ICTICT428

Select cloud storage solutions

Assessment 2 of 3

Case Study

Assessor Guide

Version 1

Assessment Instructions

Task Overview

This assessment task includes eight (8) short answer questions. Read each question carefully before typing your response in the space provided.

Important: Before commencing your work, you must update your *Student name* and *Student number* in the footer from **page 2** onwards.

To answer some of the questions, you will need to access the following documents:

- Cloud_Consumer_Factsheet.pdf
- Cloud_Small-Business-Privacy_Factsheet.pdf
- Information Security Manual (March 2024).pdf
- Australian Privacy Principles_Guidelines (December 2022).pdf

Assessment Information

Submission

You are entitled to three (3) attempts to complete this assessment satisfactorily. Incomplete assessments will not be marked and will count as one of your three attempts.

All questions must be responded to correctly to be assessed as satisfactory for this assessment.

Answers must be typed into the space provided and submitted electronically via the Learning Platform. Hand-written assessments will not be accepted unless previously arranged with your assessor.

Reasonable adjustment

Students may request a reasonable adjustment for assessment tasks.

Reasonable adjustment usually involves varying:

- the processes for conducting the assessment (e.g. allowing additional time)
- the evidence gathering techniques (e.g. oral rather than written questioning, use of a scribe, modifications to equipment)

However, the evidence collected must allow the student to demonstrate all requirements of the unit.

Refer to the Student Handbook or contact your Trainer for further information.

Please consider the environment before printing this assessment.

Part A – Evaluate cloud storage requirements

In this part of the assessment, you will evaluate business types that may have cloud storage requirements within the scope of your responsibilities in your job role.

Scenario:

Your job role and responsibilities

You are working as a Cloud Solutions Analyst and are responsible for assisting in determining the need for cloud storage solutions by reviewing and evaluating various organisational requirements and diverse environments of Australian businesses.

Industry standards and guidelines

You are also aware of the industry standards and guidelines for cloud adoption by reviewing a range of information sources such as;

- app-guidelines-combined-December-2022.pdf (oaic.gov.au) (PDF)– online version ->- Australian Privacy Principles guidelines | OAIC
  Note: A copy of this PDF version, 'Australian Privacy Principles_Guidelines (December 2022).pdf', is provided as an additional resource.
- The latest version of the ISM - Information Security Manual (ISM) | Cyber.gov.au
  Note: A copy of this PDF version, ' Information Security Manual (March 2024).pdf', is provided as an additional resource.
- About PSPF | Protective Security Policy Framework
- Fact Sheets
  - Cloud computing and privacy consumer factsheet (infrastructure.gov.au) (PDF)
    Note: A copy of this PDF version, 'Cloud_Consumer_Factsheet.pdf', is provided as an additional resource.
  - Cloud computing and privacy small business factsheet (infrastructure.gov.au) (PDF)
    Note: A copy of this PDF version, ' Cloud_Small-Business-Privacy_Factsheet.pdf', is provided as an additional resource.

International standards that may apply:

- ISO/IEC 27001:2022 - Information security, cybersecurity and privacy protection — Information security management systems — Requirements

Task instructions:

For each of the business type scenarios, in tasks **A1 to A4**,

a. identify whether there is a requirement for cloud storage solutions by indicating your decision as 'Yes' or 'No'.
b. outline the reasons for your decision, stating the data storage requirements, standards and industry guidelines where relevant (Approximate word count: 35-65 words per scenario).

Assessor instructions: Students must determine the need for cloud storage solutions for each of the given business types and their contexts within the scope of their responsibilities as a Cloud Solutions Analyst, making references to the relevant standards, guidelines and data storage requirements as appropriate.

Students are likely to use different wording than the sample answer provided. However, the acceptable responses must:

- be within the specified word limit
- reflect the characteristics described in the exemplar answer.

A sample answer is provided below.

Tasks:

Task A1

Table 1 - Task A1 answer table

Scenario: A small graphic design studio with a team of freelancers working remotely on design projects who would only like to pay for the amount of data they want to store without having to invest in expensive storage infrastructure.	
a. Does this business have cloud storage requirements? *(Indicate 'Yes' or 'No')*	Yes.
b. Outline the reason for your answer: [35-65 words]	As a small studio with remote freelancers, they need a flexible and cost-effective solution to store and collaborate on design projects. Cloud adoption aligns with cost-efficiency and scalability needs, allowing the studio to pay only for the storage used, ensuring secure, compliant, and flexible data management. The ISM offers guidelines to secure client data, while the APPs ensure data protection which also must be considered.

Task A2

Table 2 - Task A2 answer table

Scenario: A government agency handling classified information related to national security.	
a. Does this business have cloud storage requirements? *(Indicate 'Yes' or 'No')*	No.
b. Outline the reason for your answer: [35-65 words]	A government agency handling classified information may prefer on-premises storage to maintain control over sensitive data. Strict security requirements and concerns about data sovereignty make local storage infrastructure more suitable, ensuring compliance with the Protective Security Policy Framework (PSPF) and Data Sovereignty guidelines and minimising risks associated with cloud service vulnerabilities.
Other answers may include: Yes, they have cloud storage requirements. However, due to the sensitivity of classified information related to national security, they may opt for private or government-specific cloud solutions that offer enhanced security controls and compliance certifications. Cloud adoption must align with the Protective Security Policy Framework (PSPF) and Data Sovereignty guidelines to ensure secure, compliant, and localised data storage, while providing the flexibility and scalability of cloud storage.	

Task A3

Table 3 - Task A3 answer table

Scenario: A multinational retail chain with numerous stores worldwide wants to store its data backups in a remote location other than its on-premises infrastructure.	
a. Does this business have cloud storage requirements? *(Indicate 'Yes' or 'No')*	Yes.
b. Outline the reason for your answer: (35-65 words)	Cloud adoption will enable the retail chain to store backups off-site while meeting compliance requirements and reducing the burden on their internal IT resources. While cloud adoption supports cost-effective, scalable backups, the business must adhere to ISM guidelines on data security, data sovereignty laws and international standards (e.g., ISO/IEC 27001), ensuring secure and compliant global data management. The ISM provides guidelines for securing data.

Task A4

Table 4 - Task A4 answer table

Scenario: A large enterprise organisation handling confidential customer data that feels more comfortable with its own security safeguards in the on-premise infrastructure	
a. Does this business have cloud storage requirements? *(Indicate 'Yes' or 'No')*	No.
b. Outline the reason for your answer: (35-65 words)	Despite handling confidential customer data, the organisation feels more comfortable with its own security safeguards in the on-premises infrastructure. They may prioritise data control and security over the scalability and flexibility offered by cloud storage solutions. The organisation may opt for private cloud or hybrid cloud deployments to maintain control over sensitive data while leveraging cloud benefits for non-sensitive workloads while still adhering to ISM and APP guidelines.
Other answers may include: Yes. There can be a requirement for cloud adoption despite comfort with on-premises infrastructure. Cloud adoption offers scalability, disaster recovery, and compliance with data sovereignty laws, enhancing security and operational efficiency while maintaining strict data protection standards. A private or hybrid cloud solution with strict adherence to ISM guidelines for robust data security and the APPs to ensure the protection of confidential customer data.	

Part B – Evaluate cloud storage hardware and software

In this part of the assessment, you will identify and evaluate the hardware and software products relevant to cloud storage options. Read the given scenario and complete tasks B1 and B2.

Scenario:

You are working as a Cloud Solutions Analyst and are responsible for assisting organisations make the right choices when selecting cloud storage solutions and cloud service providers that best align with the needs of the organisation.

You are now tasked with identifying and evaluating the hardware and software products that support the cloud storage options currently used in the industry.

Tasks:

Task B1

Identify and evaluate hardware products that support object, block, and file storage types for an on-premise private cloud solution by doing the following.

a. Select three (3) hardware products that support cloud storage type(s) from one or more industry-leading technology hardware manufacturer(s) for your evaluation.
b. Use 'Table 5' to document your findings for the hardware products based on the following criteria:
    i. Hardware product name (with manufacturer name and model, where applicable)
    ii. General features (Approximate word count: 35-50 words)
    iii. Capabilities (Approximate word count: 35-50 words)
    iv. Application (Approximate word count: 15-30 words)

Assessor instructions: Students must outline the general features, capabilities and applications of the current industry hardware products relevant to cloud storage options.

Students are likely to use different wording than the sample answer provided. However, the acceptable responses must:

- be within the specified word limit
- reflect the characteristics described in the exemplar answer.

A sample answer is provided below.

Table 5 – Task B1 answer table

Criterion	Hardware product #1	Hardware product #2	Hardware product #3
i. **Hardware product name** *(Indicate manufacturer name and model)*	Dell EMC PowerMax	IBM FlashSystem (e.g., IBM FlashSystem 9200)	HPE Nimble Storage (e.g., HPE Nimble Storage All Flash Arrays)
ii. **General Features** (30-50 words)	PowerMax is a high-end storage array designed for enterprise-level performance and scalability. It supports both block and file storage, making it versatile for various cloud storage applications. Features include inline data reduction, data-at-rest encryption, and multi-array management through PowerMaxOS.	IBM FlashSystem offers all-flash storage arrays optimised for performance, efficiency, and reliability. Supports NVMe for ultra-low latency and high throughput, enhancing cloud application performance. Features include data deduplication, compression, and data encryption at rest and in transit.	Nimble Storage arrays are known for their predictive analytics and proactive maintenance capabilities. They offer adaptive flash technology for efficient data reduction and consistent performance. Supports both block and file storage protocols with built-in data protection features.
iii. **Capabilities** (30-50 words)	Offers ultra-low latency and high IOPS	Provides scalable performance and	Predictive analytics enable proactive maintenance and

Criterion	Hardware product #1	Hardware product #2	Hardware product #3
	(Input/Output Operations Per Second), suitable for demanding cloud workloads. Scalable up to multiple petabytes, with flexible data protection and disaster recovery capabilities. Integrates seamlessly with VMware, OpenStack, and various cloud management platforms for hybrid cloud deployments.	capacity, making it suitable for cloud environments with unpredictable workloads. Cloud integration capabilities include IBM Cloud Object Storage and various cloud management platforms. Supports multi-cloud deployments with data tiering and replication features.	automatic support case creation, reducing downtime. Scale-to-fit architecture allows seamless scaling of storage capacity and performance as needed. Offers integration with public cloud services like AWS and Azure for hybrid cloud scenarios.
iv. Application (15-30 words)	Ideal for cloud service providers (CSPs) requiring high performance and reliability in their cloud infrastructure. Used in large-scale cloud environments where throughput and data availability are critical.	Used in cloud-native applications requiring high-performance storage with enterprise-grade data services. Ideal for enterprises transitioning to cloud environments while maintaining performance and data management capabilities.	Suitable for organisations looking for predictive analytics-driven storage solutions with cloud integration. Used in hybrid cloud environments where seamless integration between on-premises and public cloud storage is essential.
Other hardware products that students may choose to research include, but are not limited to the following (Only a summary of the hardware products are provided below): • **IBM Cloud Object Storage** is ideal for scalable and durable object storage for cloud services and big data. • **Dell EMC ECS** is suitable for scalable and durable object storage needs. • **IBM Spectrum Scale** provides scalable and high-performance file storage for collaborative environments and big data analytics. • **Dell EMC Isilon** provides scalable and flexible file storage for diverse enterprise needs.			

Task B2

Identify and evaluate software products that support object, block, and file storage types for a public cloud solution by doing the following:

a. Select a software product for each storage type from one or more industry-leading cloud service provider(s) of your choice for your evaluation.
b. Use 'Table 6' to document your findings for the software products based on the following criteria:

i. Software product name (with cloud service provider name)
ii. General features (Approximate word count: 35-50 words)
iii. Capabilities (Approximate word count: 35-50 words)
iv. Application (Approximate word count: 10-30 words)

Assessor instructions: Students must outline the general features, capabilities and applications of the following categories of current industry software products relevant to cloud storage options.

Students are likely to use different wording than the sample answer provided. However, the acceptable responses must:

- be within the specified word limit
- reflect the characteristics described in the exemplar answer.

A sample answer is provided below.

Table 6 – Task B2 answer table

Criterion	Block Storage	Object Storage	File Storage
i. Software product name	Amazon EBS	Amazon Simple Storage Service (Amazon S3)	Amazon EFS
ii. General Features (35-50 words)	Scalability: Ability to dynamically increase volume size, and change volume type and performance characteristics. Cost-Effective: Various volume types (General Purpose SSD, Provisioned IOPS SSD, Throughput Optimised HDD, Cold HDD) to balance cost and performance. Security: Data encryption in transit (SSL/TLS) and at rest using AWS Key Management Service (KMS), IAM for access control, and volume snapshots for backup.	Scalability: Virtually unlimited storage capacity with automatic scaling. Cost-Effective: Multiple storage classes (Standard, Intelligent-Tiering, Standard-IA, One Zone-IA, Glacier, Glacier Deep Archive) to optimise costs. Security: Data encryption in transit (SSL/TLS) and at rest (SSE-S3, SSE-KMS, SSE-C), bucket policies, IAM for access control, and object-level permissions.	Scalability: Automatically scales up and down based on the amount of data stored, supporting petabyte-scale data storage. Cost-Effective: Pay-per-use pricing model, with options for Standard and Infrequent Access storage classes to optimise costs. Security: Data encryption in transit (TLS) and at rest, IAM for access control, POSIX-compliant permissions, and VPC integration for network security.
iii. Capabilities (35-50 words)	Integration: Deep integration with Amazon EC2, allowing easy attachment and detachment of volumes from instances. Performance: High-performance storage with low-latency access, suitable for I/O-intensive applications.	Integration: Seamless integration with other AWS services and on-premises systems via AWS Storage Gateway, DataSync, SDKs, and APIs. Durability: Designed for 99.999999999% (11 9's) durability and 99.99% availability.	Integration: Native integration with AWS services, supporting NFSv4.1 and NFSv4.0 protocols for easy mounting on on-premises and cloud-based servers. Performance: High throughput and low latency, suitable for a wide range of applications

Criterion	Block Storage	Object Storage	File Storage
	Durability: Designed for high availability with automatic replication within an Availability Zone.	Flexibility: Suitable for diverse use cases including backup, archival, content storage and distribution, and big data analytics.	requiring shared file access. Durability: High availability with storage replicated across multiple Availability Zones within a region.
iv. Application (10–30 words)	Best for applications requiring low-latency block storage such as databases, enterprise applications, and virtual machines.	Ideal for storing non-sensitive data, backups, archives, application assets, static web hosting and big data analytics, offering flexible access options and robust security measures.	Suitable for web serving, content management, data analytics, media processing, and any application requiring scalable file storage accessible by multiple instances.

Other software products that students may choose to research include, but are not limited to the following:

Block Storage:

- Microsoft Azure Managed Disks
- Google Cloud Persistent Disk

Object Storage:

- Microsoft Azure Blob Storage
- Google Cloud Storage

Cloud File Storage:

- Microsoft Azure Files
- Google Cloud File Store

Part C – Cloud implementation requirements

In this part of the assessment, you will evaluate the costs and organisational impacts relevant to cloud storage strategies and the key requirements for an ICT implementation plan. Read the given scenario and complete tasks C1 and C2.

Scenario:

A technology startup operating in a highly competitive market segment plans to adopt a multi-cloud storage strategy to mitigate vendor lock-in risks and leverage best-of-breed services from different cloud providers. The organisation intends to utilise multiple cloud storage platforms, such as AWS, Azure, and Google Cloud, to optimise performance, resilience, and cost-efficiency.

Tasks:

Task C1

Outline three (3) costs and three (3) organisational impacts that apply to the given storage strategy scenario.

[Approximate word count: 30-55 words per criterion]

Assessor instructions: Students must outline costs and organisational impacts relevant to the cloud storage strategy described in the scenario.

Students are likely to use different wording than the sample answer provided. However, the acceptable responses must:

- be within the specified word limit
- reflect the characteristics described in the exemplar answer.

A sample answer is provided below.

Table 7 - Task C1 answer table

Criterion:	Answer: [30-55 words]
Costs *[List 3, approximately 30-55 words in total]*	1. Subscription fees for multiple cloud storage services from different providers. 2. Data egress and transfer costs between different cloud platforms. 3. Costs associated with managing and orchestrating data across multiple cloud environments. Other answers may include: • Training and skill development expenses for IT staff to effectively manage multi-cloud environments. • Potential costs for third-party tools and services to facilitate data integration and interoperability.
Organisational impacts *[List 3, approximately 30-55 words in total]*	1. Reduced dependency on a single cloud provider, mitigating the risk of service disruptions and vendor lock-in. 2. Enhanced flexibility and agility in deploying workloads and leveraging specialised services from different cloud platforms. 3. Increased complexity in managing and monitoring multiple cloud environments, requiring robust governance and automation tools. Other answers may include: • Potential challenges in data interoperability and portability between different cloud providers. • Improved resilience and redundancy through geographically distributed data storage across multiple cloud regions.

Task C2

Outline the four (4) key requirements of an ICT cloud storage implementation plan (listed in 'Table 8') as they apply to the given storage strategy scenario.

[Approximate word count: 40-75 words per requirement]

Assessor instructions: Students must outline the key requirements of an ICT cloud storage implementation plan relevant to the cloud storage strategy described in the scenario.

Students are likely to use different wording than the sample answer provided. However, the acceptable responses must:

- be within the specified word limit
- reflect the characteristics described in the exemplar answer.

A sample answer is provided below.

Table 8 - Task C2 answer table

Key requirements	**Answer:** [40-75 words]
1. Storage operations	• Interoperability: Ensure seamless integration and compatibility between different cloud storage platforms to facilitate data movement and interoperability. • Data Migration: Develop efficient processes and tools for migrating data between cloud storage providers, ensuring minimal downtime and data integrity. • Performance Optimisation: Implement mechanisms to monitor and optimise storage performance across multiple cloud environments, leveraging caching, content delivery networks (CDNs), and data replication strategies. Other answers may include: • Automation: Utilise automation tools and orchestration frameworks to streamline storage provisioning, configuration management, and resource scaling across diverse cloud environments. • Monitoring and Management: Implement centralised monitoring and management tools to track storage utilisation, performance metrics, and service availability across all cloud platforms.
2. Storage Security	• Data Encryption: Enforce encryption of data at rest and in transit across all cloud storage platforms to protect sensitive information from unauthorised access. • Data Loss Prevention (DLP): Implement DLP measures, such as backup and disaster recovery solutions, to mitigate the risk of data loss or corruption in the multi-cloud environment. • Compliance: Ensure compliance with industry regulations (e.g., GDPR, HIPAA) and internal security policies by implementing auditing, logging, and reporting capabilities across all cloud environments. Other answer may include: • Security Monitoring: Deploy intrusion detection systems (IDS), security information and event management (SIEM) tools, and anomaly detection mechanisms to detect and respond to security threats in real-time. • Access Control: Implement robust access control mechanisms, such as identity and access management (IAM) policies and role-based access controls (RBAC), to ensure proper authentication and authorisation of users and applications.
3. Storage governance	• Data Classification: Define a consistent data classification framework to categorise data based on its sensitivity, compliance requirements, and business value across all cloud storage platforms. • Lifecycle Management: Establish policies and procedures for managing the lifecycle of data, including retention periods, archiving, and deletion, to optimise storage costs and ensure compliance with regulatory requirements. • Metadata Management: Develop standardised metadata schemas and tagging mechanisms to facilitate data discovery, classification, and governance across heterogeneous cloud storage environments. Other answers may include: • Policy Enforcement: Implement automated policy enforcement mechanisms to enforce governance policies, such as access controls, data encryption, and retention periods, consistently across all cloud platforms.

Key requirements	Answer: [40-75 words]
	• Audit and Compliance Reporting: Generate regular audit reports and compliance assessments to track adherence to governance policies and demonstrate regulatory compliance to stakeholders and auditors.
4. Storage cost management	• Cost Visibility: Establish mechanisms to track and analyse storage costs across different cloud providers, including storage usage, data transfer fees, and ancillary charges. • Resource Optimisation: Optimise resource utilisation and storage configurations to minimise costs while meeting performance and availability requirements, leveraging features such as auto-tiering and serverless computing. • Cost Allocation: Implement cost allocation and chargeback mechanisms to accurately attribute storage costs to individual projects, departments, or business units, facilitating financial accountability and budget management. Other answer may include: • Vendor Negotiation: Regularly review and negotiate contracts with cloud storage providers to secure favourable pricing terms, discounts, and volume commitments, optimising cost efficiency across the multi-cloud environment. • Forecasting and Planning: Conduct regular capacity planning and cost forecasting exercises to anticipate future storage needs and budget requirements, ensuring alignment with business growth objectives and financial constraints.

Assessment submission checklist

Students must have completed all questions within this assessment before submitting. This includes:

1	Eight (8) scenario-based short answer questions completed in the spaces provided.	☐

Assessment feedback

Assessors are to indicate the assessment outcome as Satisfactory (S) or Not Yet Satisfactory (NYS).

Assessor Name:

Date:

Assessor comments: ☐ S ☐ NYS

Congratulations, you have reached the end of Assessment 2!