Data Technician

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Table of contents

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 helps us store and access data, apps and services over the internet instead of relying on our own devices. It makes life easier by letting us back up photos, stream music or movies, work on documents with others, and access our stuff from anywhere. Real world examples include: Hospitals- store patient records securely. Schools- online classes, file sharing and assignments. Banks- secure transactions and customer services. Retailers- manage inventory, run websites and analyse customer needs.
How can it benefit a business?	For businesses it cuts costs as no need to buy and maintain expensive servers and hardware. It supports remote work allowing teams to work from anywhere and access the same data and helps them run faster and smarter. Allows them to process large amounts of data to gain insights and make smart decisions.
What's the alternative to cloud computing?	Other ways to store and manage data include, saving files directly on your computer or a USB drive. This saves directly to local storage and keeps it private unless chosen to be shared.
What cloud providers can we use, what are their features and functions?	Amazon web services (AWS)- Storing data, running websites and apps, and big business tools. Features include only paying for what you use, and very flexible and secure. Microsoft Azure- works well if you use windows, office or teams. Features include running websites, storing files and supporting remote work. Google Cloud- Good for apps, big data and anything that needs smart tools like AI. Features include fast, reliable and connects with things like Gmail and Google Docs.

Day 1: Task 2

Please research the below cloud offerings, 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)	Renting computers and storage over the internet instead of owning them. (Most control).	• Running a website or app but not having your own server so you rent one online. • You only pay for the time and space you use. • Add more power or space anytime like adding more shelves when storage fills up. • Amazon EC2, Microsoft Azure Virtual Machines, Google Compute Engine.
PaaS (Platform as a service)	A readymade platform where you can build and run your app without worrying about the hardware or set up.	• You want to focus on writing code, not managing servers. • You're building an app and want it online first. • You don't want to deal with updates and maintenance. • Google App Engine, Heroku, Microsoft Azure App Services.
SaaS (Software as a service)	Using software online without installing anything. (Most expensive).	• You just need the tool to do a job eg. Email, editing docs or video calls. • You want something simple and ready to go. • Gmail, Google Docs, Zoom, Microsoft 365.

Day 1: Task 3

Please research the below terms 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 is a type of cloud computing where services like storage and software are provided over the internet by a third party such as Amazin web services or google cloud).
	This would be appropriate for small businesses or startups that don't want to spend money on expensive hardware.
	Real-world examples:
	Netflix uses the public cloud (AWS) to store and stream movies and show to millions around the world. They only pay for the cloud services the need.
	Organisations- small businesses, startups, e-commerce companies e.g shopify, Netflix.
Private Cloud	It is a cloud computing service that is used by only one organisation. It can be hosted either on site or by third party. It gives businesses more control over their data, security and infrastructure.
	It is appropriate when businesses need more security or has strict privacy requirements.
	Real-world example: A bank might use a private cloud to store sensitive customer data and process financial transactions. This is to keep the information secure and private.
	Organisations- Large enterprises e.g. banks, healthcare companies or government agencies
Hybrid Cloud	A hybrid cloud is a mix of both public and private cloud services. It allows businesses to keep some of their data and applications in a private cloud while using public cloud services for less sensitive tasks. This gives businesses the flexibility to choose where to store their data and applications based on their needs.

	Appropriate when businesses want to combine the security and control of a private cloud with the scalability and cost efficiency of a public cloud.

Real-world example: A retail company might store customer payment information in a private cloud for security reasons but use a public cloud for running their website and handling orders.

Organisations- Large businesses or enterprises. |
| **Community Cloud** | This is a cloud service shared by several organisations that have similar needs or goals. The infrastructure is shared, but the cloud specifically designed for the group's particular requirements, such as security, compliance, or industry standards.

Appropriate when several businesses in the same industry wanting to share resources but still need to meet specific regulations or security standards.

Real-world examples: A group of hospitals may use a community cloud to share patient data securely and comply with healthcare regulations, while still being able to store some information in a more private way.

Organisations- Businesses in the same industry |

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

Area	Description	Example
Section 1 Unauthorised Access to Computer Material.	Accessing a computer, account, or files without permission. No need to cause damage.	A student logs into a teacher's computer just to look at files, without permission.
Section 2 Unauthorised Access with Intent to Commit a Further Crime	Accessing a computer without permission and planning to commit a crime like fraud or theft.	Someone hacks into a friend's gaming account to steal virtual items or sell them.
Section 3 Unauthorised Modification of Computer Material	Changing, deleting, or damaging files, software, or systems without permission.	A person installs a virus on someone's laptop that deletes personal photos or files.

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
One big change was making Denial of Service (DoS) attacks illegal. These are attacks that try to crash websites or stop people from using online services by flooding them with too much traffic. Another change was to increase the punishment for hacking. Before, someone caught hacking could go to prison for up to 6 months. After the update, the punishment was made stronger up to 2 years in prison to show that hacking is a serious crime.

The law also made it illegal to make or share hacking tools. This means creating or giving out programs that can be used to hack computers or steal data is now a crime, even if you don't use the tools yourself. This helps stop cybercrime before it happens.

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 and address- To contact the employee and send documents.
Date of birth- To check age for legal and payroll reasons.
National Insurance number- Needed for tax and National Insurance reporting.

Give three more examples of data that an employer can only store if they first get the employee's permission.
Health information – For medical leave or disability.
Religious beliefs – For holiday accommodation.
Sexual orientation – For diversity purposes.

Conduct further research to answer the below questions.

Question	Answer
Provide one example of: Copyright infringement	Downloading and sharing a movie online without the permission of the copyright holder.
Provide one example of: Plagiarism	Using a direct quote from a source but failing to use quotation marks or provide a citation.
What are two consequences of copyright infringement and software piracy?	Legal Penalties- Fines or imprisonment for violating copyright laws. Reputation Damage- Loss of trust and business opportunities.
Give three possible consequences for individuals when using pirated software	Legal Action- Fines or legal charges for violating copyright laws. Security Risks- Increased chance of viruses or malware infecting the device. Lack of Support- No access to updates, patches, or customer service.

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
2	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
1	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
Not ilegal	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.

Explore relational data in Azure
Learning Path 02 (CSS)

Duration:	2 Hours, 15 Minutes
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

Launch

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.

Explore non-relational data in Azure
Learning Path 03 (CSS)

Duration:	2 Hours, 15 Minutes
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

Launch

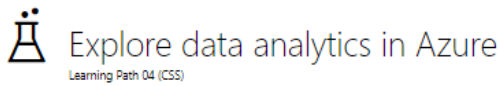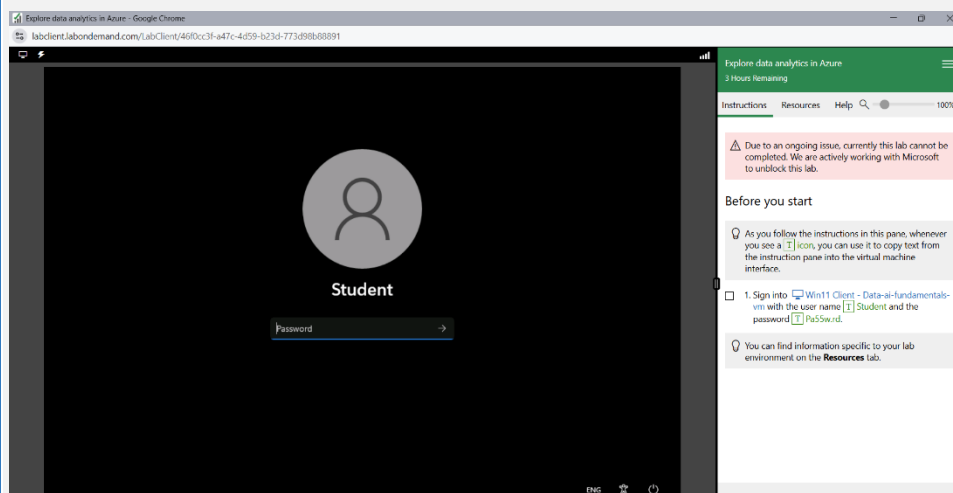|	
Completed lab	**Section1** **Section2**

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.

Practice Assessment: DP-900T00-A Microsoft Azure Data Fundamentals
Practice Assessment for Microsoft Certifications for DP-900T00-A

Additional Details

Required:	No
Available Instructor-Led:	Yes
Available Self-Paced:	Yes

Result

Overall Results

To be better prepared for the exam, aim to achieve a score of 80% or higher in multiple attempts.

Score: 86%

Show My Answers

Performance by assessment section

To further strengthen your skills in the following areas, refer to the Customized Learning Material section below.

Describe core data concepts

Identify considerations for relational data on Azure

Describe considerations for working with non-relational data on Azure

Describe an analytics workload on Azure

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.
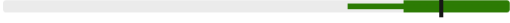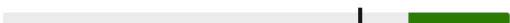
2. Data Laws and Regulations

Identify and explain the data laws and regulations relevant to handling customer data within the proposal. Ensure you cover the following points:

- **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:

- **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.

6. Additional Considerations

Provide any other considerations that might enhance data handling and efficiency in Azure, such as:

- **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.
3. **References**: Cite any resources or regulations referenced in the report.
4. **Length**: Aim for 1500-2000 words.

The goal is to make better business decisions by analysing sales, customer data, and inventory information. To achieve this, the company is looking to adopt Microsoft Azure, a cloud platform that can help store, manage, and analyse data more effectively.

Data Laws
Handling customer and business data means following certain rules, especially in the UK. Below are the key regulations that apply to Paws & Whiskers and how the company can stay compliant.

GDPR Compliance
The General Data Protection Regulation (GDPR) is a European law that protects how people's personal data is used. Although the UK has left the EU, GDPR still applies through UK GDPR.

They need to:
- Get clear permission from customers before collecting their data.
- Explain how their data will be used.
- Only collect data that's necessary (e.g., names, emails, purchase history).
- Give customers the right to access or delete their data.

When using Azure, it's important to store data in regions that comply with GDPR. Microsoft Azure is GDPR compliant and provides tools to manage and protect customer information properly.

Data Protection Act 2018 (DPA 2018)
The DPA 2018 is the UK's version of GDPR and outlines how companies should handle data locally. It sets similar rules for collecting and storing personal data within the UK. Paws & Whiskers must ensure customer data is handled according to this law, especially since they operate in the UK.

They need to:
- Be transparent with customers about how their data is used.
- Keep data secure from unauthorised access or leaks.
- Make sure only staff who need access to data can see it.
- Ensure the systems used (like Azure) support privacy and security.

Other Industry Standards:
- PCI DSS (Payment Card Industry Data Security Standard), If the shop accepts card payments, it must follow these rules to protect payment details.
- ISO 27001, While not legally required, it's a global standard for information security. Azure meets this standard, helping to build customer trust.

Azure Services
To modernise their data management, Paws & Whiskers can use a range of Azure services designed for storage, analysis, and automation.

Azure SQL Database, a cloud based relational database ideal for structured data like customer information, transactions, and inventory. It offers automatic backups, high security, and scalability.

Azure Blob Storage is another option best for unstructured or large datasets, such as images of pets or scanned documents. It's affordable and works well for storing large volumes of data.

Benefits of using this include:
- Scalability becomes easier as the business grows,
- Accessibility to built-in security features like encryption and access control
- High availability and reliability.

Data Analysis Tools:
- Azure Synapse Analytics is a powerful for analysing large volumes of sales and customer data. It helps find trends such as most popular pet products or sales patterns.
- Azure Machine Learning can be used to analyse customer behaviour such as what products they're likely to buy next and supports predictive models for marketing and inventory planning.

Data Integration and Automation:
Azure Data Factory automates the process of collecting data from different sources such as spreadsheets, databases, etc. It cleans, combines, and loads data into Azure storage or analytics tools. It also saves time and reduces human error.

Data Types and Data Modelling
To get the most value from data, it's important to know what kinds of data are being collected and how to organise them properly.
- Customer info: Names, contact details, and addresses of customers.
- Sales records, details of each purchase, including what was bought, when, and for how much.
- Pets, information about pets in the store or sold, like their species, breed, and age.
- Products: Information about items like food, toys, and supplies, including prices and stock levels.

How the Data is Organized:
Using a relational model to show data stored in tables. Each table holds information about one kind of thing.
- The Customer table holds customer details. Each customer has a unique ID.
- The Transaction table records every sale, linked to customers through their ID.
- The TransactionDetail table lists each product sold in a transaction, including quantity and price.
- The Product table stores details about each product.
- The Pet table holds information about pets and links each pet to its owner (a customer).

How Tables Connect:
- One customer can have many transactions.
- One transaction can include multiple products (through the transaction details).
- Each product can appear in many transaction details.
- One customer can own multiple pets.
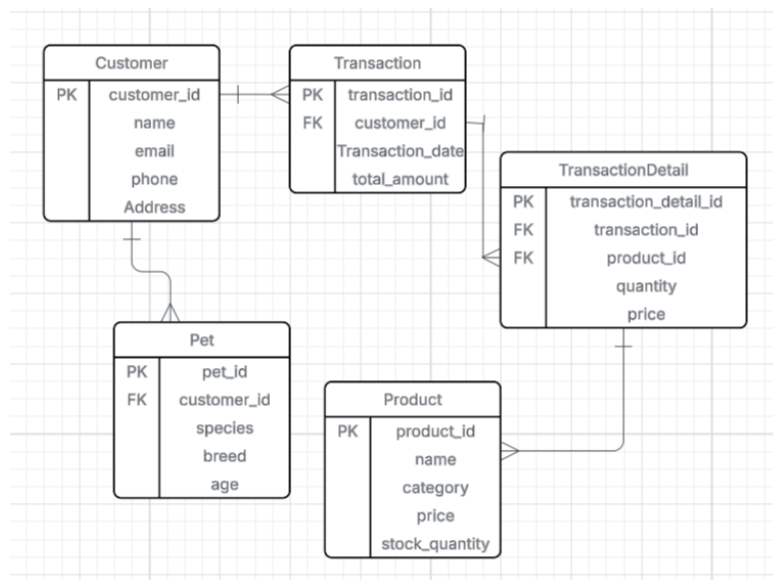
This diagram shows a database er diagram, with cardinalities, for the relation relationships between the tables. Overall, this data model provides a strong foundation for accurate reporting and data driven decision making.

Data Storage Formats and Structures
Storing data in the right format helps make analysis easy and keeps information safe.

Data Formats:
- CSV: Good for simple data like sales or customer lists. Easy to use but not great for large or complex data.
- JSON: Great for structured data like customer profiles or product details. Flexible and readable.
- Parquet: Best for large data sets and fast analysis, like sales trends. Saves space and speeds up queries.

Data Storage:
For structured data like customer details, orders, and inventory, using a relational database such as Azure SQL Database is recommended. This allows data to be organized in tables with clear relationships, making queries straightforward and reliable.
For large files or semi-structured data, such as logs or JSON files, using Azure Blob Storage or Azure Data Lake Storage works well. These storage options are scalable, cost-effective, and integrate smoothly with Azure analytics tools.

Data Security and Encryption:
Azure provides built-in encryption for data when stored and when moving between systems. This means customer information and sales data are protected from unauthorized access. Access controls let only authorized people see or change data, these features help keep customer info safe and follow privacy rules.

Additional Considerations

Backup and Disaster Recovery

To keep the data safe, Paws & Whiskers should regularly back it up using Azure Backup. This means if something goes wrong, like accidental deletion or a system problem, they can restore the data easily.

They can also use Azure Site Recovery to copy important systems to another location. This helps the business keep running smoothly even if the main system has issues.

Data Visualisation:

Using Power BI with Azure will help the team see their sales and customer data in clear, easy-to-understand charts and dashboards. This makes it simple to track which products are popular and how customers are shopping, helping managers make better decisions faster.

Future Scalability

As the pet shop grows, they will have more data to manage. Azure services can grow with them, so the system won't slow down or break. The storage and processing power can increase automatically, making sure the business can handle more sales and data without problems.

Moving to Microsoft Azure will help Paws & Whiskers manage their data more easily, make better decisions, and follow important data privacy rules in the UK and EU. Azure provides a safe place to store all data, tools that help understand sales and customers, and automation to reduce manual work. It also offers easy to read reports that give quick insights, and the system can grow with the business as it gets bigger. Overall, Azure will make the business run more smoothly and support its growth.

References:

- UK GDPR: https://ico.org.uk/for-organisations/uk-gdpr-guidance/
- Data Protection Act 2018: https://www.legislation.gov.uk/ukpga/2018/12/contents/enacted
- Microsoft Azure Compliance Offerings: https://azure.microsoft.com/en-us/explore/trusted-cloud/compliance/
- PCI DSS Overview: https://www.pcisecuritystandards.org/

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:

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.