

# **Feasibility and Implications of Migrating IT Infrastructure to the Cloud: A Comprehensive Report**

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**for**

**Tom & Jerry & Sons, Fruit and Veg Ltd**

## **Abstract**

As cloud computing and virtualisation technologies advance, businesses can modernise their Information Technology (IT) infrastructure for improved efficiency. This report analyses the feasibility of migrating Tom & Jerry & Sons, Fruit and Veg Ltd's IT systems to the cloud, exploring cloud service models—Infrastructure-as-a-Service, Platform-as-a-Service, and Software-as-a-Service. It evaluates IaaS for scalable hardware replacement, PaaS for custom application development, and SaaS for ready-to-use tools like accounting and inventory management. The report also addresses challenges related to legacy systems, legal implications, scalability, and security concerns such as data loss and provider failure. Recommendations include a phased migration strategy, strong data protection protocols, and employee training to ensure a smooth transition and long-term growth.

**Keywords:** Cloud Computing, IaaS, PaaS, SaaS, Virtualisation, Legacy Systems, IT Infrastructure, Security, Scalability, Data Protection

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## 1. Introduction

Cloud computing offers a transformative approach to Information Technology (IT) infrastructure, providing cost-efficient, on-demand outsourcing services based on a pay-per-use model (Gill, 2020). The growth of cloud computing methods, online services and user-generated content has increased the demand for computational resources within cloud environments (Le et al., 2018).

Tom & Jerry & Sons, Fruit and Veg Ltd is a private company that has served its community for over 50 years, specialising in distributing high-quality fresh produce. With a workforce of 200 employees, the company has established a strong reputation for exceptional customer service. However, as technology advances, the company faces critical challenges related to its diverse and outdated IT infrastructure. Their current setup includes a mix of legacy systems, modern Customer Relationship Management (CRM) applications, and various databases for payroll, human resources (HR), and inventory management. The lack of interoperability among these systems necessitates time consuming manual data transfers, which can lead to errors and decreased productivity. Consequently, the company is considering a significant transition to a cloud-based IT infrastructure to modernise its operations. The goals of this migration include enhancing system integration, reducing operational costs, improving data accessibility, and ensuring scalability to accommodate future growth.

This report aims to provide an analysis of migrating Tom & Jerry & Sons to a cloud-based environment. It will examine the cloud service models—Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS)—highlighting their respective advantages and disadvantages. A critical aspect of this migration involves understanding Service Level Agreements (SLAs), which define the expectations and responsibilities between the company and cloud service providers regarding performance, availability, and security (Sunilkumar and Gopal, 2021).

Additionally, the report will discuss challenges, such as integrating legacy systems, addressing data security concerns, and understanding the legal implications of operating in a cloud environment. Furthermore, it will explore the opportunities presented by cloud adoption, including enhanced scalability, improved accessibility, and cost savings. By the end of this report, "Tom & Jerry & Sons" will be equipped with insights necessary for making informed decisions regarding their IT infrastructure migration to the cloud, positioning them for sustained success in a rapidly evolving

business landscape.

## 2. Cloud Computing Platforms

Tom & Jerry & Sons must establish the deployment model they will use based on their organisational needs. The **Public Cloud** provides services to multiple clients via shared infrastructure, offering scalability and cost-efficiency (Hofmann and Woods, 2010). Amazon Web Services (AWS) and Microsoft Azure are leading providers in this space. Conversely, the **Private Cloud** is exclusively allocated to a single organisation, providing greater control, security, and customisation but at a higher cost (Hofmann and Woods, 2010). The **Hybrid Cloud** blends public and private clouds, allowing data and applications to be shared between them, enabling flexibility and optimised workloads (Rimal et al., 2010; Buyya et al., 2013). Lastly, the **Community Cloud** is a collaborative cloud infrastructure shared by organisations with similar requirements, promoting shared costs and compliance standards (Hofmann and Woods, 2010). Understanding these platforms will give Tom & Jerry & Sons the flexibility in choosing the right balance between cost, control, and security.

## 3. Cloud Service Provisions

To transition to the cloud, Tom & Jerry & Sons should consider various cloud service models, including **IaaS**, **PaaS**, and **SaaS**, provided by reputable cloud providers like AWS, Microsoft Azure, and Google Cloud Platform (GCP) 1. Each model offers distinct benefits and considerations that can align with the company's operational needs (Gupta et al., 2021). Table 1 identifies the key differences among IaaS, PaaS, and SaaS.

### 3.1. Infrastructure-as-a-Service

AWS Elastic Compute (EC) 2 cloud offers flexible pricing and reliable services for running both legacy and modern software. Priyadarshini and Kalyan (2022), identified the key advantages of IaaS:

- **On-Demand Pricing:** Pay only for the computing resources used, allowing the company to scale up during peak seasons and reduce usage during quieter periods to maintain cost efficiency.
- **Free Tier:** AWS offers a 12-month free tier. Tom & Jerry & Sons can test software compatibility at no upfront cost.
- **Dynamic Scaling:** Automatically adjusts resources based on demand, which is useful for handling seasonal peaks.

- **Reserved Instances:** Provides cost savings for long-term, continuous operations like payroll systems by offering discounted rates for one to three-year commitments.

### Disadvantages of IaaS

- **Complex Pricing:** Pricing structures (e.g., on-demand vs. reserved instances) make it difficult for smaller businesses to predict costs, leading to potential overruns.
- **Vendor Lock-In:** Migrating away from an IaaS provider like AWS may be challenging, requiring careful planning and the use of open standards and containerisation technologies (e.g., Docker) for portability.
- **Increased Operational Complexity:** Arises from managing operating systems and software applications in the cloud, which might require additional expertise and resources (Sunilkumar and Gopal, 2021).

### 3.2. Platform-as-a-Service

**PaaS** provides a managed platform for developing, testing, and deploying applications without the need to manage the underlying infrastructure (Mohammed and Zeebaree, 2021). For Tom & Jerry & Sons, PaaS can simplify the cloud transition by offering tools for application development, streamlining processes like real-time inventory management, and automating orders. An article written by Mohammed and Zeebaree (2021) listed the benefits of PaaS:

- **Reduced IT Management:** The platform can handle the infrastructure without staff management, allowing for a greater shift in focus to core business functions.
- **Collaboration and Scalability:** Developers can work together remotely, and the platform can scale easily to handle varying workloads.
- **Cost Efficiency:** PaaS eliminates the need to purchase hardware, providing a cost-effective way to build and deploy applications.

### Disadvantages of PaaS

- **Vendor Lock-in:** Businesses become dependent on specific platforms and tools. To mitigate this, cloud-agnostic tools should be used for cross-provider compatibility (Sunilkumar and Gopal, 2021).
- **Legacy System Integration:** May require custom APIs or hybrid solutions to maintain compatibility with older software (Chithambaramani and Prakash, 2021).

- **Cost Monitoring:** Unexpected expenses related to scaling or the use of additional features may arise (Buyya et al., 2013).

### 3.3. Software-as-a-Service

**SaaS** delivers cloud-hosted applications via subscription, removing the need for local installations and reducing maintenance burdens (Sunilkumar and Gopal, 2021). SaaS solutions like **QuickBooks Online** can manage accounting, CRM, payroll, and inventory tasks for Tom & Jerry & Sons. Key advantages include:

- **Automation:** Automated bookkeeping, financial reporting, and inventory tracking simplify operational processes.
- **Cost Efficiency:** SaaS eliminates the need for infrastructure management, providing a subscription-based pricing model that adjusts to business needs.

### Disadvantages of SaaS

- **Data security:** SaaS providers must offer robust encryption, secure access controls, and compliance with regulations to protect sensitive data. (Chithambaramani and Prakash, 2021).
- **Customisation Limitations:** Harder for businesses to tailor the software to their specific workflows compared to on-premise solutions (Mohammed and Zeebaree, 2021).
- **Long-term Cost Management:** The price increases over time, and subscription costs may add up if not closely monitored (Mohammed and Zeebaree, 2021).

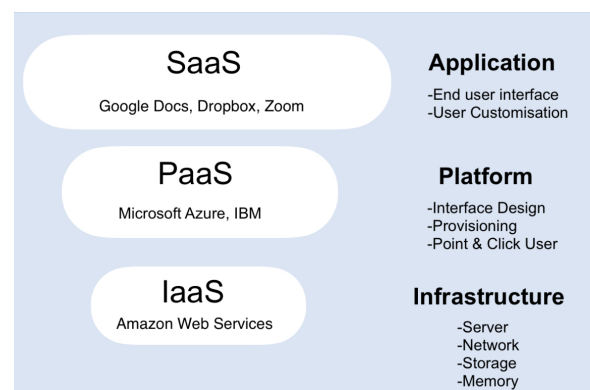


Figure 1: Cloud Services Delivery Model

## 4. Implications of Cloud Provisions

### 4.1. Security and Compliance

The security implications of IaaS, PaaS, and SaaS models differ, each impacting how Tom & Jerry & Sons should approach GDPR (General Data Protection Regulation) and ISO (International Organisation for Standardisation) 27001 compliance.

With IaaS, Tom & Jerry & Sons have extensive control over their security configurations. This level of control allows them to customise their security measures but increases the risk of misconfiguration. They are responsible for securing their virtual environments and ensuring GDPR compliance, which involves protecting any stored personal data, managing lawful data processing, and having safeguards against data breaches. ISO 27001 compliance also requires them to follow structured security management, including conducting risk assessments and maintaining incident response plans (Cambronerio et al., 2024). Although IaaS provides flexibility, there is a heightened risk that incorrect configurations could lead to serious compliance failures, data breaches, and potential fines (Rittinghouse and Ransome, 2016). In the PaaS model, the cloud provider manages the security of the underlying infrastructure. However, they are still responsible for ensuring their applications meet GDPR requirements, such as lawful data handling, obtaining user consent, and enabling data access requests. ISO 27001 compliance at the application level remains their responsibility, requiring them to secure data flows, protect data integrity, and monitor for security issues. PaaS lessens the risk of infrastructure-level vulnerabilities but still requires Tom & Jerry & Sons to handle application security and data compliance on their own (Rittinghouse and Ransome, 2016).

With SaaS, the provider takes on most security and compliance responsibilities, which is beneficial for organisations handling sensitive data. SaaS offers built-in security as the provider manages GDPR compliance by ensuring secure data storage, handling breach notifications, and keeping up-to-date with privacy requirements. ISO 27001 compliance is also managed by the provider, ensuring the service meets industry standards for information security. However, SaaS may limit the ability for Tom & Jerry & Sons to customise specific security settings. Despite this, SaaS's managed security and compliance approach can reduce the risk of non-compliance and is especially helpful for organisations that need reliable data protection without extensive internal security management (Cambronerio et al., 2024).

Understanding these differences allows Tom & Jerry & Sons to select the best model for their compliance and security needs.

### 4.2. Cost Management

IaaS offers pay-as-you-go pricing, providing flexibility but potentially leading to unexpected costs if resource usage is not monitored (Buyya et al., 2011). Whereas PaaS provides a more predictable cost structure, reducing ownership costs for application development (Buyya et al., 2013). Alternatively, SaaS operates on a subscription model, which simplifies budgeting but may incur higher long-term costs (Mohammed and Zeebaree, 2021).

### 4.3. Flexibility and Integration

Flexibility and ease of integration with existing systems differs among the cloud service models. IaaS provides the most flexibility. Organisations can customise their infrastructure to accommodate legacy systems, though this comes with increased management complexity (Buyya et al., 2011). PaaS balances flexibility and user-friendliness by facilitating application development. Although, it poses potential integration challenges (Mohammed and Zeebaree, 2021). In contrast, SaaS offers minimal customisation options, focusing on rapid deployment and ease of use, making it suitable for organisations looking to implement solutions quickly without extensive integration efforts (Mohammed and Zeebaree, 2021).

## 5. Service Level Agreement

Service Level Agreements (SLAs) are essential in cloud services as they define clear expectations between a service provider and the client (Qazi et al., 2024). For Tom & Jerry & Sons, SLAs will establish guarantees for key aspects such as uptime, performance, and support response times, which are critical for maintaining business continuity, particularly when managing sensitive payroll data or customer information. SLAs include provisions for compensation if agreed service levels are not met, reducing risks associated with cloud migration and downtime (Sunilkumar and Gopal, 2021). A standard SLA may guarantee 99.9% uptime, but this still allows for occasional disruptions, which could impact operations. It's important to focus on SLAs that include compensation for downtime and provisions for data backup, recovery, and security, especially for critical operations. Additionally, SLAs ensure compliance with key security standards, such as GDPR, protecting the company's data and reputation (Sunilkumar and Gopal, 2021). Clarifying data ownership and compliance responsibilities is another crucial aspect. This ensures accountability in the event of any failures or issues, safeguarding Tom & Jerry & Sons during their transition to the cloud and maintaining operational efficiency (Qazi et al., 2024).

Aspect	IaaS	PaaS	SaaS
Definition	Virtualised infrastructure (servers, storage)	Development platform for app building	Fully functional software applications
Control	Full control over infrastructure	Control over apps and data, not infrastructure	Minimal control; only use the software
Use Case	Custom setups, flexibility	Development and deployment of applications	Accessing software without management
Examples	AWS EC2, Azure VMs	Google App Engine, Heroku	Google Workspace, Microsoft 365
Management	User manages OS, apps, and middleware	User manages apps; provider manages platform	Provider manages everything

Table 1: Key Differences Summary

Feature	Amazon EC2	Microsoft Azure
Types of cloud computing provided	PaaS, SaaS, Specialising in IaaS	SaaS, IaaS, Specialising in PaaS
Basic Plan	\$0.11/hour	\$0.02 / hour
RAM	3,840MB	768MB
Subscription	Hourly, Monthly, Fixed, Reserved Instances, Spot Instances	Hourly
Administration & Compliance	Access Management, Compliance Monitoring, Detailed Invoices	ISO 27001 Certified, Network Uptime Guarantee
Support Services	24/7, Forums, Online/Self-serve resources	24/7, Forums, Live Chat, Phone
Middleware	Tomcat	
Framework	- Django, Drupal	Drupal, Symfony
Available Run Time	.NET	.NET
Middleware	Tomcat	
Frameworks	Django, Drupal	Django, Drupal
Server OS Types	Linux, Windows	Linux, Windows

Table 2: Comparison of Amazon EC2 and Microsoft Azure (Gandhi and Kumbharana, 2014)

1. Statement of purpose
2. Range of Services
3. Service provider responsibilities
4. Customer Responsibilities
5. Performance Metrics
6. Penalties for breach of Contract

Figure 2: Components of a SLA

## 6. Virtualisation and Legacy Systems Concerns

Virtualisation can provide a temporary solution for running legacy systems in the cloud, enabling the company to avoid costly hardware upgrades. Virtualisation employs computing resources that can imitate computers using Virtual Machines (VM)

that replicate on-premise environments (Sunilkumar and Gopal, 2021). This setup allows the company to maintain older applications without immediate investment in new hardware (Zhang et al., 2010). However, this approach comes with performance limitations and compatibility issues that can impact operational efficiency.

Legacy software might not work well in a virtualised environment due to architectural differences, causing bottlenecks and instability. Older applications were tailored to specific hardware, complicating their operation on generic cloud servers (Zhang et al., 2010). Additionally, compatibility issues could arise, leading to increased maintenance efforts and potential downtime. Relying on outdated systems exposes the company to risks. Legacy systems often lack modern security features, making them vulnerable to data breaches. With stricter data protection regulations like GDPR, outdated software in the cloud could lead to compliance issues. Tom & Jerry & Sons



must ensure that any migrated legacy applications have essential security measures, such as encryption and access controls, to safeguard sensitive information (Cambronerio et al., 2024).

A long-term solution requires updating or replacing outdated software. While virtualisation provides immediate relief, permanently migrating to cloud services is recommended for better efficiency and security. Modern systems are built for cloud environments, offering improved integration, scalability, and support, which enhances overall business operations (Zhang et al., 2010).

## 7. On-Demand Scaling

The ability to automatically adjust compute power, storage, or network capacity in response to real-time demand are characteristics of on-demand scaling (Hofmann and Woods, 2010). Tom & Jerry & Sons can dynamically add or remove resources to match their workload without any manual intervention and degradation of their system's performance. This is referred to as **elasticity**. This feature is offered by Amazon Web Services and Microsoft Azure. The real-time adjustment of resources leads to better performance. If Tom & Jerry & Sons want to build a website to sell their goods, with on-demand scaling they can add more resources during busy sale periods to ensure their website runs smoothly and can handle all transactions without delay.

VM, containers or serverless functions can be used to facilitate the automatic scaling of computing resources (Millnert and Eker, 2020). The attractive **pay-as-you-go** model is a consumption-based pricing model which would reduce overprovisioning in comparison to traditional fixed infrastructure models (Cambronerio et al., 2024).

On-demand scaling uses load balancing to distribute the incoming traffic amongst multiple resources (Samha, 2024). More instances can be produced to distribute the load so no one single resource is overwhelmed. This can be done through Horizontal or Vertical scaling 3.

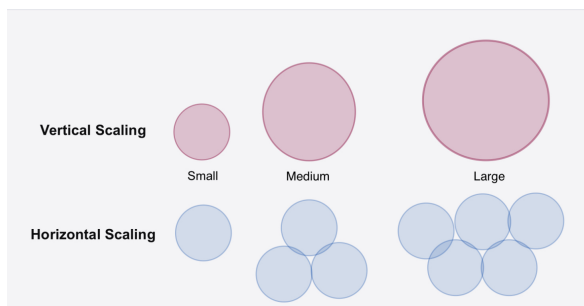


Figure 3: Vertical and Horizontal Scaling

- **Vertical Scaling:** enhances existing servers by adding resources such as Computer Processing Unit and RAM, making it effective for demanding applications. However, it has limitations in capacity and may lead to higher costs over time (Cambronerio et al., 2024; Millnert and Eker, 2020).
- **Horizontal Scaling:** Involves adding more servers to distribute workloads across multiple instances. This approach is ideal for applications like inventory management and CRM. It is generally more sustainable, allowing for gradual resource expansion without overloading individual servers (Cambronerio et al., 2024).

Scaling in cloud environments has notable limitations that Tom & Jerry & Sons should consider.

Cost management is a primary concern; inefficient scaling, especially with vertical scaling, can result in unexpected expenses (Samha, 2024). Additionally, application compatibility poses challenges, as legacy systems may struggle to scale efficiently, potentially necessitating significant re-engineering efforts (Millnert and Eker, 2020). There's also the risk of data latency, where distributing resources across multiple servers can introduce delays that negatively impact real-time operations (Millnert and Eker, 2020). The complexity of scaling requires diligent management to prevent performance bottlenecks and security vulnerabilities. Overall, careful planning is essential to mitigate these limitations.

Whether on-demand scaling is the right choice for Tom & Jerry & Sons depends on their growth expectations. If they anticipate rapid growth or fluctuating demand, this model will provide the necessary flexibility. However, if their workload stabilises and becomes more predictable, they might find other options more cost-effective.

The company should ensure that its IT strategy aligns with its overall business goals. If flexibility and the ability to quickly adapt to market changes are priorities, on-demand scaling is a good fit. On the other hand, if predictable costs and greater control over infrastructure are more important, exploring alternatives like reserved instances or hybrid solutions may be advisable.

## 8. Security and Data Protection

As Tom & Jerry & Sons move to the cloud, security becomes a top priority. Storing sensitive data, such as customer information and business operations, off-site makes it vulnerable to cyberattacks. Data protection refers to the practices used to safeguard sensitive from unauthorised access, theft, or loss. This includes encryption, access control, and backup strategies (Mokalled et al.,

2017). Tom & Jerry & Sons will need to make sure their staff are properly trained to detect any threats to their data such as phishing emails that could leak their data. A data breach can harm the company's finances and reputation. To protect against these threats, they should implement strong security measures such as:

1. **Limiting Access**
2. **Conducting regular security audits**
3. **Encrypting their data**
4. **Implementing data loss prevention measures**

**Limiting access** to sensitive data will ensure that only authorised personnel can access their systems. Role-based access control (RBAC) can help manage user permissions effectively. **RBAC** restricts access based on the predefined roles Tom & Jerry & Sons assign to their employees (Mokalled et al., 2017). Access to their systems will be dependant on the employees' job responsibilities. This simplifies permission management and improves security by ensuring users only access information relevant to their role.

Conducting regular **security audits** ensures compliance with internal policies and regulatory requirements. Continuous monitoring of cloud resources for unusual activity to detect potential breaches early.

**Data loss** is another significant risk when using cloud services. Human errors like accidental deletions and ransomware cyberattacks, can result in data loss. Additionally, cloud service providers may experience outages that make data temporarily inaccessible. To minimise the risk of data loss, Tom & Jerry & Sons should regularly back up their data and consider using multiple locations to store it. This redundancy helps ensure that even if one server fails, the data is still safe and accessible.

**Encryption** plays a vital role in securing data in the cloud. It ensures that sensitive information is protected by converting it into unreadable code that only authorised users can decipher. Tom & Jerry & Sons should implement encryption for data stored on cloud servers (data at rest) and for data being transmitted (data in transit). This dual approach helps safeguard against unauthorised access and interception. Moreover, employing data loss prevention solutions can help identify and mitigate risks associated with sensitive data.

## 9. Feasibility and Cost Considerations

Migrating to the cloud offers Tom & Jerry & Sons significant cost savings and operational efficiencies. By moving their IT infrastructure to the cloud,

the company can reduce hardware expenses related to purchasing, maintaining, and upgrading physical servers. Ongoing costs for power, cooling, and physical security are also lowered. Cloud solutions provide scalability, allowing the company to adjust resources based on demand and pay only for what they need (Rittinghouse and Ransome, 2016). However, it's important to consider ongoing expenses, such as subscription fees, data transfer costs, and security management. While cloud migration can decrease initial capital expenditures, understanding the total cost of ownership is crucial to ensure benefits outweigh ongoing costs (Rittinghouse and Ransome, 2016).

For a company with about 200 employees, successful migration depends on several factors. A well-planned migration time frame is essential, as the complexity of existing systems and employee readiness will impact the process. Minimising potential downtime is critical to avoid disrupting operations, which can be achieved by migrating during off-peak hours or in phases. Furthermore, adequate employee training will be necessary to ensure staff can effectively use the new cloud systems, maximising the benefits of the transition.

## 10. Recommendation

Microsoft Azure and Amazon EC2 are two of the leading cloud computing services, offering scalable VMs and infrastructure resources. Table 5 compares the features Amazon EC2 and Microsoft Azure.

Both platforms offer similar core features but their ecosystems differ. AWS focuses more on broader customisation whereas Azure prioritises integrated enterprise solutions.

For a small to medium sized company like Tom & Jerry & Sons, Azure presents a more budget friendly option with their base plan beginning at \$0.02/hour, compared to EC2's \$0.11/hour. Although Amazon EC2 offers higher RAM (3,840 MB) which could benefit memory-intensive applications, Azure's specialisation in PaaS can streamline application development and deployment. Additionally, Azure's ISO 27001 certification and network uptime guarantee provide essential security and reliability assurances, which are crucial for safeguarding customer data. The availability of live chat and phone support further enhances Azure's appeal, ensuring quick resolutions to any issues that may arise. Although Amazon EC2 is strong for customisation and scaling, the legacy system compatibility and hybrid cloud capabilities of Azure, combined with cost savings and better support for older systems. Overall, Microsoft Azure aligns better with Tom & Jerry & Sons' move to the cloud as its cost-effective, flexible, and offers robust support.



## 11. Conclusion

In conclusion, migrating Tom & Jerry & Sons to the cloud is a viable option that offers several advantages, including reduced hardware costs, enhanced scalability, and improved operational efficiency. However, the transition poses challenges, especially regarding legacy systems that may experience compatibility and performance issues in a cloud environment. Moreover, security concerns around data protection and regulatory compliance must be prioritised to safeguard sensitive information ([Zhang et al., 2010](#)).

While cloud models such as IaaS, PaaS, and SaaS provide flexibility and potential cost savings, the company should carefully assess its specific needs and existing infrastructure to identify the best approach. A hybrid solution could balance the retention of critical legacy systems while leveraging cloud capabilities for new applications ([Armbrust et al., 2010](#)).

Ultimately, Tom & Jerry & Sons should develop a well-structured migration strategy that includes thorough employee training, an understanding of ongoing costs, and strong security measures. This approach will enable them to effectively navigate the complexities of cloud migration and position themselves for future growth in an increasingly digital landscape.

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