management of EHR play a very important role on the research efficiency and medical quality for the whole network hospitals system. The cloud computing provides an efficient and easy way where the EHR can be easily accessed by authenticated medical personnel among these hospitals, or the different district diagnostic or treatment can be easily worked by the local district health professional to finish the snapshot of a different qualified treatment. In recent years, the secure EHR cloud storage and management system was developed for the Northwest Chinese hospital, which is the largest regional hospital with 3626 beds. To receive all the necessary treatment, patients of severe injuries usually transfer among the local district hospitals, regional hospitals and the local health service center to ensure consistent treatments, and vice versa, for the patient needs continuous postoperative cure (Syed et al., 2020). The cloud storage provides an eager way where the pertinent patient situational materials can be easily accessed by the authenticated treatment hospitals. It is why this “cloud-interlinked” hospital sequence EHR storage and management system was developed. Based on the specific patient identity, the regional or local diagnosing treatment hospital can upload or download the EHR of the treated treatment or the received previous treatments, with the restriction given the treatment time window. Rapid diagnoses and cuts to a clear-sighted target treatment can be immediately viewed or refined based on the necessary B-style examination reports made by the local hospitals. The EHR storage and management system in the cloud was developed by the “Northwest Patient EHR hospital-tied cloud storage system,” which is supported by the Azure cloud service.

6.2.2. Telemedicine Services

The role of hybrid cloud computing in telemedicine services has been the recent subject of much attention and conversation among healthcare professionals, government officials, and academics. As a remote management service, telemedicine seeks to utilise emerging technologies for the exchange or communication of required task information in order to provide medical services from within a healthcare facility to a patient based elsewhere. Hybrid cloud technology has rapidly transformed such services, providing unprecedented potential to both the existing services to operate in real-time monitoring and analysis of multitudes of data, and, to those without access to medical care facilities, in receiving services from remote healthcare professionals.

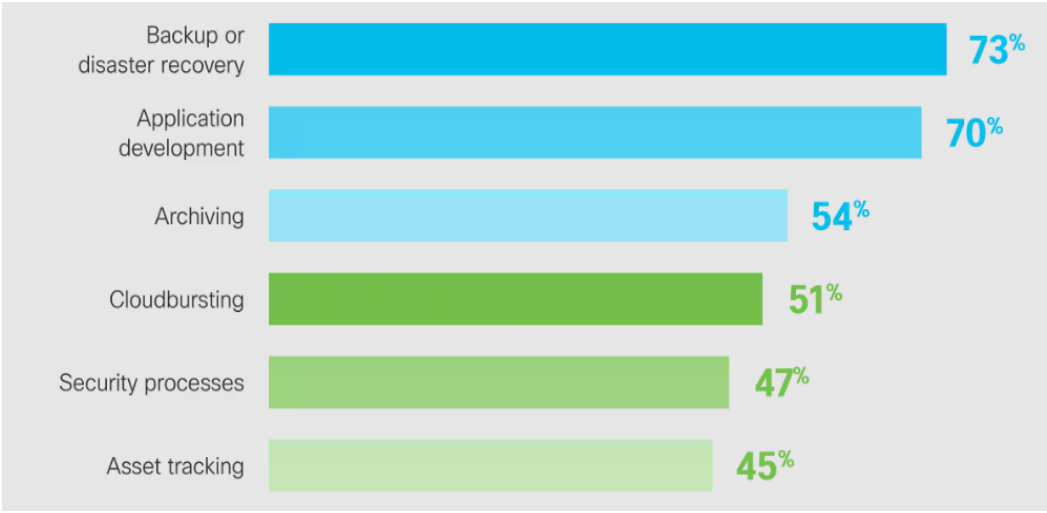

Fig : Global Hybrid Cloud Trends Report

6.3. Hybrid Cloud Use Cases in Finance Industry

Financial Services Industry companies are known for being highly complex, with large financial institutions often trading in multiple asset classes around the world every day. With the ever-changing market conditions, these companies are in a constant battle to stay ahead. Fraud is an ongoing but ever-evolving issue for financial institutions large and small, with losses from fraud increasing year-after-year (Tulasi et al., 2022). As companies get more data seemingly newer trends of fraud emerge, requiring more knowledge workers to identify potentially fraudulent trends as they emerge. Additionally,

in the financial services industry we have some of the most strict regulatory requirements – such as real-time surveillance – that a Financial Services provider must adhere to. Isolating rogue traders, identifying rogue trading and market makers, enforcing position limits and best execution are just a few examples of challenges that financial industries face under Dodd-Frank regulation.

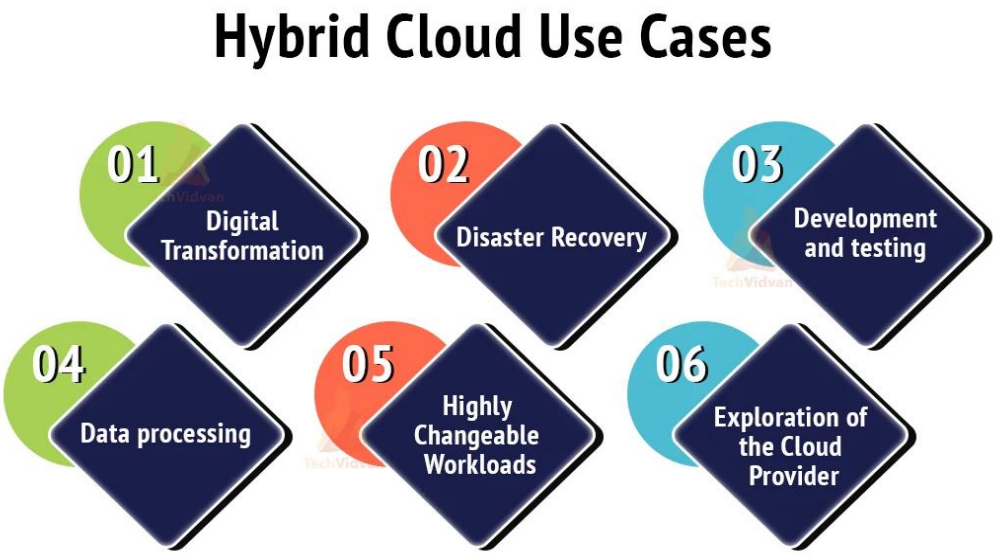

Fig 6.2: Hybrid Cloud Use Cases

6.3.1. Risk Management and Compliance

Hybrid cloud computing plays a significant role in managing risk effectively in the finance sector and ensuring regulatory compliance. As the pandemic has demonstrated, the finance sector is highly vulnerable to exogenous shocks because institutions are prone to failures and get easily interconnected. Especially in the finance industry, decision-making must be made based on real-time information to assess risks adequately (Venkata et al., 2022). The widespread application of hybrid cloud solutions in the finance industry can aggregate and store financial information quickly, so institutions can make better decisions. A hybrid solution provides a consistent environment for financial institutions to analyze data more quickly, allowing for better decision-making in monitoring and assessing the potential risks. Improved analytics can track transactions of shell corporations or digital wallets in real-time. These enhanced analytic capabilities, enabled

by hybrid clouds, could wash away the crime by seizing the money before it disappears. Such technology can analyze the drone video feed of the valuables movement and predict potential threat paths, and provide actionable intelligence to mitigate them. Funds looted from a bank can be tracked as they mix through legitimate business. The ease in which the monetization can be disrupted depends on the sophistication of the analytic tools being used to investigate the trail of funds.

6.3.2. High-Frequency Trading

High-frequency trading (HFT) strategies are a fundamental component of the finance industry, leading to billions of dollars moved within the global economy. The logic behind this process is to have the capability of executing trades within the smallest time window possible between initial price postings and a final purchase. Therefore, such trades often consist of a few lots only, but the number of trades executed on a single day may prompt considerable revenue. Lightning-fast data processing is a requirement for success in this field. A possible solution to this problem is the use of hybrid clouds, which are created by the integration of at least one public and one private cloud, sharing the same technology in order to provide a data processing approach with excellent performance because of immense computational power provided by the public element and reduced Latency inside the private element (Pandugula et al., 2024). Such a configuration offers an ability of processing enormous amounts of financial data from the global stock markets in real-time and opens the way for the creation and sophisticated testing of automated trading systems (also called Expert Advisors in the Forex market). The automated trading system is connected to the trading account of the user, controlled by the operator, inside a financial institution. The system continuously transfers the trading preferences generated following sophisticated algorithms designed to transform the large amounts of input financial data into some kind of output trading decisions. In response, the algorithm-controlled account executes prompt corresponding trades, with such omnipotent cooperation between the human and system trader, every advantage in data transfer is useful including low Latency and high availability. One technique which has become very popular and a necessity in the fast pace of the hybrid cloud-based trading is High-Frequency Trading (HFT). It allows to perform so called clocking transactions and also Algorithmic Trading (AT). These strategies reduce the time taken to complete a trade to the absolute minimum possible and in some cases decisions are made within the fraction of a second. Under normal conditions, this is not a straightforward task, though it is a prominent one. Both are greatly aided by leveraging computing power that is beyond the ability of the ordinary workstation and having access to a connection that has the lowest

latency or delay possible. In such cases, firms can contemplate placing orders embedded with BrVV and Buy LII triggers inside the exchange's computers.

6.4. Hybrid Cloud Use Cases in Retail Industry

Over the last few years, cloud computing has become an essential tool for businesses in all sectors. Retail companies in particular have seen a broad range of applications for this technology - generating data, managing inventories, maintaining websites, and other aspects of retail operations. Despite realizing these broad benefits, retail companies are still under-utilizing this technology, especially the smaller ones. With the cost of capital so high, it could be years before many retail companies can fully utilize all that cloud technology has to offer. However, retailers can still adopt hybrid solutions as a means to remain competitive in an industry that is rapidly growing and innovating.Beyond maintaining a consistent user experience, companies can also quantify other interactions in ways brick-and-mortar retailers cannot (Kalisetty et al., 2023). This is called omni-channel retail and describes a combination of technologies that allow a customer's shopping experience to be consistent and personal on all channels, browsers, and devices. This can increase cross-channel sales, accurate marketing budgets, extend shopping hours, and create a personalized customer experience through data analytics, machine learning, synchronization, and sharing of data.

Equation 2: Retail: Scalability and Customer Experience

$$S_{retail} = P_{scalability} \times C_{peak} + P_{security} \times D_{sensitive}$$

Where:

- S_{retail} = Scalability factor for retail hybrid cloud deployment
- $P_{scalability}$ = Public cloud capacity for scalability
- C_{peak} = Customer traffic peak factor (e.g., 2x normal traffic)
- $P_{security}$ = Private cloud's ability to secure sensitive customer data
- $D_{sensitive}$ = Sensitive customer data (credit cards, purchase history)

6.4.1. Inventory Management

Supply chain inventory management is defined as the process of maintaining optimal stock levels to ensure the business can operate smoothly, respond to changes in demand, minimize stock-outs or oversupply, and maximize the net value of inventory. Today, real-time data tracking through cloud technology can provide an overview of inventory at each stage. This cross-sectoral overview can go a long way in reducing inefficiencies associated with the traditional linear supply chain model and reducing operational risks . The tracking of items from suppliers to warehouses and from distributors to retailers has never been easier. This real-time cloud platform offers greater transparency and visibility through the entire supply chain, so all involved can make better decisions. Cloud technology can provide many other resources in addition to inventory tracking.

Predictive resources are connected to customers and are based on information gathered over time. This being the case, the longer partners work together, and the better the model's accuracy will be. The information gathered can include details such as the type of product bought, the time of purchase, and where the product is and what is its state: unpacked, unboxing (Sondinti et al., 2023). For that purpose, all the distributors and retailers in the chain are IoT equipped. Due to the number of partners and the amount of data involved, the gathered data directly feeds the cloud server. Even so the transfer rate is so high that every retailer has a dedicated server for locally storing all the information. Nevertheless, all information is then encrypted and uploaded to the cloud server. Upload is made overnight when the transfer rate is not that high and includes information about all the previous day operations. Since data accuracy is critical, the coding partners developed two portable solutions applicable to any environment. The server and the database both have a fingerprint scanner. This is important mainly on goods reception, to guarantee that all delivered goods are received. Proper measures were taken to ensure data security. Each partner can only access the information they own. The retailer obtains the information about the products sold, and the distributor and producer about the products bought and produced. The detailed information about tracking a product is only available to partners making part of the chain where the product is. Finally, the cloud resources are decentralized, meaning that they are not physically located in the same place, randomly distributing rack server farms over the country.

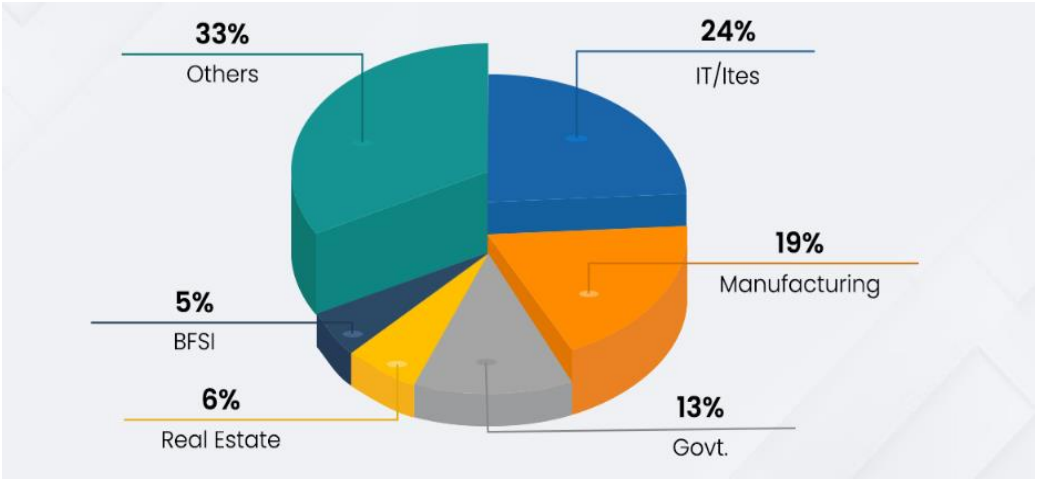

Fig: Future Scope of Cloud Computing In Manufacturing Industry

6.4.2. Personalized Marketing

Personalized marketing is made easier by hybrid clouds as retail companies can utilize big data analytics to understand and analyze customer behavior and preferences more accurately while they have a flexible platform to deal with variable-volume and volatile velocity of customer behaviors and information. In turn, analysis results can be rapidly utilized in the realization of specific campaigns, managed to communicate with existing channels and environments. With the help of technological infrastructure provided by hybrid cloud technology, companies still can understand consumer behavior and respond to them before they've seen the product. Companies in the retail industry monitor online customer interactions and define customer needs by analyzing web page views, which products they like, how they pursue easy favors, what they give up buying etc. Examining purchasing patterns and payment methods determines consumer preferences. According to these results, potential customers are invested before the opposing company offers. When customers enter the store, they are tracked by analyzing them from the uniform cameras. When they buy a product and pay for a credit card, this information is shared with the loyalty program.

6.5. Hybrid Cloud Use Cases in Education Industry

The future of learning and teaching is expected to be more fluid and adaptable. Educational institutions can prepare for this future adopting a hybrid-multi cloud framework. In academia, a hybrid cloud can be used to ensure data is always on and accessible. Moreover, it can provide a better platform for in-person, online learning, and peer-to-peer collaboration. Scaling is very important, especially with a growing student population. Sizeable and scalable platforms can help educational institutions move into new teaching territories. Creation of an online learning platform to upgrade hybrid cloud as a service (Hybrid-Multi Cloud AS) exploit for educational institutions is advised. Online learning platforms can provide students with organizational flexibility. They can study wherever they have a network connection and in their spare time. A combination of in-person education and online learning can have a much greater effect. For in-person classes, streaming lectures online can help students understand these technical subjects better by letting them replay difficult concepts until they understand. Furthermore, sharing notes and presentations online can help students understand mathematical content. DPUs can therefore be repurposed to analyze how often notes or presentations are viewed online and schedule smaller group additional lectures as required.The future of learning and teaching is rapidly evolving towards greater fluidity and adaptability, with educational institutions increasingly adopting hybrid-multi cloud frameworks to stay ahead. A hybrid cloud infrastructure ensures that data remains accessible and always-on, facilitating seamless in-person, online, and peer-to-peer collaboration. As student populations grow, scalability becomes critical, and hybrid-multi cloud solutions offer the flexibility to expand teaching capabilities and reach new territories. The creation of an online learning platform powered by Hybrid-Multi Cloud as a Service (HM-CaaS) is a strategic move for educational institutions, providing students with the freedom to learn at their own pace and from anywhere with an internet connection. This combination of online learning and in-person classes creates a more comprehensive educational experience, allowing students to revisit difficult concepts through streaming lectures. Additionally, sharing notes and presentations online enhances understanding, particularly in complex subjects like mathematics. Advanced analytics, such as utilizing DPUs to track student engagement with online content, can help institutions identify areas where further support is needed, enabling the scheduling of targeted smaller group sessions to reinforce learning.

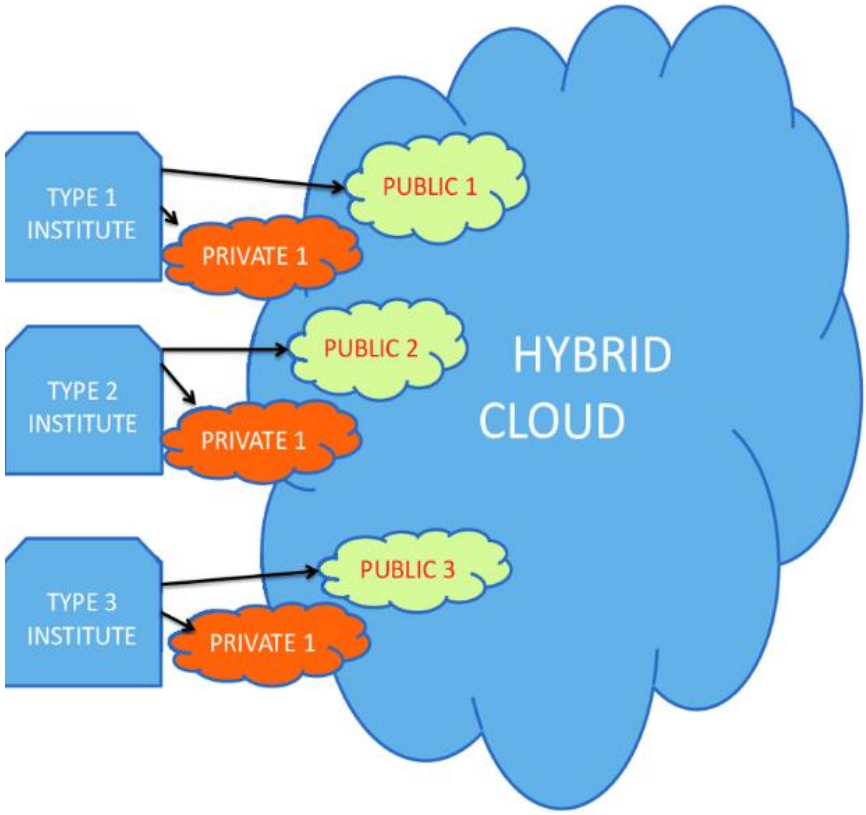

Fig 6.3: Creation of Hybrid Cloud from educational sectors

6.5.1. Online Learning Platforms

In recent years, digital education has attracted attention with the increase in technological developments. The importance of digital education has been understood in the process of combating the COVID-19 pandemic. Thus, many countries turned to remote learning in this period. Online learning platforms have been of great importance and hybrid cloud computing has been used in these platforms for scalable development and sustainable growth.

One of the main issues is the optimization of resources of the schools and universities, guaranteeing the maintenance of the service levels. In consequence, institutions are searching for solutions that allow optimization in the use of their resources, while maintaining the service at adequate levels. Educational institutions are supported by cloud

providers to develop e-learning modules with the innermost settings. BlueSky is embraced for the implementation of the e-Learning platform for distance learning synchronous and asynchronous. BlueSky enhances the on-spot method of studying through a real time apparatus set to convey pictures concerning the study accomplished by a fellow fellow at a distance to a new fellow keen in duplicating the same. On the other hand, there have been many academic investigations to suggest the structure of e-learning platforms. All of them range in private cloud configurations. These facts characterize the public cloud services. Now, there are no studies that define architectures with a focus on the optimal use of cloud resources types.

6.5.2. Student Information Systems

Student Information Systems (SIS) are essential applications for higher education institutions to manage student information. Student data management is a highly critical function for educational institutions and aims to provision student data efficiently and securely. Utilizing hybrid cloud solutions for managing SIS provides secure and efficient management of student data. Educational institutions have various departments related to student handling such as the office of the registrar, student services, finance etc. Handling student data among all these departments is highly critical and having the student information system in place and integrating cloud technology can help to have the student data flow efficiently and securely.

Many schools, colleges and universities are increasingly adopting cloud technologies to share and upload the student data and information among teachers, students and management. As schools, colleges and universities are spread across various geographical locations, it is essential that student information is available for the authorized personnel on demand. Adoption of cloud technologies has made the student information easily accessible. The Department of Education, administrative offices, and various programs in schools require data analysis for understanding performance parameters e.g. tracking the progress of students, analysis can be related to credit points, ranks, and grades etc. It is necessary to have this analysis available for the departments immediately as the semester progresses. By leveraging the hybrid cloud, the student performances can be analyzed on a variety of factors and it is possible to load the same data to the on premise every semester to make it available for data analysis. Education needs are very dynamic. Every institution keeps evolving and the needs keep changing with the developments in the industry. Many functions including handling student data are being progressively outsourced to other third party vendors. Student collaborative tools were paying attention e.g. tools that

integrate with the LMS are in place, tools for students that can help them to work together and tools for writing assignments online. It is possible to enhance the faculty, the students' collaboration through the usable applications which are both on cloud and on premise. Therefore, with that, the student information data can actually be shared a lot more and easily efficiently. Thankfully, the adoption of cloud based technologies is making these available. Privacy in student data is one of the major concerns in educational institutions. Being a responsible institution, it is necessary for the institute to ensure student's data is securely stored. In order to comply with regulatory requirements, it is important to report on when education records may be disclosed within a cloud environment. With the hybrid cloud in place, it is possible to have granular control over the on premise student information system and the cloud systems that handle the student information data. This allows secure sharing of student data as mandated by the education department.

6.6. Conclusion

As technology continues to advance, companies are reexamining the way business is done, and many have turned to the transformative power of hybrid cloud computing. Hybrid cloud computing is a subset of cloud computing that combines on-premises (private cloud) computing and off-premises resources, such as components of a public cloud. Efforts have been made to understand the applications and benefits of hybrid clouds in various sectors. The strategic advantages that hybrid clouds can bring to companies include the ability to avoid lock-in propensities with single cloud providers, the flexibility to create a workload-specific environment, the dynamic scalability to adjust to workload demands, and an enhanced ability to manage data that is almost impossible to be perfectly located.

In the healthcare industry, hybrid solutions for patient records have been addressed. Hybrid cloud storage solutions have also been proposed for medical image and imaging data storage. In the financial and retail sectors, hybrid cloud solutions for transaction data analytics have been examined. For the education industry, solutions for personal data management have been studied. In healthcare, the emergence of electronic health records (EHRs) has changed the traditional way in which patient records have been managed. A hybrid cloud solution is proposed to store only the metadata and index files on the public cloud, and the patient record associated with the metadata is stored on the private cloud. As a result, companies store patient records under tight regulation and at the same time offload their heavy metadata from air traffic control to public cloud providers.

6.6.1. Summary of Key Findings

This work analyzed various hybrid cloud use cases across industries, including banking, healthcare, media, pharmaceutical, and retail. The impact of regulatory requirements and constraints that influence technical and architectural designs have been analyzed. The results are concluded, highlighting the benefits achieved by adopting the reviewed hybrid cloud use cases. Additional aspects that have been considered include APIs, where external data feeds can be leveraged, and the scalability of cloud services, where sensors and other data feeds can scale up quickly. In summary, the analyzed use cases indicated a strong focus on platform and software service offerings that enable businesses to leverage external data feeds. In the context of the benefits, the findings highlight the flexibility to shape specific queries on the external data feeds and the potential to perform multiple types of predictive analysis, such as usage predictions, sentiment analysis, and market movements. Services and products tailored to individual needs, such as personalized pricing, are supported, emphasizing how businesses can develop specific ideas to take advantage of the reviewed use cases. An overview was thus provided of multiple practical applications of hybrid cloud computing beyond basic IT and storage solutions. The banking and healthcare use cases are heavily dominated by private and community cloud solutions. The analysis of the healthcare case illustrated the complex series of interactions and processes that form between regulatory compliance, stakeholders, technical services, and architecture. The media, pharmaceutical, and retail use cases indicate a trend of an increasingly elaborate mix of hybrid cloud solutions. In particular, the reviewed retail use case demonstrates a range of existing and new projects acknowledging the strategic importance of hybrid models to drive innovation, capture new revenue channels, and maintain competitiveness. Six use cases also illustrate the rapid rate of emerging projects that demand the organization can adapt to changing developments and leverage the technology most effectively.

6.6.2. Future Trends

This text discusses the use cases of the hybrid cloud in a variety of industries. The healthcare industry is adopting policy changes to meet the need for large-scale data storage and processing solutions. Education is using a hybrid cloud to accelerate the construction of smart classes. The finance industry improves system reliability and performance with hybrid cloud-based solutions like high-speed data write operations and analytics for market trends. The government is setting up a hybrid cloud infrastructure to adapt to budget constraints. The media industry uses a hybrid cloud to distribute 3D/4K

content for broadcast and live streaming. Transportation uses hybrid clouds and IoT to achieve fuel-saving eco-driving and environment maintenance. Human resource service startups build recruitment platforms on hybrid clouds and open their services to third parties. The startups produce web services with the continuous integration method provided by the hybrid cloud service. Using the hybrid cloud, the game business offers international services and also protects users from network attacks and data loss using high computed security functions. This text implemented a backup environment that prevents all services from stopping even when one cloud service is in trouble in the hybrid cloud environment. In e-commerce, real-time service refreshes faster with a hybrid cloud for the web and cache servers and they can be automatically scaled according to CPU usage. Furthermore, an original idea of visiting personal photo album generating system based on route logs is also presented here.

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