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 enhances daily life by enabling seamless access to data, applications, and services from anywhere. It powers online storage, streaming, and communication tools, making remote work, e-learning, and collaboration more efficient. Businesses leverage it for scalability, disaster recovery, and AI-driven insights, while industries like healthcare, finance, and smart cities use it for secure data management, fraud detection, and automation. Cloud gaming, IoT, and scientific research also benefit from its flexibility and processing power, making technology more accessible, cost-effective, and innovative across various sectors.
How can it benefit a business?	Cloud computing benefits businesses by providing scalable, cost-effective solutions for data storage, computing power, and collaboration. It enables remote work, enhances security with automatic backups, and reduces IT infrastructure costs. Businesses can quickly deploy applications, analyse big data for insights, and leverage AI for automation. Cloud-based tools improve efficiency in customer service, finance, and supply chain management, while ensuring flexibility to adapt to changing market demands.
What's the alternative to cloud computing?	The main alternative to cloud computing is **on-premises computing**, where businesses host their own servers, data centres, and IT infrastructure. This approach offers greater control, security, and customisation but requires significant upfront investment in hardware, maintenance, and IT staff. Other alternatives include **edge computing**, which processes data closer to the source (e.g., IoT devices) to reduce latency, and **hybrid computing**, which combines on-premises infrastructure with cloud services for flexibility. Some organisations also use **dedicated hosting** or **colocation services**, where third-party data centres provide physical space for privately owned servers.

What cloud providers can we use, what are their features and functions?	Major cloud providers include **Amazon Web Services (AWS)**, **Microsoft Azure**, **Google Cloud Platform (GCP)**, **IBM Cloud**, and **Oracle Cloud**. AWS is known for its vast range of services, scalability, and global infrastructure, offering computing power, storage, and machine learning tools. Azure integrates well with Microsoft products, providing strong hybrid cloud solutions and enterprise-level security. GCP specializes in data analytics, AI, and machine learning, with strong tools for big data processing. IBM Cloud offers flexible cloud solutions with a focus on AI, blockchain, and hybrid cloud environments. Oracle Cloud excels in database management and enterprise applications, making it ideal for businesses relying on Oracle software. Each provider offers unique strengths in various domains like AI, storage, compute, and security, catering to different business needs.

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)	**IaaS (Infrastructure as a Service)** is a cloud computing model that provides virtualized computing resources over the internet, such as virtual machines, storage, and networks. It allows businesses to rent IT infrastructure without the need for on-premises hardware. Major IaaS providers include AWS, Azure, and Google Cloud.	Examples of IaaS use cases include hosting websites, running virtualized applications, and managing development or test environments. It's also used for disaster recovery, where businesses can quickly scale resources during outages, and for big data processing, where companies leverage cloud resources to analyze large datasets without investing in physical servers.

PaaS (Platform as a service)	**PaaS (Platform as a Service)** is a cloud computing model that provides a managed environment for developers to build, test, and deploy applications without worrying about underlying infrastructure. It includes tools for coding, databases, and automation, streamlining the development process.	Examples of PaaS use cases include web and mobile app development, where platforms like Google App Engine or AWS Elastic Beanstalk handle deployment and scaling. It's also used for API management, AI-powered applications, and DevOps automation, enabling faster development cycles. Popular PaaS providers include Microsoft Azure App Services, Heroku, and Red Hat OpenShift.
SaaS (Software as a service)	**SaaS (Software as a Service)** is a cloud computing model where software applications are delivered over the internet on a subscription basis, eliminating the need for installation or maintenance. Users can access SaaS applications from any device with an internet connection.	Common use cases include productivity tools like **Google Workspace** and **Microsoft 365**, customer relationship management (CRM) platforms like **Salesforce**, and collaboration tools like **Slack** and **Zoom**. SaaS is also used in e-commerce (**Shopify**), finance (**QuickBooks Online**), and project management (**Trello, Asana**), allowing businesses to operate efficiently without managing software updates or infrastructure.

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 cloud computing model where services and infrastructure are shared across multiple users and managed by third-party providers like **AWS, Microsoft Azure, and Google Cloud**. It is cost-effective, scalable, and requires no on-premises hardware, making it ideal for startups, small businesses, and enterprises needing flexible IT resources. Public clouds are best suited for **web hosting, app development, big data processing, and disaster recovery**. A real-world example is **a tech startup** using AWS to host its mobile app, leveraging the cloud's scalability to handle varying user demand without large upfront costs.
Private Cloud	A **private cloud** is a cloud computing model where infrastructure and services are dedicated to a single organization, offering greater security, control, and customization. It is ideal for businesses handling **sensitive data** or requiring strict **compliance** with regulations, such as **financial institutions, government agencies, and healthcare organizations**. Private clouds are commonly used for **secure data storage, internal applications, and enterprise resource planning (ERP) systems**. A real-world example is **a bank** using a private cloud to manage customer transactions and financial data securely, ensuring compliance with data protection laws like GDPR or HIPAA.
Hybrid Cloud	A **hybrid cloud** is a cloud computing model that combines both **public and private cloud** environments, allowing data and applications to move between them. This approach provides flexibility, scalability, and security, making it ideal for businesses that need to balance **cost-efficiency** with **data privacy**. It is commonly used in industries like **healthcare, finance, and retail**, where sensitive data can be kept in a private cloud while less critical workloads run in the public cloud. A real-world example is **a hospital** using a private cloud for storing patient records securely while leveraging a public cloud for running AI-driven analytics to improve patient care.

Community Cloud	A **community cloud** is a cloud computing model where infrastructure and resources are shared among multiple organizations with **similar needs, security, and compliance requirements**. It provides a balance between the control of a private cloud and the cost efficiency of a public cloud. This model is ideal for **government agencies, research institutions, healthcare organizations, and financial sectors** that require collaboration while maintaining security and regulatory compliance. A real-world example is **a group of universities** using a community cloud to share research data, computing resources, and applications while ensuring compliance with data protection laws.

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	This covers accessing a computer system or data without permission. Even if no damage is done, simply logging into a system without authorization is an offense.	**Example: A student guesses their school administrator's password and logs into the system to view exam papers. Even if they don't change or steal any data, this is still illegal.**
Unauthorized Access with Intent to Commit or Facilitate Further Offenses	This applies when unauthorized access is used to commit crimes such as fraud, identity theft, or data theft.	**Example: A hacker gains access to an online banking system and uses stolen credentials to transfer money from victims' accounts to their own.**

Unauthorized Acts with Intent to Impair, or Reckless Acts Causing Impairment	This focuses on actions that cause harm to computer systems, including spreading viruses, launching denial-of-service (DoS) attacks, or deleting critical data.	**Example: A disgruntled employee introduces a virus into their company's network, causing the system to crash and disrupting business operations.**

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

Description
1. Increased Penalties for Unauthorized Access with Intent (Section 35) • The amendment increased the **maximum prison sentence** for **unauthorized access with intent to commit further offenses** from **five years** to **ten years**. **Example:** • A hacker who accesses a government database to commit fraud could now face a **longer prison sentence** under the updated law.
2. Criminalization of Denial-of-Service (DoS) Attacks (Section 36) • The amendment made **Denial-of-Service (DoS) attacks explicitly illegal** under Section 3 of the **Computer Misuse Act 1990**. • Previously, these attacks were difficult to prosecute because they didn't always involve unauthorized access. **Example:** • A hacker floods an online retailer's website with fake traffic, causing it to crash and preventing real customers from accessing it. This is now clearly an offense under the law.

3. Making the Creation or Distribution of Hacking Tools Illegal (Section 37)

- The amendment criminalized the **creation, supply, or use of hacking tools** if there is intent to commit an offense.
- This includes software designed to bypass security systems or steal data.

Example:

- A programmer creates a password-cracking tool and sells it on the dark web. Even if they don't personally hack anyone, they can still be prosecuted for **aiding cybercrime**.

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
Date of birth

Give three more examples of data that an employer can only store if they first get the employee's permission.
race and ethnicity
trade union membership
Genetics

Conduct further research to answer the below questions.

Question	Answer
Provide one example of: Copyright infringement	**Example of Copyright Infringement:** A person downloads a movie from a torrent website and then uploads it to YouTube without permission from the copyright owner. **Why is this copyright infringement?** • The movie is protected by copyright, meaning only the owner (or someone with legal permission) can distribute or share it. • Uploading the movie without authorization violates the owner's rights and can lead to legal consequences such as takedown notices, fines, or
Provide one example of: Plagiarism	**Example of Plagiarism:** A student copies paragraphs from an online article into their research paper without citing the original source and submits it as their own work. **Why is this plagiarism?** • The student is presenting someone else's work as their own without giving proper credit. • Even if they slightly reword the content, failing to acknowledge the original source still counts as plagiarism. • This can lead to academic penalties, loss of credibility, or even legal consequences in professional settings.

What are two consequences of copyright infringement and software piracy?	**1. Legal Penalties** • Individuals or businesses caught infringing copyright can face **lawsuits, fines, or even imprisonment** depending on the severity of the violation. • Companies like Microsoft, Adobe, and the music/ movie industries actively pursue legal action against pirates. **Example:** A business using unlicensed software may be fined thousands of dollars in damages if caught by a software audit. **2. Security Risks** • Pirated software and media often come with **malware, viruses, or spyware**, putting users at risk of **data theft, hacking, or system corruption**. • Without official updates or security patches, pirated software is also more vulnerable to cyberattacks. **Example:** A person downloads a cracked version of an expensive design program, but it secretly installs malware

Give three possible consequences for individuals when using pirated software	**1. Legal Consequences** • **Fines or legal action:** If caught using pirated software, individuals may face **lawsuits** or **hefty fines** from software companies. • In some countries, piracy is a **criminal offense**, leading to possible imprisonment. **Example:** A freelancer using a pirated version of Adobe Photoshop gets reported and is fined thousands of dollars for copyright infringement. **2. Security Risks** • **Viruses, malware, and spyware:** Pirated software often comes with malicious programs that can steal **personal data, banking details, or login credentials**. • Since it doesn't receive **official security updates**, it is more vulnerable to cyberattacks. **Example:** A person downloads a cracked version of Microsoft Office, but it secretly installs malware that steals their online banking passwords. **3. Lack of Support and Updates** • **No technical support:** Pirated software cannot access **customer support** or official troubleshooting help. • **No updates or patches:** Missing security updates leaves the system vulnerable to **bugs, crashes, and cyber threats**. **Example:** A student using a pirated version of an operating system cannot install critical security patches, making their laptop an easy target for hackers.

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
1	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
3	Unauthorised modification of computer material is illegal

1/2	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
1/2	It is illegal to distribute hacking tools for criminal purposes
6	It is illegal to distribute an illicit recording
7	Personal data may not be kept longer than necessary
1/2	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
4	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.

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 Completed

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 Completed

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.

Paws & Whiskers: Azure Data Transition Proposal

In today's digital age, businesses must leverage technology to remain competitive. "Paws & Whiskers," a growing pet shop, aims to enhance its operations by improving data management processes related to sales, customer information, and inventory. At present, data is manually collected or stored in spreadsheets, which can lead to inefficiencies, errors, and challenges in retrieving actionable insights. To address these issues, management is exploring the transition to Microsoft Azure, a cloud-based platform that will streamline data storage, analysis, and reporting. This proposal outlines the key aspects of this transition, including legal considerations, Azure service recommendations, data modelling strategies, and additional measures to ensure compliance and efficiency.

A crucial aspect of handling customer data is ensuring compliance with relevant legal and regulatory frameworks. "Paws & Whiskers" must adhere to several data protection laws and industry standards to protect customer information and prevent legal repercussions. The General Data Protection Regulation (GDPR) sets strict rules on data collection, processing, and storage within the EU and UK. Businesses must adhere to principles such as data minimisation, obtaining user consent, and ensuring secure data storage. Microsoft Azure provides GDPR-compliant solutions, including encryption, access controls, and audit logs, to enhance data security. Additionally, the UK's Data Protection Act (DPA) 2018 supplements GDPR by defining the country's specific data-handling requirements. "Paws & Whiskers" must ensure that customer data is lawfully collected, securely stored, and accessed only by authorised personnel. Furthermore, if the business stores payment information, compliance with the Payment Card Industry Data Security Standard (PCI DSS) is essential. Implementing best practices such as anonymisation and role-based access control will further strengthen data security.

To optimise data management and analytics, Microsoft Azure offers a variety of services that align with "Paws & Whiskers'" needs. Data storage is a fundamental requirement, and Azure provides multiple solutions. Azure SQL Database is a fully managed relational database service ideal for structured data, such as customer transactions and product inventory. For unstructured data, such as pet images and scanned invoices, Azure Blob Storage is a suitable option. Additionally, powerful analytics tools are essential for deriving insights. Azure Synapse Analytics facilitates large-scale data analysis, helping management understand sales trends and customer purchasing behaviour. Azure Machine Learning enables predictive analytics, which can forecast demand for specific pet products based on historical sales data. To improve data integration and automation, Azure Data Factory is recommended. This service automates data collection, transformation, and integration processes, reducing manual effort and enhancing efficiency.

Understanding and classifying data types is vital for structuring an effective data management system. "Paws & Whiskers" handles various categories of data, including customer information (names, contact details, and purchase history), transaction records (sales data, payment methods, and invoices), inventory details (pet and product listings, stock levels, and supplier details), and operational data (employee schedules, store locations, and vendor contracts). To organise and maintain data integrity, a structured data modelling approach is required. A relational model using structured tables can be employed, where entities such as Customers, Orders, and Products maintain clear relationships. Alternatively, for advanced reporting and business intelligence, a data warehouse approach using Azure Synapse Analytics is advisable. This enables aggregation of datasets to facilitate in-depth analysis.

In addition to defining data models, selecting appropriate data formats is critical for optimising storage and processing efficiency. CSV is recommended for raw data imports and simple data transfers, while JSON is ideal for structured data with nested attributes, such as customer preferences. Parquet, known for its columnar storage efficiency, is best suited for analytical workloads. Security is paramount, and Azure provides several features to ensure data protection. Azure Key Vault manages encryption keys, safeguarding sensitive information. Role-Based Access Control (RBAC) restricts access based on user roles, ensuring that only authorised personnel can view or modify confidential data. Implementing data masking further enhances security by preventing unauthorised users from accessing sensitive customer details.

Beyond storage and security, additional considerations must be addressed to maximise the benefits of transitioning to Azure. Backup and disaster recovery solutions are essential to prevent data loss. Azure Backup automates data backups, ensuring quick recovery in case of accidental deletions or system failures. Azure Site Recovery provides disaster recovery capabilities, minimising downtime and maintaining business continuity. Moreover, data visualisation plays a critical role in deriving insights from stored data. Power BI, integrated with Azure, enables real-time dashboard creation, offering management a comprehensive view of sales trends, customer behaviour, and inventory levels. As "Paws & Whiskers" grows, scalability will be a key factor. Azure's flexible architecture allows for seamless expansion of storage and processing capabilities. Additionally, servers computing options, such as Azure Functions, optimise costs while maintaining high performance, ensuring that the platform can evolve with the business.

This proposal provides a comprehensive strategy for "Paws & Whiskers" to transition to Microsoft Azure, addressing legal requirements, service recommendations, data modelling techniques, and security measures. The adoption of Azure will not only enhance operational efficiency but also empower the business with real-time insights, improved decision-making capabilities, and future scalability. By leveraging Azure's advanced features, "Paws & Whiskers" can modernise its data infrastructure and gain a competitive edge in the pet retail industry.

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.