**Student Assessment Submission and Declaration**

When submitting evidence for assessment, each student must sign a declaration confirming that the work is their own.

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**1 . As part of SmartTech you are required to clarify the importance of cloud computing by specifying the fundamental concepts of Cloud Computing highlighting: definition of cloud computing, cloud computing services models, deployment model and cloud architecture.**

# Cloud computing

Cloud computing is a way to access a shared pool of computing resources, such as servers, storage, and applications, over a network with minimal management and service provider interaction. It is characterized by five essential characteristics and can be divided into three service models and four deployment models.

# Cloud computing services models

Cloud computing services can be broadly classified into three categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).  
  
**1 - Infrastructure as a Service (IaaS)** refers to the delivery of computing infrastructure (e.g., servers, storage, networking) as a service over the internet. IaaS providers offer users the ability to rent out physical or virtual infrastructure on a pay-as-you-go basis.  
  
**2 - Platform as a Service (PaaS)** refers to the delivery of a platform for developing, testing, delivering, and managing software applications over the internet. PaaS providers offer users the ability to build and deploy applications on their platform without the need to worry about underlying infrastructure.  
  
**3 - Software as a Service (SaaS)** refers to the delivery of software applications over the internet. SaaS providers offer users the ability to access and use software applications on a pay-as-you-go basis, without the need to install or maintain the software on their own computers.

# Deployment models

Cloud computing deployment models refer to the way in which cloud services are provided to users. There are four main deployment models: public cloud, private cloud, hybrid cloud, and community cloud.

Public cloud refers to cloud services that are provided over the internet and are available to the general public. Public clouds are owned and operated by third-party cloud service providers.  
  
**1 - Private Cloud:** Private cloud refers to cloud services that are provided to a single organization over a private network. Private clouds can be owned and operated by the organization itself or by a third-party provider.  
  
**2 - Community clouds:** Community cloud refers to cloud services that are provided to a specific community of users (e.g., government agencies, educational institutions) over a private network.  
  
**3 - Hybrid cloud:** refers to a combination of public and private clouds, where different types of workloads are run on different types of clouds based on their specific requirements.

# Cloud architecture

Cloud architecture encompasses the design and organization of a cloud computing system, including its hardware, software, and networking components. Different models exist, such as the client-server, three-tier, and n-tier models.

**2 . The SmartTech team has requested that you provide detailed information about the benefits of using cloud services for both users and organizations. Explore the advantages of cloud solutions in your response.**

**Benefits for Organizations**

1. Cost savings: Cloud services can significantly reduce costs associated with IT infrastructure, including hardware, software, and maintenance.
2. Scalability: Cloud services can be easily scaled up or down based on the organization's changing needs.
3. Flexibility: Cloud services can be accessed from any location with an internet connection, allowing organizations to work remotely and collaborate more easily.
4. Improved disaster recovery: Cloud services can provide organizations with better disaster recovery options, including automatic backups and easy data restoration.
5. Enhanced security: Cloud service providers often have more robust security measures in place than most organizations can afford on their own.
6. Increased efficiency: Cloud services can automate many IT processes, freeing up staff to focus on other tasks.  
   In summary, cloud services offer a range of benefits for both users and organizations, including cost savings, scalability, flexibility, security, data backup and recovery, improved collaboration, and enhanced performance.  
     
   **Benefits for Users**
7. Accessibility: Cloud services can be accessed from any device with an internet connection, allowing users to work from anywhere.
8. Automatic updates: Cloud services automatically receive updates and new features, which users can benefit from without having to perform their own updates.
9. Collaboration: Cloud services enable users to collaborate and share documents in real-time, making teamwork more efficient and effective.
10. Data synchronization: Cloud services synchronize data across devices, allowing users to access their files from any device they use.  
      
    5. Reduced IT costs: Cloud services typically require no upfront investment, so users only pay for what they use.

**6. Increased storage:** Cloud services offer large amounts of storage, allowing users to store more data than they would be able to on a local device.

**3. Suppose SmartTech desires to migrate all works to a cloud-based system. You understand the migration process from your perspective. Investigate the significance of migrating to a Cloud Computing solution and the challenges that may arise during this process.**

Migrating to a cloud-based system can bring a number of benefits to organizations, including cost savings, scalability, flexibility, and improved security. However, there are also challenges that can arise during the migration process. Some of the main challenges to consider include:

# Data migration

One of the main challenges of migrating to the cloud is moving large amounts of data from on-premises systems to the cloud. This process can be time-consuming and resource-intensive, and it requires careful planning and execution to ensure that the data is transferred securely and without loss or corruption.

# Compatibility issues

Another challenge that can arise during the migration process is ensuring that the cloud-based system is compatible with the organization's existing systems and processes. This may require updates or modifications to the organization's hardware, software, and other IT infrastructure.

# Security concerns

Some organizations may be hesitant to migrate to the cloud due to concerns about data security and privacy. It is important for organizations to carefully evaluate the security measures and policies of their cloud provider to ensure that their data will be protected.

# Staff training and support

Migrating to a cloud-based system may also require staff training and support to ensure that employees are able to use the new system effectively. This can be a significant challenge for organizations with large or dispersed workforces.

**4. The SmartTech Company's team requested that different deployment models be used with the three services, which include IaaS, SaaS, and PaaS. Your task is to examine why certain combinations of cloud deployment models and service models are only effective in certain situations.**

**Public Infrastructure as a Service (IaaS)** is a deployment model that provides virtualized computing resources over the internet to the general public. This model is cost-effective and easy to use, making it a good option for small and medium-sized businesses that need a low-cost way to quickly scale their IT infrastructure. However, it may not be the best option for organizations with strict compliance or security requirements, as the data and resources are shared among multiple users.

**Private IaaS,** on the other hand, provides virtualized computing resources over a private network, either on-premises or through a third-party provider, and is used by a single organization. This deployment model is more secure and compliant as the data and resources are not shared with other users. However, it may be more expensive and require more management effort than public IaaS.

**Hybrid IaaS** is a combination of public and private IaaS deployment models, allowing organizations to use the best of both worlds. It offers the cost-effectiveness and scalability of public IaaS and the security and compliance of private IaaS. Organizations can choose to keep sensitive data and applications on-premises while using public IaaS for less sensitive workloads.

**For Platform as a Service (PaaS), Public PaaS** is a deployment model that provides a platform for the development, testing, and deployment of applications and services over the internet to the general public. It is a cost-effective option for developers and small organizations that need a low-cost way to quickly build and deploy applications. However, it may not be the best option for organizations with strict compliance or security requirements, as the data and resources are shared among multiple users.

**Private PaaS,** on the other hand, provides a platform for the development, testing, and deployment of applications and services over a private network, either on-premises or through a third-party provider, and is used by a single organization. This deployment model is more secure and compliant as the data and resources are not shared with other users. However, it may be more expensive and require more management effort than public PaaS.

**Hybrid PaaS** is a combination of public and private PaaS deployment models, allowing organizations to use the best of both worlds. It offers the cost-effectiveness and scalability of public PaaS and the security and compliance of private PaaS. Organizations can choose to keep sensitive data and applications on-premises while using public PaaS for less sensitive workloads.

**For Software as a Service (SaaS), Public SaaS** is a deployment model that provides software applications over the internet to the general public. It is a cost-effective option for small organizations that need a low-cost way to quickly access and use software applications. However, it may not be the best option for organizations with strict compliance or security requirements, as the data and resources are shared among multiple users**.**

**Private SaaS,** on the other hand, provides software applications over a private network, either on-premises or through a third-party provider, and is used by a single organization. This deployment model is more secure and compliant as the data and resources are not shared with other users. However, it may be more expensive and require more management effort than public SaaS.

**Hybrid** SaaS is a combination of public and private SaaS deployment models, allowing organizations to use the best of both worlds. It offers the cost-effectiveness and scalability of public SaaS and the security and compliance of private SaaS. Organizations can choose to keep sensitive data and applications on-premises while using public SaaS

1. Assume SmartTech wishes to migrate their Adobe Acrobat Pro, Data storage, Outlook, HR System, Oracle Database, Video streaming, network, and sensitive data. By comparing service models your tasks are to:
   1. Formulate the best deployment model for SmartTech.

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| **Applications** | **IaaS, SaaS, or PaaS** | **Platform hosting option** | **Management optio­­n** | **Cloud Models** |
| Adobe Acrobat Pro | SaaS | Online | Managed by provider | Public cloud |
| Data Storage | SaaS or IaaS | Online or on-premises | Managed by provider or self-managed | Private cloud |
| Outlook | SaaS | Online | Managed by provider | Public cloud |
| HR System | SaaS | Online or on-premises | Managed by provider or self-managed | Public cloud |
| Oracle Database | IaaS or PaaS | Online or on-premises | Managed by provider or self-managed | Private cloud |
| Video streaming | SaaS | Online | Managed by provider | Public cloud |
| Network | IaaS | Online or on-premises | Fully Managed | Private cloud |
| Sensitive Data | SaaS or IaaS | Online or on-premises | Fully Managed | Private cloud |

1. Examine at least 5 different deployment models, service models, and technologies and how they interact in your proposed solution in task 5.A

**Public cloud** deployment model with SaaS service model: SmartTech could use a public cloud provider, such as Amazon Web Services or Microsoft Azure, to host software applications like Adobe Acrobat Pro, Outlook, and HR System on a subscription basis. The provider would be responsible for managing the infrastructure and ensuring that the applications are available to users over the Internet.

**Private cloud** deployment model with PaaS service model: SmartTech could set up a private cloud using its own infrastructure, such as servers and storage, to host a platform for developing, testing, and deploying applications. The company could use technologies such as containers or microservices to enable flexible and scalable deployment of applications across the private cloud.

**Hybrid cloud** deployment model with IaaS service model: SmartTech could use a combination of public and private cloud resources to host its data storage and sensitive data. The public cloud could be used for scalable resources like storage and computing power, while the private cloud could be used for data that requires strict security controls. Technologies such as cloud gateways or network virtualization could be used to seamlessly integrate the public and private clouds.

**Community cloud** deployment model with SaaS service model: SmartTech could join a community cloud with other organizations that have similar requirements, such as other private schools. The community cloud could be used to host software applications like video streaming, with the resources being shared among the member organizations. Technologies such as load balancers or content delivery networks could be used to distribute the workload across the community cloud.

**Public cloud** deployment model with IaaS service model: SmartTech could use a public cloud provider to host its network infrastructure, such as servers, storage, and networking resources, on a pay-per-use basis. The provider would be responsible for managing the infrastructure and ensuring that it is available to the company over the Internet. Technologies such as virtual private clouds or security system as a service could be used to secure and manage the network infrastructure. tenant, which means that multiple organizations share the same resources and infrastructure

1. **Criticize the possible effect of cloud migration strategies on both users and organizations.**

Cloud migration, or the process of moving data, applications, and other resources to a cloud computing environment, can have both positive and negative effects on users and organizations. Some potential impacts of cloud migration strategies include:

**Cost savings:** One of the primary benefits of cloud migration is the potential for cost savings. By using shared resources and paying for only what is used, organizations can reduce the costs of building and maintaining their own infrastructure. However, it is important to carefully evaluate the costs of different cloud service models and providers to ensure that the overall costs are reasonable and in line with the organization's budget.

**Improved security:** Cloud providers often have robust security measures in place to protect data and prevent unauthorized access. This can be especially beneficial for organizations that may not have the resources or expertise to implement strong security measures on their own. However, it is important to carefully evaluate the security policies and practices of different cloud providers to ensure that they meet the organization's needs and requirements.

**Increased flexibility and scalability:** Cloud migration can enable organizations to scale up or down their resources as needed, without the need to invest in additional hardware or infrastructure. This can be especially beneficial for organizations that experience fluctuating demand or need to quickly respond to changing business conditions. However, it is important to carefully evaluate the service level agreements (SLAs) and terms of service of different cloud providers to ensure that the organization has the resources it needs when it needs them.

**Complexity:** Cloud migration can introduce complexity, as organizations may need to integrate their existing systems and processes with the cloud environment. This can require significant time and resources and may require changes to the organization's internal processes and policies. It is important to carefully plan and manage the cloud migration process to minimize disruptions and ensure a smooth transition.

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1. **Assume that SmartTech asked you to list the services provided by cloud service providers for Virtual Server, Object Storage, and Relational Database Management Service. You are invited to differentiate between Microsoft, Amazon, and Google services.**

# Virtual Server

**Microsoft Azure:** Azure Virtual Machines is a service that allows organizations to create and manage virtual machines in the cloud. It offers a wide range of operating systems and pre-configured images, as well as the ability to create custom images.

**Amazon Web Services (AWS):** AWS EC2 is a service that allows organizations to create and manage virtual machines in the cloud. It offers a wide range of operating systems and pre-configured images, as well as the ability to create custom images.

**Google Cloud Platform (GCP):** GCP Compute Engine is a service that allows organizations to create and manage virtual machines in the cloud. It offers a wide range of operating systems and pre-configured images, as well as the ability to create custom images.

# Object Storage

**Microsoft Azure:** Azure Blob Storage is a service that allows organizations to store and retrieve large amounts of unstructured data, such as images, videos, and audio files. It offers options for hot, cool, and archive storage, as well as the ability to replicate data across regions.

**Amazon Web Services (AWS):** AWS S3 is a service that allows organizations to store and retrieve large amounts of unstructured data, such as images, videos, and audio files. It offers options for standard, infrequent access, and glacier storage, as well as the ability to replicate data across regions.

**Google Cloud Platform (GCP):** GCP Cloud Storage is a service that allows organizations to store and retrieve large amounts of unstructured data, such as images, videos, and audio files. It offers options for multi-regional, regional, and nearline storage, as well as the ability to replicate data across regions.

# Relational Database Management Service

**Microsoft Azure:** Azure SQL Database is a service that allows organizations to create and manage relational databases in the cloud. It offers options for single databases, managed instances, and elastic pools, as well as the ability to replicate data across regions.

**Amazon Web Services (AWS):** AWS RDS is a service that allows organizations to create and manage relational databases in the cloud. It offers options for MySQL, PostgreSQL, MariaDB, Oracle, and Aurora, as well as the ability to replicate data across regions.

**Google Cloud Platform (GCP):** GCP Cloud SQL is a service that allows organizations to create and manage relational databases in the cloud. It offers options for MySQL and PostgreSQL, as well as the ability to replicate data across regions.

1. **SmartTech request from you to make clear the cloud architecture frameworks and tools such as: Microsoft, Amazon, and Google provide.**

# Architecture

**Architecture** refers to the high-level design of a system, including the structure, components, modules, interfaces, and data for a software application or technology solution. In the context of cloud computing, architecture refers to the design of a cloud-based system, including the hardware and software components, the network infrastructure, the security mechanisms, and the data storage and processing services.

A well-designed cloud architecture should provide the necessary scalability, reliability, and security to meet the demands of the users and customers. It should also be flexible enough to adapt to changes in technology, business requirements, and regulations. To achieve these goals, cloud architects use a variety of frameworks, patterns, and tools to design, build, and manage cloud-based systems.

# Microsoft Azure

**Azure Architecture Center:** The Azure Architecture Center is a resource that provides guidance and best practices for designing, building, and managing cloud solutions on Azure. It includes a library of reference architectures, patterns, and practices for common scenarios, as well as tools and guidance for design, testing, and deployment.

**Azure Resource Manager:** Azure Resource Manager is a tool that allows organizations to deploy, manage, and monitor resources in Azure. It enables organizations to create and manage resource groups, which are logical collections of resources that can be managed as a single unit.

**Azure DevOps:** Azure DevOps is a set of development tools, services, and features that enable organizations to plan, develop, deliver, and maintain software. It includes tools for version control, work tracking, testing, and deployment, as well as integration with Azure services.

# Amazon Web Services (AWS)

**AWS Well-Architected Framework:** The AWS Well-Architected Framework is a resource that provides guidance and best practices for designing, building, and operating reliable, secure, efficient, and cost-effective systems in the cloud. It includes a set of guidelines, questions, and review processes that organizations can use to assess and improve the quality of their cloud architectures.

**AWS CloudFormation:** AWS CloudFormation is a tool that allows organizations to use templates to create and manage AWS resources in a predictable and repeatable way. It enables organizations to automate the provisioning and management of resources, as well as to deploy and update resources in a controlled and scalable manner.

**AWS Solutions Architecture:** provides a library of architecture diagrams and templates for various types of cloud solutions, such as web applications, big data, and disaster recovery.

# Google Cloud Platform (GCP)

**GCP Architecture Center:** The GCP Architecture Center is a resource that provides guidance and best practices for designing, building, and managing cloud solutions on GCP. It includes a library of reference architectures, patterns, and practices for common scenarios, as well as tools and guidance for design, testing, and deployment.

**GCP Architecture Patterns:** provide detailed examples of common patterns used in cloud architecture, such as microservices, event-driven architectures, and serverless computing.  
 **GCP Cloud Build:** GCP Cloud Build is a service that enables organizations to build and test software in the cloud. It includes tools for version control, testing, and deployment, as well as integration with other GCP services.

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1. SmartTech plans to move their database and storage to the cloud. You've been asked to investigate the storage and database services supplied by Microsoft Azure and AWS in greater detail in terms of pricing and availability in order to make the best decision

# Microsoft Azure

**Azure Storage:** Azure Storage is a service that provides scalable, highly available, and secure storage for data in the cloud. It offers a range of options for storing data, including blobs (unstructured data), files (network file shares), tables (NoSQL key-value storage), and queues (messaging between applications). Azure Storage is priced based on the volume of data stored, the number of transactions performed, and the type of storage used. There are also options for reserved capacity and capacity on demand to help manage costs.

**Azure SQL Database:** Azure SQL Database is a service that allows organizations to create and manage relational databases in the cloud. It offers options for single databases, managed instances, and elastic pools, as well as the ability to replicate data across regions. Azure SQL Database is priced based on the size of the database, the performance level, and the features used. There are also options for reserved capacity and capacity on demand to help manage costs.

# Amazon Web Services (AWS)

**Amazon Simple Storage Service (S3):** Amazon S3 is a service that allows organizations to store and retrieve large amounts of unstructured data, such as images, videos, and audio files. It offers options for standard, infrequent access, and glacier storage, as well as the ability to replicate data across regions. Amazon S3 is priced based on the volume of data stored, the number of requests made, and the level of durability and availability required. There are also options for reserved capacity and capacity on demand to help manage costs.

**Amazon Relational Database Service (RDS):** Amazon RDS is a service that allows organizations to create and manage relational databases in the cloud. It offers options for MySQL, PostgreSQL, MariaDB, Oracle, and Aurora, as well as the ability to replicate data across regions. Amazon RDS is priced based on the size of the database, the performance level, and the features used. There are also options for reserved capacity and capacity on demand to help manage costs.

It's important to carefully evaluate the pricing and availability of these services to ensure that they meet the needs and budget of your organization. Factors to consider may include the volume of data to be stored, the performance and scalability requirements, the level of durability and availability needed, and the level of support required.

1. **Assume that SmartTech has asked you to create e-mail and backup services utilizing a cloud service provider. You are asked to investigate the evidence and discuss the benefits and drawbacks of using CSP technologies to construct previous apps.**

Using a cloud service provider (CSP) to create email and backup services can have several benefits and drawbacks. Some of the benefits include:

**Cost:** Using a CSP can be more cost-effective than building and maintaining these services in-house. CSPs typically offer pay-as-you-go pricing models that allow organizations to scale their usage up or down as needed, as well as options for reserved capacity and capacity on demand to help manage costs.

**Reliability:** CSPs typically offer high levels of reliability and uptime, as they have the resources and infrastructure to ensure that their services are available and functioning properly. This can be especially important for mission-critical services such as email and backup.

**Security:** CSPs typically have robust security measures in place to protect the data and systems of their customers. This can include measures such as data encryption, secure data centers, and access controls.

However, there are also some drawbacks to consider when using CSPs to create email and backup services:

**Dependence on the CSP:** Organizations that rely on CSPs for these services may be at risk if the CSP experiences outages or other issues that affect the availability of the services. This can be mitigated through the use of multiple CSPs or through the implementation of redundant systems.

**Data privacy and control:** Organizations that use CSPs to store their data may have less control over their data than they would if they were hosting the data in-house. This can be a concern for organizations that handle sensitive or regulated data and may require additional measures to ensure compliance.

**Integration with existing systems:** Integrating email and backup services with existing systems and processes can be complex, especially if the systems are not designed to work with CSPs.

1. **SmartTech is concerned that migrating to the cloud will threaten their data, allowing attackers to access and alter it. You have asked to analyse the security features offered by cloud service providers.**

Cloud service providers typically offer a variety of security features to protect their customers' data. These may include:

**Encryption:** Encrypting data in transit (while it is being transmitted to or from the cloud) and at rest (when it is stored in the cloud) can help to prevent unauthorized access.

**Access controls:** Cloud service providers often offer various access controls, such as multifactor authentication, to ensure that only authorized users can access data.

**Physical security:** Cloud service providers typically invest in physical security measures, such as surveillance cameras and security guards, to protect their data centers.

**Compliance:** Many cloud service providers are compliant with various industry-specific regulations, such as HIPAA for healthcare or PCI DSS for financial services, which can help to ensure that data is handled in a secure manner.

**Disaster recovery:** Cloud service providers often offer disaster recovery solutions to ensure that data can be recovered in the event of an outage or other disaster.

It's important to note that the specific security features offered by cloud service providers may vary, so it's important to carefully review the offerings of any provider you are considering. Additionally, it's important to consider the security needs of your own organization and ensure that the cloud service provider you choose can meet those needs.

1. **SmartTech has asked for all of the information regarding managing and maintaining cloud-based computing solutions. Your job is to determine the most typical technical issues that occur in a Cloud Computing platform and propose acceptable solutions.**

There are a variety of technical issues that can occur in a cloud computing platform. Some common issues include:

**Outages:** Cloud service providers may experience outages due to various factors, such as hardware failures or network issues. To minimize the impact of outages, it's important to have a disaster recovery plan in place.

**Performance:** Cloud-based applications may experience performance issues due to a variety of factors, such as network latency or resource contention. To improve performance, it may be necessary to optimize the application or to scale resources up or down.

**Security:** Security is a critical concern in the cloud, and it's important to ensure that data is protected against unauthorized access or tampering. This may involve implementing security measures such as encryption, access controls, and compliance with relevant regulations.

**Integration:** When integrating cloud-based solutions with on-premises systems, it's important to consider issues such as data transfer, interoperability, and integration with existing processes and systems.

To address these and other technical issues, it may be necessary to implement a variety of solutions, such as implementing best practices for cloud computing, using monitoring and management tools, and leveraging the expertise of trained professionals.Top of Form

**13. SmartTech is concerned about the possibility of cloud-based risks in its services. As an IT technical member, you need to evaluate security risks as well as legal issues that may affect both the user and the business that uses your services.**

There are several security risks and legal issues that can affect both the user and the business that uses cloud-based services. Some common risks and issues to consider include:

**Data breaches:** The risk of data breaches is a major concern in the cloud, as sensitive data may be stored on servers that are managed by third parties. It's important to implement robust security measures to protect against data breaches, and to have a plan in place to respond if a breach does occur.

**Data privacy:** The use of cloud-based services may raise concerns about data privacy, as data may be stored on servers that are located in other countries. It's important to ensure that data is protected in accordance with relevant laws and regulations, such as the General Data Protection Regulation (GDPR) in the EU.

**Data ownership:** There may be legal issues related to who owns the data stored in the cloud. It's important to clearly define the ownership of data in contracts with cloud service providers.

**Compliance:** The use of cloud-based services may raise compliance issues, such as the need to meet regulatory requirements or industry-specific standards. It's important to ensure that the cloud service provider is compliant with relevant regulations and standards.

Brender, N. and Markov, I., 2013. Risk perception and risk management in cloud computing: Results from a case study of Swiss companies. *International journal of information management*, *33*(5), pp.726-733.

**14. SmartTech needed to know about the legal and security features of migrating their data-center to the cloud, including networking, storage, servers, and virtualization. Your job is to examine the IaaS legal and security features and develop solutions to the problems that can occur in a cloud-based environment.**

There are a variety of legal and security issues that can arise when migrating a data center to the cloud, including those related to networking, storage, servers, and virtualization. Some key considerations include:

**Networking:** When migrating to the cloud, it's important to consider issues such as network connectivity, bandwidth, and latency. It's also important to ensure that the cloud service provider has robust security measures in place to protect against threats such as cyber-attacks.

**Storage:** When storing data in the cloud, it's important to consider issues such as data privacy, data ownership, and compliance with relevant laws and regulations. It's also important to ensure that data is securely stored and backed up to prevent data loss.

**Servers:** The use of cloud-based servers may raise issues such as vendor lock-in, which can make it difficult to switch to a different provider. It's important to carefully review contracts with cloud service providers to ensure that the business has the flexibility to switch providers if needed.

**Virtualization:** The use of virtualization in the cloud can help to improve efficiency and reduce costs, but it can also raise issues such as resource contention and security vulnerabilities. It's important to carefully consider these issues when deploying virtualization in the cloud.

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