Reshaping Christian Volunteer Service's Business Processes:

System Analysis and Cloud Computing Recommendations

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Executive Summary

The purpose of this report is to recommend modernizing Christian Volunteer Service's (CVS) IT infrastructure through cloud computing solutions, aiming to enhance performance, reduce costs, and improve security.

Key Findings:

1. **Current System Analysis:** CVS's IT infrastructure is outdated, insecure, costly, and inefficient, leading to frequent downtime.
2. **Proposed IT Infrastructure:** Transitioning to cloud-based solutions (SaaS, PaaS, IaaS) using Microsoft Azure services, including Azure Kubernetes Service and SQL Server Containers, offers modernization, scalability, and cost-efficiency.
3. **Cost Analysis:** Shifting to cloud solutions over three years saves costs, with an estimated total of £1,514,430.08 based on specific assumptions about CVS's needs.
4. **Security and Compliance:** Implementing Azure Security Center, Azure Sentinel, and other security measures will address vulnerabilities and ensure regulatory compliance.
5. **Additional Services:** Recommendations for INaaS and BPaaS include tools for advanced data analytics and process automation.

Recommendations:

- Adopt Azure Kubernetes Service (AKS) for scalability and integration.
- Transition to SQL Server Containers to enhance performance and reduce overhead.
- Use Azure Virtual Machines (D16s_v4) to meet performance needs.
- Enhance security with Azure Security Center, Azure Sentinel, Azure DDoS Protection, and Azure Firewall.
- Implement INaaS and BPaaS solutions like Microsoft Power BI and Power Automate for better analytics and workflow efficiency.

Assumptions:

- **Currency Conversion:** Calculations use an exchange rate of 1 USD = 0.78 GBP.
- **Company Size:** Analysis based on 200 users across various departments.
- **System Requirements:** 8-16 vCPUs, 32-64 GB RAM, 1 TB SSD storage, and high data transfer bandwidth.
- **Service Requirements:** For Azure Kubernetes Service, five VMs (D16s_v4), and for SQL Server Containers, primary and secondary containers with 8 vCPUs, 32 GB RAM, and backup containers with 4 vCPUs, 16 GB RAM.

Current System Analysis

Christian Volunteer Service (CVS) is a national charity established in the 1860s, dedicated to supporting poor and vulnerable individuals across the UK. With a long history of pastoral and charitable service, CVS operates 260 charity shops and employs approximately 4,000 staff, including many part-time workers, and engages 50,000 members. Despite its noble mission, CVS's current IT infrastructure is plagued by outdated and insecure systems, leading to inefficiencies and high operational costs. The primary goals of this analysis are to reduce the high costs associated with licensing, support, and maintenance of legacy systems by transitioning to more cost-effective cloud solutions, enhance IT efficiency, reduce system downtime, and improve the overall performance of IT operations and address vulnerabilities in the current IT setup to protect it against cybersecurity threats and ensure compliance with regulatory standards.

CVS's existing IT infrastructure comprises a combination of on-premises and cloud systems. The primary components include leased CRM systems, legacy databases and custom applications, HRM and payroll software, and various office applications, mail, and web services. These systems are crucial for storing membership and donor records but are often slow, unreliable, and expensive to maintain. The organization incurs substantial expenses for software licensing and support, which strain its budget. Of the £25.7 million annual IT expenditure, £8.5 million is allocated to software licensing and services. Frequent system

Figure 1: A SWOT Analysis of the current IT infrastructure & services of CVS.

downtimes result in lost productivity, with 15 working days lost last year alone due to system failures. The use of multiple, unintegrated software solutions across regional offices complicates IT management and reduces operational efficiency.

Given these challenges, it is crucial for CVS to modernize its IT infrastructure. The proposed transition to cloud computing solutions aims to provide a more robust, scalable, and cost-effective IT environment, enabling CVS to better support its mission and improve service delivery.

Cloud Solution Proposals

To provide an overview of the services proposed in this report, Table 1 below outlines the various cloud computing solutions recommended for CVS. The table categorizes these

Table 1

Cloud Computing Solutions for CVS and Their Service Types

Cloud Computing Solutions	Proposed Applications	Type of Service
Office Applications	Microsoft 365 Office	SaaS
Email and Web Services	Microsoft Exchange Online ve Outlook	SaaS
Communication and Collaboration Tools	Microsoft Teams	SaaS
Document Management System	Microsoft SharePoint	SaaS
CRM System	Microsoft Dynamics 365 Sales	SaaS
HRM System	Microsoft Dynamics 365 Human Resources	SaaS
Payroll System	Gusto	SaaS
	Microsoft Dynamics 365 Finance	SaaS
E-commerce Portal	Shopify Plus	SaaS
Social Media Management and Analytics	Hootsuite	SaaS
Analytics and Reporting	Microsoft Power BI	SaaS
Learning and Development Support	Microsoft Learn	SaaS
	Microsoft Azure Training and Certification	SaaS
Database Management System	Azure Kubernetes Service	PaaS
	SQL Server Container	PaaS
Network Management System	Azure Virtual Network	IaaS
	Azure Virtual Machines	IaaS
Security and Access Management System	Azure Active Directory	SaaS
	Azure Security Center	SaaS
	Azure Sentinel	SaaS
	Microsoft Information Protection(MIP)	SaaS
	Azure DDoS Protection	PaaS
	Azure Firewall	IaaS
Monitoring Management	Azure Monitor	PaaS
	Azure Log Analytics	PaaS
Storage, Backup Business Continuity and Disaster Recovery Services	Azure Site Recovery	PaaS
	Azure Blob Storage	IaaS
	Azure Backup	PaaS

solutions into Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), demonstrating a comprehensive approach to meet the organization's diverse operational needs.

Email and Web Services, Office Applications, Communication and Collaboration Tools, and Document Management System

In analysing the needs of CVS, Microsoft's suite of cloud services provides comprehensive solutions for email and web services, office applications, communication and collaboration tools, and document management systems. Microsoft 365 Office enhances flexibility, collaboration, and productivity through features like real-time co-authoring and advanced security. This integration supports CVS's diverse business needs efficiently.

Microsoft Exchange Online and Outlook offer reliability, advanced security, and seamless integration with other Microsoft 365 applications, ensuring secure and efficient email communications. The Microsoft 365 Business Premium package was identified as a cost-effective solution for marketing and fundraising teams, offering essential tools at a reasonable cost of £18.10 per user per month. For the IT and Database Management team, Microsoft 365 E5 was chosen for its advanced security capabilities, including Microsoft Defender, Microsoft Information Protection, and Azure Active Directory Premium P2. The E5 package, priced at £50.30 per user per month, also includes Power BI Pro, providing powerful analytics and business intelligence tools.

Power BI Pro was also added for the marketing and fundraising teams to enhance their data analytics capabilities. The cost for Power BI Pro standalone is £10.00 per user per month, facilitating advanced data visualization and reporting.

The total monthly cost for these services amounts to £7,229.12. This strategic selection of Microsoft cloud services ensures CVS benefits from enhanced security, integrated workflows, and cost-effective solutions tailored to the specific needs of different user groups

within the organization. This approach not only meets the current operational demands but also positions CVS to scale efficiently in the future, leveraging Microsoft's robust ecosystem for ongoing improvement and innovation.

CRM, HRM, Payroll, E-commerce, Social Media Management, Analytics and Reporting

For HRM, Microsoft Dynamics 365 Human Resources is recommended for its user-friendly interface, comprehensive functionalities, and strong security features. This system will help CVS manage its human resources processes more effectively. The combined monthly cost for HRM services totals £1,063.90, supporting CVS's extensive HR operations with efficiency and compliance.

For payroll, using Gusto and Microsoft Dynamics 365 Finance is recommended. Gusto offers automated payroll processing, tax calculations, and flexible payment options, essential for managing both full-time and part-time staff. Dynamics 365 Finance adds seamless data flow between payroll and other financial operations, with a total monthly cost for both services of £4,502.94.

For e-commerce, Shopify Plus is preferred for its ease of integration, multi-channel sales capabilities, and strong logistics tools. With a three-year term deal cost of £1,794 (£49.83 per month), Shopify Plus supports CVS's e-commerce strategy, helping increase revenue from donated items.

Hootsuite, with its multi-channel management, scheduling, analytics, and reporting features, is ideal for social media management. Integrating seamlessly with Microsoft Teams, Dynamics 365, OneDrive, and Power BI, Hootsuite ensures coordinated and data-driven social media efforts, enhancing engagement and marketing effectiveness at a cost of £249 per month. Power BI, included with Microsoft 365 E5, empowers CVS with advanced data visualization and reporting capabilities, crucial for informed decision-making.

The total estimated monthly cost for these services is £10,399.87, as detailed in the appended cost tables, ensuring transparency and aiding in financial planning for CVS's cloud transition.

Database and Network Management Systems and Storage, Backup, Business Continuity and Disaster Recovery Services

Database and Network Management Systems. The implementation of Azure Kubernetes Service (AKS) combined with SQL Server containers presents economic and technological advantages. Containers optimize costs by using only the necessary resources, particularly beneficial for dynamic and variable workloads, thereby achieving significant cost savings. The pay-as-you-go model further enhances cost efficiency by ensuring payment only for the resources used.

Modernization and portability are key benefits of this approach, as containers facilitate easy migration of applications across different cloud providers and environments, reducing technological dependency and enhancing flexibility. The microservices architecture improves management and development processes, allowing for faster and more flexible development cycles. Performance and scalability are substantially improved with containerization, enabling rapid deployment and updates of applications.

For a container-based solution utilizing Azure Kubernetes Service (AKS) and SQL Server containers, the total monthly cost considerations include AKS Cluster Management and Node Costs at £981.53 per month for 5 VMs, SQL Server Standard Edition licensing for containers requiring approximately £30,077.10 for 10 licenses, and costs for primary and secondary containers amounting to £851.34 monthly, while backup containers add another £212.84. The combined total monthly cost for using AKS and SQL Server containers is approximately £3,439.34.

Network and Hardware Management. Selecting the appropriate VM series for CVS is crucial to balance CPU, memory, and storage requirements. The D16s_v4 series, offering 16 vCPUs and 64 GB RAM, ensures robust performance for database and backup operations. Opting for a 3-year savings plan, the cost of each VM is reduced to approximately £201.24 per month.

Azure Virtual Network (VNET) facilitates secure and seamless communication between Azure resources. For CVS, VNET peering ensures secure connections between different Azure virtual networks at no hourly cost, with a total monthly data transfer cost of approximately £145.64.

Storage, Backup, Business Continuity, and Disaster Recovery Services. Azure Site Recovery ensures business continuity by automating backups and providing rapid system recovery in disaster scenarios. The monthly cost for protecting three instances with Azure Site Recovery is approximately £59.42.

Azure Blob Storage offers a scalable and cost-effective solution for storing unstructured data. The total monthly cost for 1 TB of storage under the Hot Access Tier is £16.59. Azure Backup offers a secure cloud-based backup solution, supporting long-term data retention and encryption, with a monthly expense for 1 TB of backup data being approximately £28.37. For smaller-scale private cloud backups, the cost is significantly lower at £0.7148 per month.

It is proposed that CVS adopt a comprehensive cloud strategy leveraging Azure Kubernetes Service for container management, Azure SQL Server Containers for database management, Azure Virtual Network for network management, and Azure Blob Storage, Azure Backup, and Azure Site Recovery for robust storage, backup, business continuity, and disaster recovery. This integrated approach ensures cost-efficiency, flexibility, scalability, and enhanced security, supporting CVS's operational needs and future growth effectively. The total monthly cost for these virtualization and storage tools is approximately £3,544.42.

Table 2

Cloud Computing Service Cost Estimate for CVS

Service	Details	Unit Cost	Number of Users/ Instances	Monthly Cost	Annual Cost	Total Cost (3 Year Plan)
Microsoft 365 Office Microsoft Exchange Online ve Outlook Microsoft Teams Microsoft SharePoint Microsoft Defender Azure Active Directory Premium P1	Sold as Microsoft 365 Business Premium Bundle (For marketing and fundraising team) and Microsoft Power BI Pro	£18.10	145	£2,624.50	£31,494.00	£94,482.00
Power BI Pro Standalone		£10.00	145	£1,450.00	£17,400.00	£52,200.00
Microsoft 365 Business Premium Contents Power BI Pro Microsoft Information Protection(MIP) Azure Active Directory Premium P2 Microsoft Cloud App Security	Sold as Microsoft 365 E5 (For IT and Database Management Team) and Microsoft Teams Standalone	£50.30	58	£2,917.40	£35,008.80	£105,026.40
Microsoft Teams Standalone		£4.09	58	£237.22	£2,846.64	£8,539.92
Microsoft Dynamics 365 Sales		£78.10	57	£4,451.70	£53,420.40	£160,261.20
Microsoft Dynamics 365 Human Resources	Full Application Capabilities Licence	£98.60	5	£493.00	£5,916.00	£17,748.00
	Self-Service Licence	£3.30	198	£653.40	£7,840.80	£23,522.40
Gusto	Premium User Licences Base Cost	£105.30	1	£105.30	£1,263.60	£3,790.80
	Per Person Cost	£12.87	10	£128.70	£1,544.40	£4,633.20
	Simple User Licences Base Cost	£31.20	1	£31.20	£374.40	£1,123.20
	Per Person Cost	£4.68	168	£786.24	£9,434.88	£28,304.64
Microsoft Dynamics 365 Finance	Standard Licences	£147.90	15	£2,218.50	£26,622.00	£79,866.00
	Premium Licences	£246.60	5	£1,233.00	£14,796.00	£44,388.00
Shopify Plus	3-Year Term Deal	£1,794.00	1	£49.83	£598.00	£1,794.00
Hootsuite	Team of 3 Users	£249.00	1	£249.00	£2,988.00	£8,964.00
Microsoft Learn		£0.00	178	£0.00	£0.00	£0.00
Microsoft Azure Training and Certification		£0.00	178	£0.00	£0.00	£0.00
Azure Kubernetes Service	VM Costs for AKS Nodes, 5 VM's	£981.53	1	£981.53	£11,778.36	£35,335.08
	Persistent Storage	£192.00	1	£192.00	£2,304.00	£6,912.00
SQL Server Container	Primary and Secondary Containers	£425.67	2	£851.34	£10,216.13	£30,648.38
	Backup Container	£212.84	1	£212.84	£2,554.03	£7,662.10
SQL Server 2022 Licence	SQL Server Standard 2 Core Pack	£3,077.10	10	£854.75	£10,257.00	£30,771.00
Azure Virtual Network	Data Transfer Costs	£145.64	1	£145.64	£1,747.68	£5,243.04
Azure Virtual Machines	3-Year Savings Plan for D16s_v4 VM	£201.24	1	£201.24	£2,414.88	£7,244.64
Azure Security Center	Container Secuirty	£33.58	1	£33.58	£402.96	£1,208.88
	Virtual Machines Security	£10.95	5	£54.75	£657.00	£1,971.00
Azure Sentinel		£792.60	1	£792.60	£9,511.20	£28,533.60
Azure DDoS Protection	Fixed Monthly Charge	£2,964.82	1	£2,964.82	£35,577.84	£106,733.52
	Additional Data Processing Charge	£17.41	1	£17.41	£208.92	£626.76
Azure Firewall	Standard Tier Deployment Cost	£723.43	1	£723.43	£8,681.16	£26,043.48
	Data Processing Cost	£130.00	1	£130.00	£1,560.00	£4,680.00
Azure Monitor		£7,909.00	1	£7,909.00	£94,908.00	£284,724.00
Azure Log Analytics		£8,268.50	1	£8,268.50	£99,222.00	£297,666.00
Azure Site Recovery	Site Recovery to Azure	£59.42	1	£59.42	£712.98	£2,138.94
Azure Blob Storage	Standard (GPv2) Storage Cost	£16.19	1	£16.19	£194.28	£582.84
	Transaction Cost	£0.40	1	£0.40	£4.80	£14.40
Azure Backup	Standard Tier LRS Storage Cost	£18.23	1	£18.23	£218.76	£656.28
	Standard Tier ZRS Storage Cost	£0.44	1	£0.44	£5.33	£15.98
	Backup Operations (Snapshots)	£3.23	1	£3.23	£38.76	£116.28
	Data Transfer Cost	£7.17	1	£7.17	£86.04	£258.12
				£42,067.50	**£504,810.03**	**£1,514,430.08**

Note: All calculations are based on the following assumptions:

(1) Currency: 1 USD = 0.78 GBP

(2) Company Structure: approximately 200 users (IT and Programmer/Database Support Personnel: 58 users, Marketing and Fundraising: 120 users, HR: 15 users, Management: 10 users

(3) System Requirements and Specifications: CPU: 8-16 vCPU, RAM: 32-64 GB RAM, Storage: 1 TB SSD, Network Bandwidth: High. Virtual Machines: D16s_v4 (16 vCPU, 64 GB RAM), Number of VMs: 5. SQL Server Containers (Primary and Secondary Containers: 8 vCPU, 32 GB RAM; Backup Containers: 4 vCPU, 16 GB RAM), Azure Virtual Machines: VM Instance: D16s_v4 (16 vCPU, 64 GB RAM)

Security, Access, and Monitoring Management Systems

The proposed security, access, and monitoring management systems for CVS incorporate several key Azure services. Azure Active Directory (AAD) plays a pivotal role in identity and access management, providing features like multi-factor authentication (MFA) and single sign-on (SSO), enhancing security. AAD integrates seamlessly with Office 365 and other Azure services. Marketing and fundraising personnel utilize Active Directory Tier 1, while IT and databasing staff access the more advanced Active Directory Tier 2, included within the Microsoft 365 Business Premium and Microsoft 365 E5 packages.

Azure Security Center offers continuous monitoring and management of the Azure environment's security posture. It provides vulnerability assessments, threat intelligence, and security recommendations to mitigate risks. For container security, Azure Security Center charges approximately £44.53 per month, ensuring containers and virtual machines are protected.

Azure Sentinel enhances threat detection and response capabilities through advanced machine learning and AI. The monthly cost for Azure Sentinel is estimated at £792.60, crucial for real-time security analytics and automated threat response.

Azure DDoS Protection provides automated threat detection and mitigation, with a fixed monthly charge of £2,964.82 and an additional data processing charge of £17.41, leading to a total monthly cost of £2,982.23, ensuring high levels of security for public-facing applications.

Azure Firewall ensures secure network traffic management, providing a stateful firewall as a service with high availability and scalability. The monthly cost, including deployment and data processing, is £853.43.

Azure Monitor and Azure Log Analytics are essential for comprehensive monitoring. Azure Monitor tracks the performance and health of applications and infrastructure, with a

monthly cost of £7,909.00. Azure Log Analytics provides data collection and analysis, with a monthly cost of £8,268.50.

Microsoft Information Protection (MIP), integrated within the Microsoft 365 E5 package, provides advanced data protection and compliance features, including data classification, labelling, and encryption, ensuring sensitive information is secure both in transit and at rest.

In summary, the comprehensive monthly cost for these security, access, and monitoring management systems is approximately £20,894.09. Although security and monitoring tools constitute almost half of the monthly expenses, this integrated approach leverages Azure's robust capabilities to ensure CVS maintains a secure, compliant, and efficient operational environment.

Cost Estimates

Upon evaluating the comprehensive cloud solution proposals for CVS, the total monthly cost is estimated at £42,067.50. When projected over a year, this results in an annual expenditure of £504,810.03. Extending this analysis to a three-year period, the total cost amounts to £1,514,430.08. These calculations are based on several key assumptions and all assumptions have been stated in the Table 2, which shows the detailed breakdown of the cost estimates.

Figure 2: A SWOT Analysis of the proposed IT infrastructure & services of CVS.

Following the first SWOT analysis on the current IT structure, the subsequent Figure (2) presents a SWOT analysis to evaluate the impact of the proposed systems on CVS's IT infrastructure. By implementing these recommended solutions, significant improvements are anticipated in operational efficiency, security, and scalability, thereby enhancing the overall IT framework of the organization.

Training and Development Platform

Training and development are critical components in overcoming employee resistance to change, a key weakness and threat identified in the SWOT analysis. Employees' dissatisfaction with change can be mitigated by equipping them with the necessary skills and knowledge through comprehensive training programs. Microsoft offers an array of educational services that can significantly enhance employee performance and motivation, especially in adopting new technologies like containers and cloud services.

Microsoft Learn is a free online learning platform providing extensive modules and learning paths on Microsoft technologies, including Azure Kubernetes Service (AKS) and container technologies. Microsoft Azure Training and Certification offers various training courses and certification programs focused on container technologies and Kubernetes. Moreover, Microsoft provides practical experience through GitHub Repos and Hands-On Labs, offering sample applications and labs for Azure Kubernetes Service (AKS). This hands-on approach enables employees to build and manage AKS clusters, enhancing their practical skills.

The Microsoft Partner Network and Enterprise Skills Initiative provide tailored training programs and resources for partners and large enterprises. These programs include specialized training, webinars, and technical support, ensuring that employees receive targeted and comprehensive education. Microsoft also regularly hosts webinars and workshops on Azure services and container technologies, keeping employees updated with the latest developments.

By leveraging these comprehensive educational services, CVS can allocate a portion of the £10 million budget set aside for training—demonstrated by the fact that only £1.5 million is needed to utilize these platforms effectively. Incentivizing employees with raises upon completing necessary training landmarks can break resistance to change, motivating them to enhance their skills for both personal and company benefits. This focused training strategy can ensure that IT personnel are well-equipped to manage new container and cloud services, leading to improved performance and smoother adoption of innovative technologies.

Future Recommendations on INaaS and BPaaS

To further enhance CVS's capabilities and ensure sustained growth, it is recommended to adopt Information as a Service (INaaS) solutions such as Azure Data Lake Analytics, Microsoft Power BI Embedded, and Azure Cognitive Services. Azure Data Lake Analytics will enable CVS to process large volumes of data efficiently, supporting advanced analytics and machine learning, which are crucial for data-driven decision-making. Power BI Embedded will enhance user experience by integrating interactive visualizations directly into applications, providing real-time insights. Azure Cognitive Services will facilitate the development of intelligent applications, improve customer interactions, and automate routine tasks, thus increasing overall productivity and innovation.

In addition to INaaS, it is crucial to invest in Business Process as a Service (BPaaS) solutions like Microsoft Dynamics 365 Business Central, Salesforce Service Cloud, and SAP Ariba. Dynamics 365 Business Central will streamline CVS's core business processes, improving operational efficiency and enabling better collaboration across departments. Salesforce Service Cloud will enhance customer service capabilities, improve response times, and ensure higher customer satisfaction. SAP Ariba will optimize procurement processes, reduce costs, and mitigate supply chain risks, which will be vital as the company scales its

operations. By integrating these BPaaS solutions, CVS can achieve greater efficiency, cost savings, and agility, ensuring a competitive edge in the market.

Green Credentials of Microsoft

Microsoft is a company that takes significant steps towards sustainability and engages in various initiatives to minimize its environmental impact. By developing innovative solutions such as underwater data centres, Microsoft aims to increase energy efficiency and reduce its carbon footprint. These solutions are designed to consume less energy and lower cooling costs compared to traditional data centres. However, these solutions also have some ecological impacts, such as the effects of underwater data centres on marine ecosystems are not fully understood and raise some concerns.

Microsoft's sustainability efforts are further supported by the company's goals to be carbon negative by 2030 and to offset all historical carbon emissions by 2050. In this context, the company invests in renewable energy sources and implements various strategies to reduce carbon emissions across its supply chain. For instance, Microsoft ensures that the energy sources used in its data centres are renewable and strives to minimize environmental impacts such as water consumption.

It can be discussed that it is currently impossible for any company, especially large-scale technology firms, to be entirely environmentally friendly. The production and operation of technology inevitably leave a certain environmental footprint, which is an unavoidable reality. Although Microsoft has made significant strides in sustainability and puts serious effort into fulfilling its environmental responsibilities, achieving the complete elimination of environmental impacts seems challenging. Nevertheless, the company's determination and continuous improvement efforts place it in a favourable position regarding sustainability.

Microsoft's sustainability initiatives and goals serve as an example for other technology companies and lead to positive change within the industry. While it is not possible to eliminate

environmental impacts, increasing and improving such efforts will contribute to a more sustainable future. In this regard, Microsoft's current and future sustainability initiatives are critically important for both the environment and the company's reputation.

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