Just IT

B2W group

Apprenticeships | Training | Recruitment

Data Technician

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Day 1: Task 1

Please research and complete the below questions relating to key concepts of cloud.

Be prepared to discuss the below in the group following this task.

What can cloud computing do for us in the real-world?	Cloud computing has transformed real-world operations by providing on-demand access to resources, enabling businesses and individuals to be creative, cut costs, and collaborate globally. It powers everything from data storage and AI-driven insights like machine learning models, to IoT systems and disaster recovery solutions. Industries like healthcare (telemedicine), education (e-learning platforms), retail (inventory management), and government (digital services) rely on the cloud for agility and efficiency. By eliminating upfront infrastructure costs, supporting remote work, and offering sustainable, energy-efficient solutions, it democratizes access to advanced technology, driving digital transformation across sectors while enhancing productivity and resilience. (online game, streaming services)
How can it benefit a business?	**Cloud computing benefits businesses by:** 1. **Reducing costs** (no upfront hardware, pay-as-you-go model). 2. **Scaling instantly** (handle traffic spikes or growth seamlessly). 3. **Enabling remote work** (global access to apps/data via tools like Microsoft 365). 4. **Boosting security** (encryption, compliance, backups). 5. **Accelerating innovation** (AI/analytics tools, faster product launches).
What's the alternative to cloud computing?	i. **On-Premises Infrastructure** gives full control but comes with high costs and limited scalability. ii. **Hybrid Setup** of cloud and on-premises systems balances control and flexibility but can be complex to manage. iii. **Co-location**: Rent space in a data centre to host your own hardware. It avoids building your own data centre but still requires hardware upkeep.
What cloud providers can we use, what are their features and functions?	

Provider	Strengths	Best Use Case
AWS	Scalability, diverse services	Large enterprises, startups
Azure	Microsoft integration, hybrid cloud, better development	Businesses using Microsoft tools
GCP	AI/ML, data analytics, open-source, better pricing	Data-driven companies
IBM	Hybrid cloud, AI, enterprise solutions	Regulated industries
Oracle	Databases, enterprise apps	Oracle-dependent businesses

Day 1: Task 2

Please research the below cloud offerings (service models/infrastructure), explain what they are and examples of use cases.

Cloud Offerings	Explain what it is	When / how might you use this service in the real-world?
IaaS (Infrastructure as a service)	It is a cloud computing model that provides virtualized computing resources over the internet. It allows businesses to rent IT infrastructure—such as servers, storage, and networking—on a pay-as-you-go basis. This means you can scale your resources up or down based on your needs without the hassle of managing physical hardware. They allow for on-demand resources, scalability, reduced costs, and good management.	**Disaster Recovery and Backup Solutions**: can be used to create backup environments and disaster recovery solutions, ensuring business continuity in case of data loss or system failures. **Development and Testing**: A developer can quickly set up and tear down environments for testing applications without the need for physical hardware, speeding up the cycle of development. **Hosting Complex Websites**: Businesses can host websites that require significant resources, such as e-commerce platforms, without investing in expensive servers. **High-Performance Computing (HPC)**: ideal for applications that require substantial computational power, such as scientific simulations or big data analytics. **Big Data Analytics**: large datasets can be analyzed without the need for extensive on-premises infrastructure.

PaaS (Platform as a service)	It provides a cloud-based environment for developers to build, deploy, and manage applications without worrying about the underlying infrastructure. It includes services such as application hosting, development tools, middleware, and database management, offering a more streamlined environment for application development.	**Application Development**: Rapidly developing applications using pre-built software components and development tools, which can significantly reduce the "time-to-market". **API Development and Management**: Creating, testing, and managing APIs, allow applications to communicate with each other and with other services. **Microservices Architecture**: Building applications using microservices, enables teams to develop, deploy, and scale individual components independently. **Collaboration and Development**: Collaboration among development teams through shared development environments and tools. **Integration with Databases**: Easily integrating applications with various databases and managing data without the complexity of infrastructure management. **Scalability for Applications**: Automatically scaling applications based on demand, ensuring performance during peak usage without manual intervention.

SaaS (Software as a service)	It is a cloud-based service that delivers software applications over the internet. Users can access these applications via a web browser, eliminating the need for installation or maintenance on local devices. SaaS providers manage the infrastructure, security, and updates, allowing organizations to focus on using the software rather than managing it	**Email Services**: Applications like Gmail or Outlook provide users with services without the need for local servers or software installations. **Customer Relationship Management (CRM)**: Platforms like Salesforce enable businesses to manage customer interactions, sales processes, and marketing campaigns from anywhere. **Collaboration Tools**: Applications such as Slack and Microsoft Teams facilitate team communication and collaboration, regardless of team members' locations. **Finance**: Solutions like QuickBooks Online or Xero allow businesses to manage their accounting needs through an intuitive, cloud-based interface. **Project Management**: Tools like Asana and Trello help teams plan, track, and manage projects efficiently, with real-time updates and collaboration features. **E-commerce Platforms**: Services like Shopify provide businesses with the ability to create and manage online stores without needing extensive technical knowledge.

Day 1: Task 3

Please research the below terms (cloud deployment models) and explain what they are, when they would be appropriate and a real-world example of where it could be implemented (i.e. what type of organisation).

Public Cloud	A public cloud's services are offered over the internet by providers like AWS, Google Cloud, or Azure. Public clouds are ideal for organizations that need scalability, cost-effectiveness, and minimal maintenance. They are suitable for businesses with fluctuating workloads, startups, or companies that don't want to manage their own infrastructure. For example, a small startup could host their website on the AWS cloud. They only pay for what they use and can adapt the scaling depending on their traffic.
Private Cloud	A private cloud is an environment dedicated to a single organization. It can be hosted on-premises or by a third-party provider, but the infrastructure is not shared with other organizations. It offers much greater control, security, and customization. They are ideal for organizations with strict security, compliance, or regulatory requirements, such as government agencies, financial institutions, or healthcare providers. For example, the NHS can use a private cloud to store sensitive patient dat. This ensures compliance with regulations like GDPR and provides enhanced security.
Hybrid Cloud	A hybrid cloud combines both public and private clouds, allowing data and applications to be shared between them. This model provides flexibility and enables organizations to keep sensitive data on a private cloud while using the public cloud for less critical workloads. It is ideal for organizations that want to have scalability and cost-efficiency of public clouds, while maintaining strong security and control of private clouds. For example. a clothing retail company might use a hybrid cloud to handle its e-commerce platform. Sensitive customer data (like payment and customer details) could be stored on a private cloud, while the public cloud is used to handle traffic spikes during holiday sales.
Community Cloud	A community cloud is a shared cloud infrastructure that serves a specific community or industry with common concerns, such as security, compliance, or performance requirements. It can be managed by the organization itself or by a third-party. A community cloud could be ideal for organizations within the same industry or sector that need to collaborate and share resources while meeting specific regulatory or operational requirements. For example, a group of charities tackling similar issues might use a community cloud to share data regarding their work and needs, while complying with regulations. Such cloud, allows them to collaborate securely without the fear of malicious interference.

Day 2: Task 1

Describe, with examples, the **three** major areas that the Computer Misuse Act deals with.

Area	Description	Example
Unauthorized Access to Computer Material (Section 1)	Accessing a computer, system, or data without permission.	An employee using a colleague's login credentials to access confidential HR records.
Unauthorized Access with Intent to Commit Further Offenses (Section 2)	Gaining access to a computer system with the intention of committing additional crimes (e.g., fraud, data theft).	A hacker getting into a bank's system to steal credit card details for financial gain
Unauthorized Modification of Computer Material (Section 3)	Altering, deleting, corrupting, or disrupting data, software, or systems without permission.	Deploying ransomware to encrypt a company's files and demand payment.

The computer misuse act 1990 is an act where an individual can be criminalised because of computer related offense.
Describe three extra powers that the Police and Justice Act 2006 (Computer Misuse) has added.

Description
1. **Criminalizing the creation, distribution, or possession of hacking tools intended for illegal use.**
2. **Making denial-of-service (DoS) attacks explicitly illegal.**
3. **Increases penalties for severe offenses (e.g., up to 10 years imprisonment).**

Look at the below website to answer the questions:
https://www.gov.uk/personal-data-my-employer-can-keep-about-me

Write down three items of data which a company can store about an employee.
Name, address, and contact details.
Payroll and tax information (e.g., National Insurance number).
Employment history (e.g., start date, job role, salary).

Give three more examples of data that an employer can only store if they first get the employee's permission.
Health or medical records.
Criminal record checks.
Biometric data (e.g., fingerprints for access systems).

Conduct further research to answer the below questions.

Question	Answer
Provide one example of: Copyright infringement	Use of songs or movies in content media without giving a unique commentary or transforming the content sufficiently.
Provide one example of: Plagiarism	A student writes a research paper for a class by copying paragraphs from a published academic article without citing the original author.
What are two consequences of copyright infringement and software piracy?	i) Legal penalties involving fines and lawsuits ii) Reputational damage (individual or for a business)
Give three possible consequences for individuals when using pirated software	1) Malware infections like viruses or worms. 2) Fines and legal prosecution 3) No support or updates for any illegal obtained software

Listed below are some laws which we have covered today:

1. Computer Misuse Act 1990
2. Police and Justice Act 2006 (Computer Misuse)
3. Copyright, Designs and Patents Act 1988
4. Copyright (Computer Programs) Regulations 1992
5. The Health and Safety (Display Screen Equipment) Regulations 1992
6. Data Protection Act 2018
7. Consumer Rights Act 2015

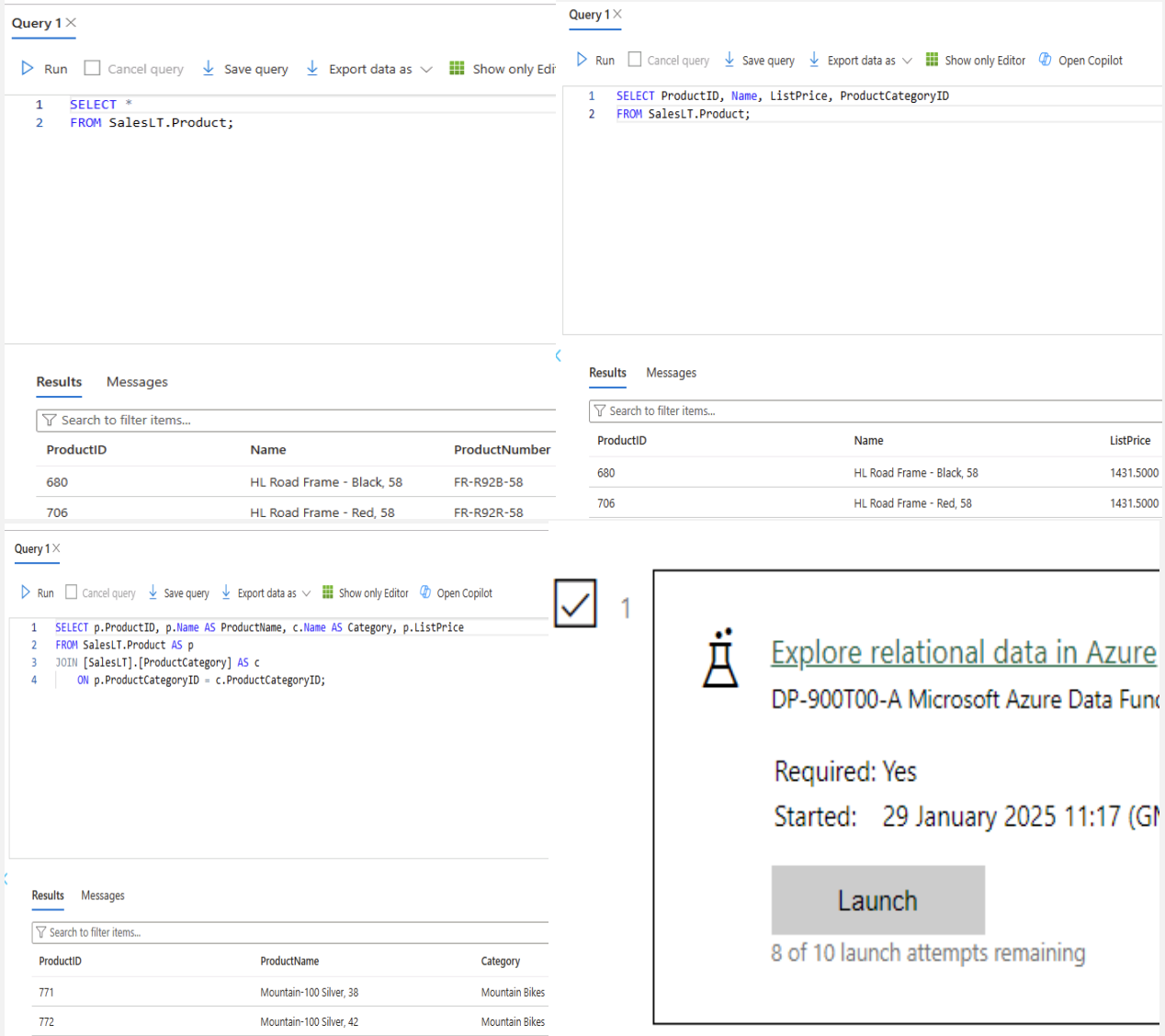
- Insert a number in the first column of each row to match each of the statements with one of the above Acts.
- One of statements is incorrect and not illegal. For this statement, write 'Not illegal'.

Act number	Clause
4	With some exceptions, it is illegal to use unlicensed software
7	Any product, digital or otherwise, must be fit for the purpose it is supplied for
1	Unauthorised modification of computer material is illegal
Not illegal	It is illegal to create or use a hacking tool for penetration testing
6	Personal data may only be used for specified, explicit purposes
5	Employers must provide their computer users with adequate health and safety training for any workstation they work at
2	It is illegal to distribute hacking tools for criminal purposes
3	It is illegal to distribute an illicit recording
6	Personal data may not be kept longer than necessary
1	Gaining unauthorised access to a computer system is illegal
5	Employers must ensure that employees take regular and adequate breaks from looking at their screens
1	It is illegal to prevent or hinder access (e.g. by a denial-of-service attack) to any program or data held in any computer
6	Personal data must be accurate and where necessary kept up to date

Day 3: Task 1

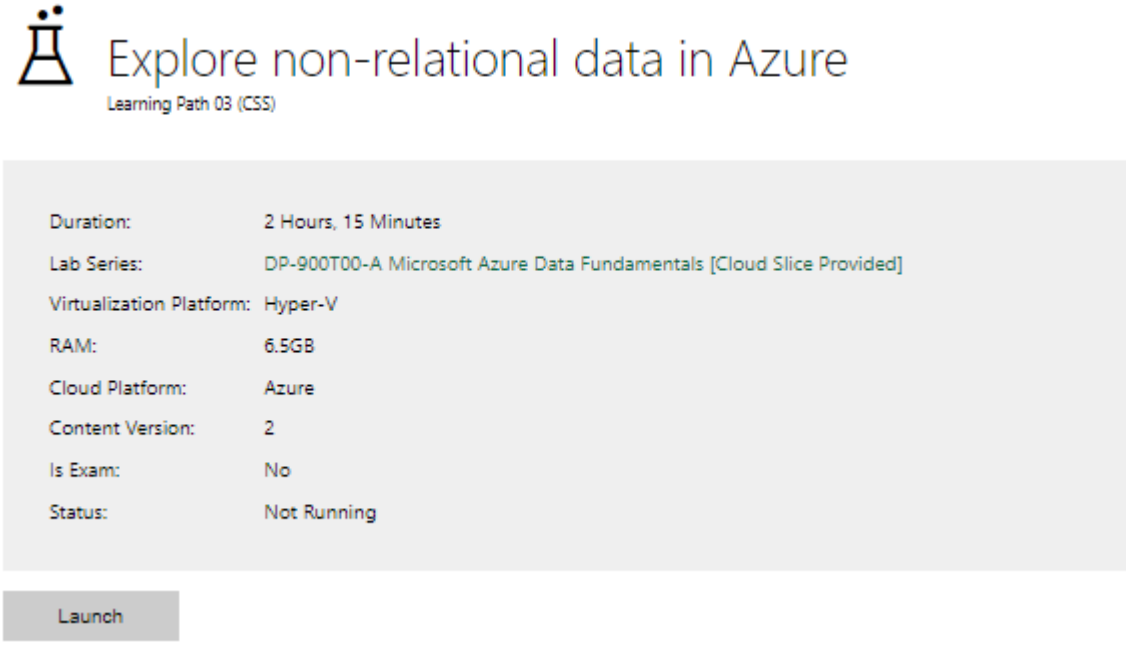
Please complete the below lab (3) *'Explore relational data in Azure'* and paste evidence of the completed lab in the box provided.

Completed lab



Day 3: Task 2

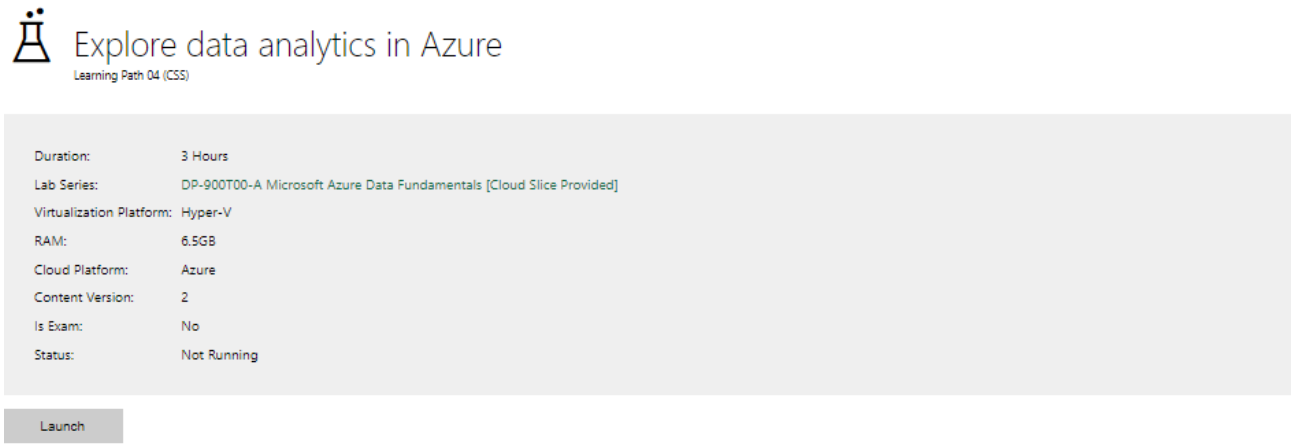
Please complete the below lab (4) *'Explore non-relational data in Azure'* and paste evidence of the completed lab in the box provided.



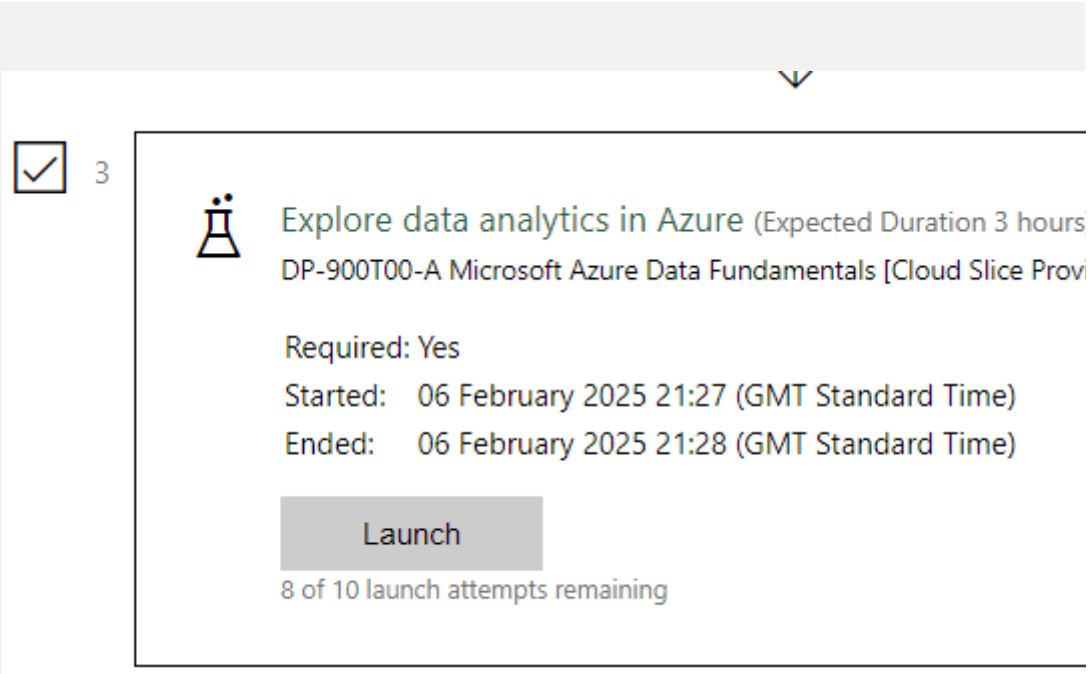
Completed lab

Day 3: Task 3

Please complete the below lab (5) 'Explore data analytics in Azure' and paste evidence of the completed lab in the box provided.



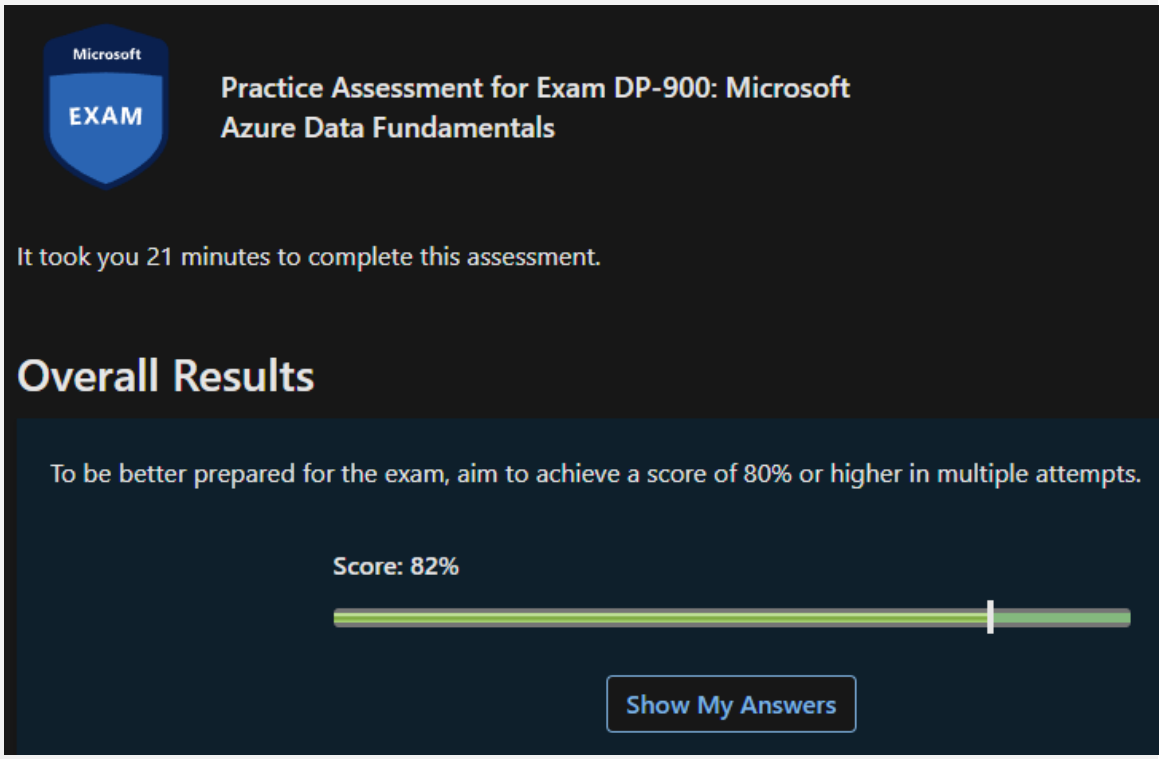
Completed lab



Day 4: Task 1

In your teams, complete the Azure DP-900 practice exam and paste your result below – this is open book and please research and discuss your answers as a team.

Result



Day 4: Task 2

1. Scenario Background

"Paws & Whiskers" is a growing pet shop that aims to improve its business by analysing sales, customer information, and inventory data. Currently, the data is collected manually or stored in spreadsheets. Management is interested in transitioning to Microsoft Azure to streamline data storage, analysis, and reporting, enabling them to make data-driven decisions.

2. Data Laws and Regulations

Identify and explain the data laws and regulations relevant to handling customer data within the proposal. Ensure you cover the following points (make sure to mention how each law is applicable in this case and this type of business with examples):

- **GDPR Compliance**: Highlight the importance of adhering to the General Data Protection Regulation (GDPR), particularly as it relates to storing and processing customer information.
- **Data Protection Act (DPA) 2018**: Outline how the DPA 2018 may affect the way "Paws & Whiskers" collects and stores data, ensuring compliance with UK laws on data privacy.
- **Other Industry Standards**: Research any additional data protection standards or regulations that may apply to pet shop data, particularly if they involve sensitive or payment information.

3. Azure Service Recommendations

Recommend Microsoft Azure services that would suit the company's data analysis needs and explain why these services are suitable. Your recommendations should include (build a table with service, description, why you chose it):

- **Data Storage**: Identify suitable storage options, such as **Azure Blob Storage** or **Azure SQL Database**, and discuss the benefits of each for storing large datasets, including inventory, sales transactions, and customer details.
- **Data Analysis Tools**: Recommend tools such as **Azure Machine Learning** for customer behaviour analysis or **Azure Synapse Analytics** for analysing sales trends.
- **Data Integration and Automation**: Explain how services like **Azure Data Factory** could automate data collection and integration processes, improving efficiency.

4. Data Types and Data Modelling

Define the types of data "Paws & Whiskers" will need to work with and describe your approach to data modelling:

- **Data Categories**: Identify key data types, such as customer demographics, transaction history, pet inventory, and product categories.
- **Data Modelling Approach**: Outline how you would structure this data using a relational model or a data warehouse approach, considering factors like tables, entities, relationships, and primary keys.

5. Data Storage Formats and Structures in Azure

Discuss how you would store data within Azure and the formats you would recommend:

- **Data Formats**: Specify recommended formats (e.g., CSV for raw data imports, JSON for structured data, Parquet for analytics) and explain why these formats are suitable for specific data types.
- **Data Security and Encryption**: Include recommendations for securing data using Azure's built-in encryption features and access controls to ensure compliance with data privacy regulations. (who has access, how many ppl for what purpose?)

6. Additional Considerations

Provide any other considerations that might enhance data handling and efficiency in Azure, such as (focus on a PaaS):

- **Backup and Disaster Recovery**: Outline a backup plan using **Azure Backup** or **Azure Site Recovery** to safeguard against data loss.
- **Data Visualisation**: Discuss potential use of **Power BI** within Azure for creating dashboards that provide management with real-time insights into sales and customer trends.
- **Future Scalability**: Comment on how Azure services can scale as the business grows, accommodating larger datasets and more complex analyses.

Submission Guidelines:

1. **Structure**: Ensure your report is well-organised, with sections for each task (e.g., Data Laws, Azure Services, Data Types, etc.).
2. **Formatting**: Include headings, bullet points where appropriate, and any visuals or diagrams that support your explanations (use a lucid chart for diagrams)
3. **References**: Cite any resources or regulations referenced in the report.
4. **Length**: Aim for 1500-2000 words.

(1) Scenario Background (Introduction)

"Paws & Whiskers" is a growing pet shop that is seeking to enhance its business operations by utilizing the modern cloud-based technologies. The current reliance on manual data collection and spreadsheets limits the company's ability to efficiently analyse sales, customer information, and inventory data. Transitioning to Microsoft Azure will enable the streamline of data storage, analysis, and reporting, empowering the business to make data-driven decisions.
This is a proposal that will outline the relevant data laws and regulations, Azure service recommendations, data types and modelling, storage formats, and additional considerations to ensure compliance, efficiency, and scalability in order to help such an ever-growing business transition into 2025.

(2) Data laws & Regulations

Law/Regulation	Description
GDPR	Protects personal data of EU residents.
DPA 2018	Aligns GDPR principles with UK-specific laws.
PCI DSS	Secures credit card transactions.
Animal Welfare Act (UK)	Ensures humane treatment of animals in human care in accordance with the "Five Freedoms".

✓ **GDPR Compliance**

For example, if the company opens has online store that serves customers across Europe and the UK and a customer that has purchased pet supplies, later requests that their purchase history be deleted. Under the GDPR law:

- The company must verify this customer's identity
- Locate all instances of the customer's data (e.g., name, address, email, purchase history) stored in its systems
- Delete the data unless retention is required by law (e.g., tax records)
- Provide confirmation to the customer that their data has been erased

✓ **Data Protection Act (DPA) 2018**

For instance, if "Paws & Whiskers" decided to introduce a loyalty program in the UK where customers can earn points for every purchase., they will need to take certain actions in order to comply with the DPA 2018.

- The company must clearly explain in its privacy policy how customer data (e.g., names, email addresses) will be used for the program.

✓ **PCI DSS (Payment Card Industry Data Security Standard)**

As an example, when a customer in the UK purchases an item online using their credit card, our company needs to comply with PCI DSS by:

- Encrypting their credit card details during transmission to prevent interception by hackers.
- Avoiding storing any sensitive authentication data like the CVV codes and ensure that the payment data is securely processed through a certified payment gateway.
- Establishing regular audits, depending on the customer traffic, both to test the security of the payment system and prevent breaches.

✓ **Animal Welfare Act**

For example, if Paws & Whiskers" stocks puppies, kittens, and exotic reptiles, it is committed to ensuring the welfare of all animals in its care in accordance with the Animal Welfare Act. To achieve this, the following measures will be implemented.

- Compliance with animal welfare laws ensures pets are housed and handled ethically (e.g., proper enclosures, staff training)

By strictly adhering to aforementioned laws, "Paws & Whiskers" can demonstrate a comprehensive approach to ethical business practices. Ensuring compliance with data protection laws safeguards customer privacy and trust, while also using secure payment processing. In terms of animal welfare, by following upholding the Five Freedoms animals are free from hunger, discomfort, pain, and fear, while also allowing them to express natural behaviours) the company guarantees that all animals in its care receive the proper treatment, health care, and environment for their well-being.

(3) Azure Service Recommendations

Resource	Description	Use case
Azure Blob Storage	Scalable object storage for unstructured data like images, videos, and raw CSV files.	Ideal for storing large volumes of pet photos and transaction logs cost-effectively.
Azure SQL Database	Fully managed relational database service for structured data.	Perfect for storing customer details, sales transactions, and product categories in a relational format.
Azure Machine Learning	Cloud-based platform for building and deploying machine learning models.	Enables predictive analytics, such as forecasting sales trends or identifying high-value customers.
Azure Synapse Analytics	Enterprise-grade analytics service for big data and data warehousing.	Supports complex queries across large datasets, enabling insights into sales patterns and inventory levels.
Azure Data Factory	Data integration service for orchestrating and automating data pipelines.	Streamlines data ingestion from multiple sources (e.g., POS systems, spreadsheets) into Azure.
Azure Bot Service	Fully managed platform for building, testing, and deploying intelligent bots.	Provides a scalable and customizable foundation for creating an AI chatbot for the website.
Azure Cognitive Services	Pre-built AI models for NLP, sentiment analysis, and FAQ management.	Powers the chatbot's ability to understand customer intent, answer questions, and analyse feedback.

- For data storage, Azure Blob Storage can manage large volumes of unstructured data, such as images of pets for sale or raw transaction logs since they can be easily retrieved and displayed on the website without overloading the primary database. On the other hand, Azure SQL Database is perfect for structured data like customer details, sales transactions, and product categories.

- For data analysis, Azure Machine Learning enables predictive analytics, such as identifying seasonal spikes in dog food sales based on historical data, allowing the company to tailor marketing campaigns accordingly. Meanwhile, Azure Synapse Analytics can support real-time analysis of large datasets, helping showcase trends like premium pet food performing better in during the holiday season.

- For data integration and automation Azure Data Factory automates workflows by pulling daily sales data from POS systems, online orders, and inventory spreadsheets into a unified database, ensuring all data is up-to-date and ready for analysis without manual intervention. Additionally, to enhance customer experience, Azure Bot Service combined with Azure Cognitive Services can be used to deploy an AI-powered chatbot on the website. This chatbot will be able to handle customer inquiries in real-time.

(4) Data types & Modelling

Data types:

- **Customer Demographics**: Includes customer details such as name, email, address, and phone number.
- **Transaction History (Sales)**: Records of sales transactions, including sale ID, timeID, customer ID, product ID, quantity, and total amount.
- **Pet Inventory**: Information about pets available for sale, such as breed, age, health status, and price.
- **Product Categories**: Details about non-pet products like food, toys, and accessories

To structure this data, a relational model will be used, with the option to extend into a data warehouse approach for advanced analytics.

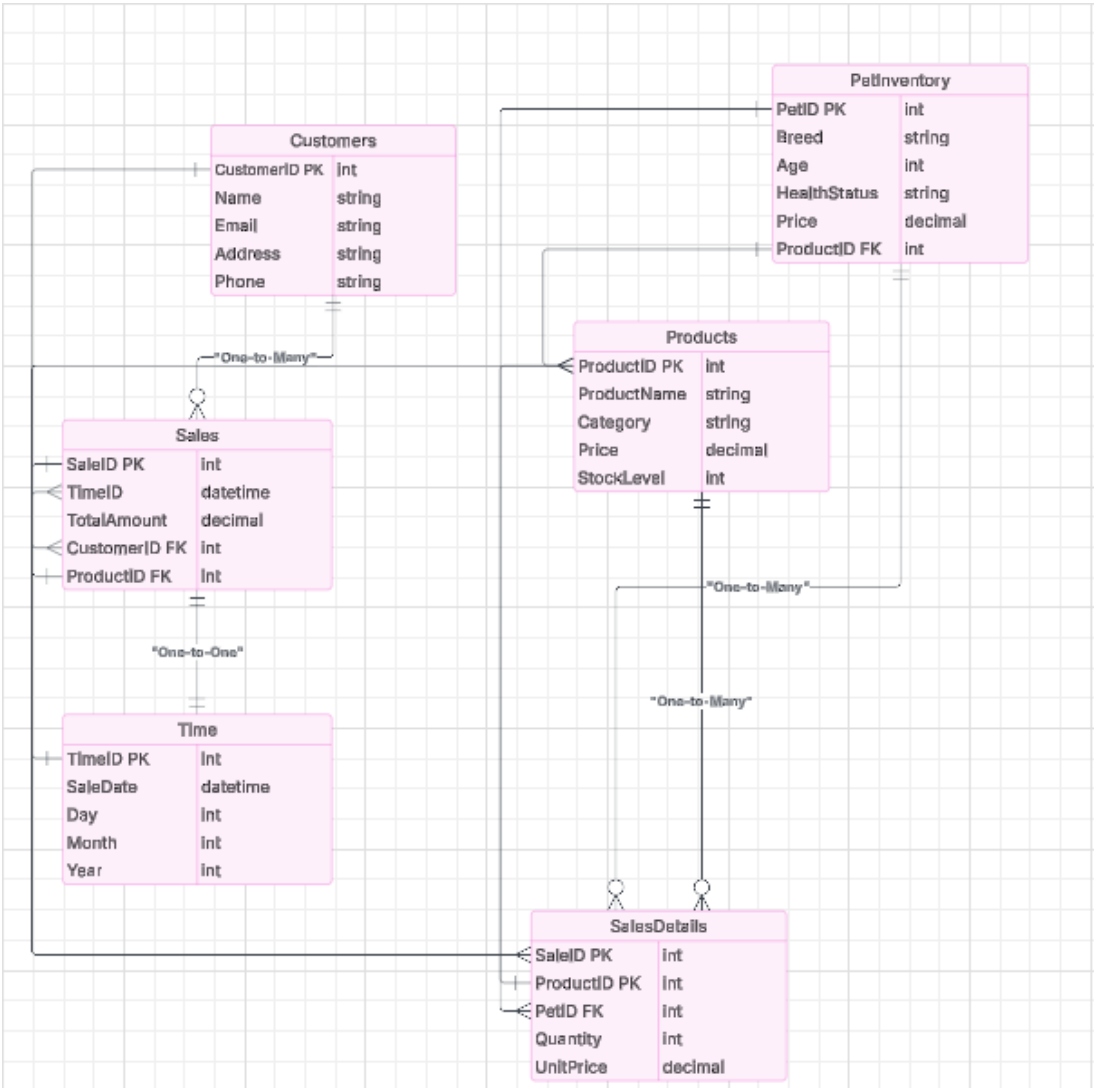


Figure 1 An ERD showcasing the data and the relationships

Primary Keys

CustomerID in **Customers**.

a. ProductID in **Products**.
b. PetID in **Pet Inventory**.
c. SaleID in **Sales**.
d. Composite key (SaleID + ProductID or SaleID + PetID) in **Sales Details**.

Relationships:

e. **Customers → Sales**
    i. *Cardinality: One-to-Many (1 customer can have multiple sales).*
f. **Products → Sales Details**:
    i. Cardinality: One-to-Many (1 product can appear in multiple sales).
g. **Pet Inventory → Sales Details**
    i. Cardinality: One-to-Many (1 pet can appear in multiple sales)

(5) Data Storage Formats and Structures in Azure

Data Formats
To ensure efficient data storage, processing, and analysis, "Paws & Whiskers" will adopt the following data formats based on their specific use cases:

Data Type	Suggested Format	Why Suitable	Example Use Case
Raw Data Imports	CSV	- Simple, human-readable, and widely compatible with spreadsheets.	Migrating historical sales data from Excel files into Azure.
Structured Customer Data	JSON	- Supports nested structures (e.g., customer profiles with addresses and purchase history).	Storing customer loyalty program details with preferences (e.g., pet type, product interests).
Analytical Datasets	Parquet	- Columnar storage reduces I/O and costs for analytical queries.	Analysing sales trends across product categories in Azure Synapse Analytics.
Unstructured Data	Azure Blob Storage	- Scalable for large volumes (e.g., transaction logs, customer uploads like pet photos).	Archiving daily POS system logs for auditing.

- **Data Security and Encryption:** Ensuring the security of sensitive data is a top priority for "Paws & Whiskers." Azure provides robust built-in features to protect data both at rest and in transit:
- **Encryption**:
    - **At Rest**: All data stored in Azure services is encrypted using **AES-256**, one of the strongest encryption standards available. This ensures that sensitive information, such as customer details and payment data, remains secure even if physical storage media are compromised.
    - **In Transit**: Data transmitted between Azure services and external systems is protected using **TLS 1.2**, safeguarding it from interception or tampering during transfer.

Role	Access Level	Purpose	Example Users
Finance/Manager Team	Read/write access to payment transaction tables in SQL Database.	Reconciling sales and processing refunds.	1-2 managers.
Inventory Team	Read/write access to pet inventory data in Blob Storage.	Updating stock levels and supplier details.	3-4 warehouse staff.
Sales Team	Read-only access to customer demographics (no payment data).	Analysing purchase patterns for marketing campaigns.	5+ sales associates.
Admins	Full access to databases, encryption keys, and audit logs.	Managing backups, security policies, and compliance reporting.	1-2 IT administrators (least privilege principle).

Data Lifecycle Management: To optimize storage costs and ensure compliance with data retention policies, "Paws & Whiskers" will implement the following strategies:

Tiered Storage:

a. Use Azure Blob Storage tiers (Hot, Cool, Archive) to store data based on its usage frequency. For example:
   i. Frequently accessed data (e.g., recent sales transactions) is stored in the **Hot tier**.
   ii. Infrequently accessed data (e.g., archived purchase histories) is moved to the **Cool tier**.
   iii. Long-term archival data (e.g., old invoices) is stored in the **Archive tier**.

Automated Data Retention Policies:

b. Configure lifecycle management rules in Azure Blob Storage to automatically transition data between tiers or delete outdated records after a specified period. For example:
   i. Delete raw transaction logs older than 7 years to comply with GDPR's "Right to Erasure."
   ii. Move inactive customer profiles to the Cool tier after 12 months of inactivity.

Enhanced Security Measures: To further strengthen data protection, "Paws & Whiskers" will adopt the following advanced security practices:

(6) **Data Masking**:

a. Use Azure SQL Database's **Dynamic Data Masking** feature to hide sensitive information (e.g., partial credit card numbers or email addresses) from non-administrative users. This ensures that only authorized personnel can view sensitive data.

(7) **Multi-Factor Authentication (MFA)**:

a. Require MFA for all administrative accounts accessing Azure resources. This adds an extra layer of security to prevent unauthorized access.

(6) Additional Considerations

To maximize efficiency, resilience, and scalability in Azure, "Paws & Whiskers" should adopt key Platform-as-a-Service (PaaS) strategies. Prioritizing PaaS minimizes overhead, leverages Azure's built-in security for GDPR/DPA 2018 compliance, and enhances agility through the rapid deployment of new services like Power BI dashboards.

Backup and Disaster Recovery

Service	Purpose	Key Features	Example Use Case
Azure Backup	Protect critical data (e.g., databases, files).	- Incremental backups	Daily backups of customer transaction databases.
		- Encryption at rest	
		- Retention policy customization.	
Azure Site Recovery	Replicate workloads to a secondary region for business continuity.	- Automated failover	Recover inventory systems during a regional outage.
		- Low RPO (15-minute intervals)	
		- Cross-region replication.	

Data Visualization

To empower management with actionable insights, Power BI which transforms raw data into visually appealing charts, graphs, and dashboards, enabling real-time insights into sales trends, customer behaviour, and operational performance.

- Connecting Power BI to Azure SQL Database, Azure Synapse Analytics, or Blob Storage to pull data for analysis.
- Building dashboards that display key metrics such as:
  - Monthly sales trends by product category or region.
  - Customer segmentation based on purchasing behaviour.
  - Inventory levels and restocking needs.
- Enabling real-time updates by integrating Power BI with Azure Data Factory or Azure Event Hubs for streaming data.

As an example, a dashboard could show a heatmap of sales performance across different regions, helping management identify areas with high demand for premium pet products. This insight can inform targeted marketing campaigns or inventory adjustments.

Future Scalability

As "Paws & Whiskers" grows, its data needs will expand, requiring scalable solutions to handle larger datasets and more complex analyses. Azure's PaaS offerings are designed to scale seamlessly with business growth.

Serverless Computing:

a. Utilizing Azure Functions or Logic Apps to build serverless workflows that automatically scale based on demand. For example. trigger automated email notifications when inventory levels fall below a threshold.

(7) Conclusion

In summary, migrating to Azure, *Paws & Whiskers* ensures security, compliance, efficiency, and growth with scalable tools, automation, and AI-driven insights.

Word count: 1995

References:

Data Laws & Regulations

- **GDPR (General Data Protection Regulation)**: GDPR Full Text.
- **DPA 2018 (Data Protection Act 2018)**UK DPA 2018 Guidance.
- **PCI DSS (Payment Card Industry Data Security Standard)**: PCI DSS Standards.
- **Animal Welfare Act (UK)**: Animal Welfare Act 2006.
- **Five Freedoms (Animal Welfare)**: RSPCA Guidelines
- **Parquet Format**: Azure Parquet Best Practices

Azure Service Recommendations

- **Azure Blob Storage**: Azure Blob Storage Docs.
- **Azure SQL Database**: Azure SQL Database Docs.

Data Analysis

- **Azure Machine Learning**: Azure ML Docs.
- **Azure Synapse Analytics**: Azure Synapse Docs.

Data Integration & Automation

- **Azure Data Factory**: Azure Data Factory Docs.

Customer Experience

- **Azure Bot Service + Cognitive Services:**
  - Azure Bot Service
  - Cognitive Services.

Data Storage Formats & Security

- **AES-256 Encryption**: Azure Encryption at Rest
- **TLS 1.2**: Azure Data Encryption in Transit
- **Dynamic Data Masking**: Azure SQL Data Masking

- **Multi-Factor Authentication**: Azure MFA Docs

Backup & Disaster Recovery

- **Azure Backup**: Backup Documentation
- **Azure Site Recovery**: Site Recovery Docs

Data Visualization

- **Power BI**: Power BI with Azure

Future Scalability

- **Azure Functions**: Serverless Workflows

Course Notes

It is recommended to take notes from the course, use the space below to do so, or use the revision guide shared with the class:

- **Computer Misuse Act 1990**
    - Aims to criminalize unauthorized access to computer systems (e.g., hacking, DDoS attacks).
- **Data Protection Act 2018 (DPA)**
    - Implements GDPR in the UK, ensuring personal data is processed lawfully, transparently, and securely.
- **Copyright, Designs and Patents Act 1988**
    - Protects intellectual property (e.g., software, digital content) from unauthorized use or distribution.
- **Police and Justice Act 2006**
    - Amends the Computer Misuse Act to criminalize creating/distributing hacking tools for malicious purposes.
- **Regulation of Investigatory Powers Act 2000 (RIPA)**
    - Governs surveillance and interception of communications by public authorities.
- **Digital Economy Act 2017**
    - Addresses online copyright infringement and enforces age verification for adult content.
- **Network and Information Systems (NIS) Regulations 2018**
    - Requires critical infrastructure providers (e.g., energy, transport) to implement cybersecurity measures.

We have included a range of additional links to further resources and information that you may find useful, these can be found within your revision guide.

END OF WORKBOOK

Please check through your work thoroughly before submitting and update the table of contents if required.

Please send your completed work booklet to your trainer.