

**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.

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| What can cloud computing do for us in the real-world? | Cloud computing simplifies our lives by enabling easy access to data, services, and applications over the internet. It powers businesses, enhances technology like streaming platforms, improves healthcare, supports education, fosters innovation, and even helps mitigate disaster risks. It's the backbone of modern digital life. |
| How can it benefit a business? | Cloud computing helps businesses save money, scale resources easily, enable remote work, boost security, foster innovation with advanced tools, and expand globally. It's all about flexibility and efficiency!  Here are quick examples: |
| What’s the alternative to cloud computing? | The alternatives to cloud computing are:   * **On-Premises Computing**: Hosting your own servers and infrastructure in-house. * **Edge Computing**: Processing data closer to its source, like on IoT devices. * **Hybrid Models**: Combining cloud and on-premises systems for flexibility.   Each has its own benefits depending on needs! |
| What cloud providers can we use, what are their features and functions? | Here are some top cloud providers and their features:   * **Amazon Web Services (AWS)**: Offers over 200 services, including AI, IoT, and global scalability. Known for its pay-as-you-go pricing. * **Microsoft Azure**: Integrates seamlessly with Microsoft products and provides enterprise-grade solutions. * **Google Cloud Platform (GCP)**: Excels in data analytics and machine learning capabilities |

# Day 1: Task 2

Please research the below cloud offerings, explain what they are and examples of use cases.

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| Cloud Offerings | Explain what it is | When / how might you use this service in the real-world? |
| IaaS (Infrastructure as a service) | Provides virtualized computing resources like servers and storage. Ideal for hosting websites, app development, and data backups. | **IaaS**: Provides virtual servers and storage for hosting websites, backing up data, or running heavy computations. |
| PaaS (Platform as a service) | Developers can use it to build, test, and deploy applications without managing infrastructure—perfect for startups creating new apps. | **PaaS**: Offers platforms for building and deploying apps—ideal for developers creating software. |
| SaaS (Software as a service) | Common for everyday tools like email (e.g., Gmail), collaboration apps (e.g., Microsoft Teams), or CRM systems (e.g., Salesforce). | **SaaS**: Delivers ready-to-use applications like Gmail or Microsoft Teams for easy, everyday use. |

# 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).

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| Public Cloud | Startups, e-commerce platforms, or small businesses looking for cost-effective, scalable solutions (e.g., hosting websites or applications). |
| Private Cloud | Healthcare, finance, or government institutions needing tight control and data security for sensitive information. |
| Hybrid Cloud | Retailers or large enterprises balancing public-facing operations with secure customer data management. |
| Community Cloud | Universities, research organizations, or government agencies collaborating with shared goals or compliance needs. |

# Day 2: Task 1

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

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| Area | Description | Example |
|  | Gaining access to someone else's computer, network, or data without permission, often referred to as "hacking." This could involve bypassing security measures or exploiting vulnerabilities to access systems. | A person logs into a company’s database using someone else’s credentials without consent. They don't modify or misuse the data but simply access it without permission. |
|  | Accessing a computer system with the purpose of committing another crime. This includes using the unauthorized access to facilitate fraud, theft, or other malicious actions. | A hacker gains access to an online banking system and transfers money from someone else's account to their own. The unauthorized access was intended to commit theft. |
|  | Changing, deleting, or corrupting data or systems without authorization. This includes activities like spreading viruses, deleting files, or deliberately crashing systems. | An individual infects a company's network with ransomware, encrypting files and demanding payment to unlock them. This unauthorized modification disrupts operations and causes significant harm. |

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.

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| Description |
| The Police and Justice Act 2006 expanded the Computer Misuse Act 1990 by adding these powers:   1. Criminalizing Denial-of-Service (DoS) Attacks: It made DoS attacks illegal, addressing the growing threat of system overloads caused by malicious traffic. |
| 1. Penalizing Supply of Hacking Tools: It became an offense to create, distribute, or possess tools designed for unauthorized computer access. |
| 1. Increasing Sentences: The maximum penalty for unauthorized access offenses was raised from six months to two years.   These updates strengthened protections against evolving cyber threats! |

Look at the below website to answer the questions:

<https://www.gov.uk/personal-data-my-employer-can-keep-about-me>

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| Write down three items of data which a company can store about an employee. |
| Personal Information: Such as full name, date of birth, and contact details. |
| Employment Records: Including job title, work history, and performance appraisals. |
| Payroll Details: Information related to salary, tax, and pension contributions. |

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| Give three more examples of data that an employer can only store if they first get the employee’s permission. |
| 1. Health Information: Such as medical conditions or disabilities. |
| 1. Biometric Data: Like fingerprints or facial recognition for security purposes. |
| 1. Criminal Record: Details about past convictions or background checks. |

Conduct further research to answer the below questions.

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| Question | Answer |
| Provide one example of: Copyright infringement | The case of Robin Thicke and Pharrell Williams being sued by Marvin Gaye’s heirs for their song “Blurred Lines”, Which was found to infringe on Gaye’s “Got to Give It Up”   |  | | --- | |  | |
| Provide one example of: Plagiarism | |  | | --- | |  |   Plagiarism is using someone else's work or ideas without proper credit. For example, copying a paragraph from a blog into an essay without citing the source. |
| What are two consequences of copyright infringement and software piracy? | 1. **Legal Penalties**: Fines or imprisonment for violating copyright laws. 2. **Financial Losses**: Creators and businesses lose revenue due to piracy. |
| Give three possible consequences for individuals when using pirated software | 1. **Exposure to Malware**: Pirated software often carries viruses or malicious code, risking data breaches or system damage. 2. **No Support or Updates**: Users miss out on essential patches and updates, leaving systems vulnerable. 3. **Legal Action**: Individuals could face fines or prosecution for software piracy.   The risks far outweigh the benefits! |

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’.

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| **Act number** | **Clause** |
| 1992 | With some exceptions, it is illegal to use unlicensed software |
| 2015 | Any product, digital or otherwise, must be fit for the purpose it is supplied for |
| 1990 | Unauthorised modification of computer material is illegal |
| Not Illegal | It is illegal to create or use a hacking tool for penetration testing |
| 2018 | Personal data may only be used for specified, explicit purposes |
| 1992 | Employers must provide their computer users with adequate health and safety training for any workstation they work at |
| 2006 | It is illegal to distribute hacking tools for criminal purposes |
| 1988 | It is illegal to distribute an illicit recording |
| 2018 | Personal data may not be kept longer than necessary |
| 1990 | Gaining unauthorised access to a computer system is illegal |
| 1992 | Employers must ensure that employees take regular and adequate breaks from looking at their screens |
| 2006 | 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 |
| 2018 | 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.



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| 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.



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| 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.



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| 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:

* **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.

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| **Scenario Background**  "Paws & Whiskers" is a rapidly growing pet shop aiming to modernize its data handling by leveraging Microsoft Azure services. By transitioning from manual methods and spreadsheets to cloud-based solutions, the company seeks to streamline operations, improve data analysis, and enable data-driven decision-making. This shift will enhance efficiency in managing sales, customer information, and inventory while ensuring scalability for future growth.  **Data Laws and Regulations**  **1. GDPR Compliance**  The **General Data Protection Regulation (GDPR)** is a cornerstone for protecting customer data within the European Union (and UK through UK GDPR). Businesses must adhere to the following principles:   * **Lawfulness, Fairness, and Transparency**: Ensure customer data is collected with explicit consent and used only for the stated purposes. * **Data Minimization**: Only collect the information necessary for business operations. * **Security**: Implement robust measures to protect personal data from unauthorized access, leaks, or breaches.   **Real-World Application**: "Paws & Whiskers" must create clear privacy policies, notify customers about data usage, and ensure consent is obtained before processing customer information.  **2. Data Protection Act (DPA) 2018**  The **DPA 2018** enforces data protection standards in the UK, aligning with GDPR while adding UK-specific rules. Key aspects include:   * Limiting data retention periods to prevent unnecessary data storage. * Providing customers with the right to access, modify, or delete their personal information.   **Impact**: The company must ensure its Azure setup allows for easy compliance with these requirements, including features to delete or anonymize outdated data.  **3. Other Industry Standards**   * **Payment Card Industry Data Security Standards (PCI DSS)**: If handling customer payments, compliance with PCI DSS ensures secure processing and storage of payment data. * **Retail-Specific Practices**: As "Paws & Whiskers" operates in retail, following best practices like ensuring customer loyalty programs protect sensitive details will be key.   **Azure Service Recommendations**  **1. Data Storage**  **Azure Blob Storage**: Designed for unstructured data like images or customer transaction records. Its scalability makes it ideal for businesses with growing datasets.   * **Benefits**: Cost-effective and accessible from anywhere.   **Azure SQL Database**: Perfect for structured data like customer profiles, purchase histories, and inventory details.   * **Benefits**: Reliable querying and high performance for real-time access to critical data.   **2. Data Analysis Tools**  **Azure Machine Learning**: Helps analyse customer purchasing patterns to personalize promotions and predict future trends.   * **Example**: Identify which products are most popular and when demand peaks.   **Azure Synapse Analytics**: Combines data sources to deliver insights on inventory, sales, and customer behaviour trends.   * **Example**: Optimize inventory levels to prevent overstocking or shortages.   **3. Data Integration and Automation**  **Azure Data Factory**: Enables the automation of data integration processes, like combining sales and inventory data into a central repository for reporting.   * **Benefits**: Reduces manual work and eliminates errors caused by manual data entry.   **Data Types and Data Modelling**  **1. Data Categories**   * **Customer Demographics**: Names, addresses, contact information. * **Transaction History**: Purchases, payment methods, and total spend. * **Pet Inventory**: Species, stock levels, and pricing. * **Product Categories**: Food, toys, and accessories classifications.   **2. Data Modelling Approach**   * **Relational Model**: Set up interconnected tables for customers, products, and transactions. Each table should have a unique identifier (e.g., a primary key like "Customer"). * **Data Warehouse**: Use for historical and aggregated data, enabling large-scale analysis and reporting on business trends.   **3. Data Formats**   * **CSV**: Simple and widely compatible for raw data imports. * **JSON**: Ideal for structured data exchanged between systems. * **Parquet**: Best for analytics due to its compact storage and fast querying capabilities.   **4.Data Security and Encryption**  **Azure Security Features**:   * **Encryption**: Use Transparent Data Encryption (TDE) to protect Azure SQL databases. * **Access Control**: Role-Based Access Control (RBAC) restricts access to sensitive data, ensuring only authorized staff can view or modify information. * **Network Security**: Implement Azure Virtual Network to isolate sensitive workloads.   **Additional Considerations**  **1. Backup and Disaster Recovery**  **Azure Backup**: Automatically backs up business-critical data, such as customer information and sales records, to ensure minimal disruption during system failures. **Azure Site Recovery**: Enables quick restoration of operations in the event of a disaster, reducing downtime.  **2. Data Visualization**  **Power BI**: Integrates seamlessly with Azure to create detailed, real-time dashboards.   * **Example**: Managers can monitor sales performance and customer trends in a user-friendly format.   **3. Future Scalability**  **Azure's Elasticity**: As "Paws & Whiskers" grows, Azure services can scale to handle larger datasets, more users, and more complex analyses without the need for costly infrastructure upgrades.  **Example**: As the pet shop expands to new locations, Azure can accommodate increased data from additional stores. |

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| **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:

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| **Additional Information** |

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.**